

Biodentine A Bandage to Dentine: A Review

Dr.Darshil Sodha¹, Dr.Dipti Choksi², Dr.Barkha Idnani³, Dr.Nishtha Chauhan⁴

1(Pg Student, Faculty of Dental Science, Dharmsinh Desai University, Nadiad 387001)
 2 (Professor and Head of Department, Faculty of Dental Science, Dharmsinh Desai University, Nadiad 387001)
 3 (Professor, Faculty of Dental Science, Dharmsinh Desai University, Nadiad 387001)
 4 (Pg Student, Faculty of Dental Science, Dharmsinh Desai University, Nadiad 387001)

Submitted: 15-08-2021	Revised: 29-08-2021	Accepted: 31-08-2021

ABSTRACT: The ideal material for dental rehabilitation should have certain unique properties such as adhesion strength, insolubility, dimensional stability, biocompatibility, bioactivity, etc. In order to optimize the care of dental patients, new materials that demand improved efficiency are constantly put in the market. Recently launched, Biodentine has become the "first all-in-one, bioactive and biocompatible dentin replacement material." It eliminates the disadvantages of calcium hydroxide and mineral trioxide aggregate.

Biodentine is a material basically made up of calcium silicate, which has attracted attention in recent years. Biodentine is recommended to be used in different clinical applications and for various procedures like as root perforations repair, apexification procedure, resorptions, retrograde fillings, pulp capping procedures and dentine replacement. Since its launch, considerable research has been carried out on this material, but few reviews contain details and data obtained from the studies. This analysis paper is therefore prepared to give the reader an overview of the results of different content characteristics. The review initially focuses on various parts of material.

KEYWORDS:Biodentine, Pulp Capping, Dentine Bridge, MTA, Pulp Protection, Pulp Vitality

I. INTRODUCTION

Over the last few decades, there has been a surge of interest in restorative materials. Direct composite restorations were used to replace amalgams in small anterior restorations and medium-sized posterior restorations. In contrast to amalgams, resin composites can achieve micromechanical retention through the use of different adhesives. Although, a few disadvantages have been reported with resin-based materials such as wear resistance under high load, shrinkage due to polymerization leading to microleakage and toxic monomers release.^{1,2}



Calcium hydroxide-based materials have been commonly used in direct pulp capping procedures to shield the pulp from the harmful components of resin-based materials. Despite the material's highly alkaline pH, a dentin bridge may develop within 3 months, protecting the underlying pulp from mild to moderate inflammation. However, several tests have shown that this bridge has partial dissolution and tunnel defects. Mineral trioxide aggregate (MTA) was developed as a root-end filling material and direct pulp capping as a result of the recent emphasis on biocompatible materials such as Portland. Tricalcium and dicalcium silicates make up the majority of this material.⁵When used for pulp capping, it stimulates the development of reparative dentin, resulting in the formation of a normal tubular dentin bridge in two months with no signs of inflammation. When used for pulp capping, it stimulates the development of reparative dentin, resulting in the formation of a normal tubular dentin bridge in two months with no signs of inflammation.⁴ However, this content has been



International Journal of Dental Science and Innovative Research (IJDSIR)

IJDSIR : Dental Publication Service Available Online at:www.ijdsir.com

Volume – 4, Issue – 5, September - 2021, Page No. : 130 - 137

Resin infiltration: a micro-invasive approach to white spot lesions

¹Dr.Aabha Rawal, Postgraduate student, Department of Conservative Dentistry and Endodontics, Faculty of Dental Science, Dharmsinh Desai University, Nadiad, Gujarat 387001

²Dr.Dipti Choksi, Professor and Head of the department, Department of Conservative Dentistry and Endodontics, Faculty of Dental Science, Dharmsinh Desai University, Nadiad, Gujarat 387001

³Dr.Barkha Idnani, Professor, Department of Conservative Dentistry and Endodontics, Faculty of Dental Science, Dharmsinh Desai University, Nadiad, Gujarat 387001

⁴Dr.Darshil Sodha, Postgraduate student, Department of Conservative Dentistry and Endodontics, Faculty of Dental Science, Dharmsinh Desai University, Nadiad, Gujarat 387001

Corresponding Author: Dr. Aabha Rawal, Postgraduate student, Department of Conservative Dentistry and Endodontics, Faculty of Dental Science, Dharmsinh Desai University, Nadiad, Gujarat 387001

Citation of this Article: Dr. Aabha Rawal, Dr. Dipti Choksi, Dr. Barkha Idnani, Dr. Darshil Sodha, "Resin infiltration: a micro-invasive approach to white spot lesions", IJDSIR- September - 2021, Vol. – 4, Issue - 5, P. No.130 – 137.

Copyright: © 2021, Dr. Aabha Rawal, et al. This is an open access journal and article distributed under the terms of the creative commons attribution noncommercial License. Which allows others to remix, tweak, and build upon the work non commercially, as long as appropriate credit is given and the new creations are licensed under the identical terms.

Type of Publication: Review Article

Conflicts of Interest: Nil

Introduction

With the advancement in preventive and adhesive techniques in dentistry, newer methods are applied for inhibiting the carious process aiming to preserve the tooth structure. Thus introducing the concept 'Minimally Invasive Dentistry' for preservation of healthy dental structures. It is a systematic respect for the original tissue by replacing and removing with little tissue loss.¹

Enamel demineralization and remineralization are considered as a continuous process. Cavitated lesions occur as a result of demineralization of the hard tissues and destruction of the organic matter of the tooth by production of acid by hydrolysis of carbohydrates in the plaque.² Non cavitated caries lesions show increased porosity within the lesion due to loss of inorganic substance beneath an intact surface layer. When compared with the refractive index of sound enamel (RI 1.65), incipient enamel caries lesions are porous and are filled with air (RI 1.0) and water (RI 1.33). Consequently, due to scattering of reflected light, the lesion looks opaque.³

Recent minimally invasive concepts in Operative Dentistry are focused on the control of the etiological factors using noninvasive and microinvasive strategies. The current modalities for the treatment of early lesions are either invasive or non-invasive in nature. Noninvasive strategies target at arresting or reverting noncavitated enamel caries lesions, microinvasive strategies include barriers that prevent further dissolution of enamel by the acidic challenge from cariogenic bacteria. Two microinvasive procedures are used: (a) pit-and-fissure

Corresponding Author: Dr. Aabha Rawal, ijdsir, Volume – 4 Issue - 5, Page No. 130 - 137

Prevalence of Habit-related Oral Lesions in Patients Visiting Dental College in Central Gujarat

Priti Shah, Kevin Parikh, Mona Shah, Hetul Patel

Department of Oral Medicine and Radiology, Faculty of Dental Science, Nadiad, Gujarat, India.

Abstract

Background: Oral cancer is the sixth most common cancer around the globe and one of the largest groups of cancer in the Indian subcontinent. The incidence and prevalence of oral precancerous lesions are rising due to an increase in number of people consuming tobacco and related products. This study aims to find the prevalence of use of tobacco, areca nut, and related products and associated oral mucosal lesions. Materials and Methods: It is a hospital-based prevalence study conducted at dental college in Central Gujarat. The study population were 1143 subjects having tobacco, areca nut, and related products associated oral mucosal lesions. A standardized extraoral and intraoral examination was performed by trained dental surgeons. All the details were entered into the specially designed pretested "Pro forma." The unpaired "r" tests, Chi-square tests, and Fisher's exact test were applied as required. $P \le 0.01$ was considered statistically significant. Results: A total of 44,681 subjects (with a male-to-female ratio of 1.2:1) of above 15 years were examined. Among them, s total of 4667 (10.45%) subjects were having adverse habits in which a total of 1143 (24.5%) subjects were having oral habit-related lesions. Bidi smoking was a most prevalent habit (29.83%) followed by gutkha chewing (25.10%). Maximum patients were having habit of smoking from 11 to 15 years with frequency of 11 to 20 times/day, while in case of chewing, most of the patients were having habit for <5 years with frequency <10 times/day still more incidence of precancerous lesions were developed because of tobacco chewing. Conclusion: Prevalence rate of our study does not reflect the whole population but may prove valuable in planning future oral health studies. Increase in prevalence of oral submucous fibrosis, especially in lower age group in our study, is alarming.

Keywords: Prevalence study, Oral precancerous lesions, Oral cancer, Tobacco, Areca nut.

INTRODUCTION

Oral cancer is a global health problem with rising prevalence and mortality rates. It constitutes one of the largest groups of cancer in the Indian subcontinent with an incidence rate as high as 30–40%.^[1] The tobacco and areca nut habit have a major social and cultural role in communities throughout the Indian subcontinent, Southeast Asia, and parts of the Western Pacific.^[2] Mortality attributable to tobacco has been estimated to be 1 million every year in India, projected to be 1.5 million by 2020.^[1] India is the third largest producer and consumer of tobacco.^[4] Kheda district is one of the leading tobacco growing areas of India.^[9]

The adverse health effects associated with tobacco and areca (betel) nut use include addiction, oral and oropharyngeal cancer, and oral precancerous lesions and conditions.^[6,7] The early diagnosis and treatment of such lesions would go a long way in improving the overall health status of the population and preventing the otherwise irreversible condition.^[8]

Access this article online	
Website: www.jrad.co.in	
DOI: https://doi.org/10.53064/jrad.2021.12.4.19	

© 2021 Journal of Research and Advancement in Dentistry

Lack of adequate information to form a basis of effective preventive strategies prompted us to conduct this study with the objective of finding prevalence of use of tobacco and areca nut, their commercial preparations and different oral mucosal lesions associated with their use among the patients visiting OPD of Faculty of Dental Science, DDU, Nadiad, in Kheda district, Gujarat. Furthermore, their association with age, duration, and frequency of habits was studied.

MATERIALS AND METHODS

The present study was carried out in the Department of Oral Medicine and Radiology, Faculty of Dental Science, Dharmsinh Desai University, Nadiad, Gujarat. All the cases

	Address for correspondence: Takshil D. Shah, Department of Prosthodontics, Faculty of Dental Science, Nadiad, Gujarat, Gujarat, India. Email: shahtakshil1991@gmail.com
Received	Mar. 23, 2021; Accepted: Apr. 10, 2021; Published: Jun. 29, 2021
This is an op	en access journal, and articles are distributed under the terms of the Creative
Commons	Attribution-NonCommercial-ShareAlike 4.D License, which allows others to
remix, twee	ik, and build upon the work non-commercially, as long as appropriate credi
is given and	4 the new creations are licensed under the identical terms.
How to o	tite this article: Shah P, Parikh K, Shah M, Patel H. Prevalence of
Habit-Re	elated Oral Lesions in Patients Visiting Dental College in Central
Guiarat	J Res Adv Dent 2021;12:4:83-86.

83

Efficacy of Collagen Membrane Graft in Intraoral Surgery - An Evaluative Study

Pratap N. Movaniya, Tushar R. Makwana, Nimisha N. Desai, Kalpesh G. Makwana, Hirakben B. Patel Department of Oral and Maxillofacial Surgery, Karnavati School of Dentistry, Gandhinagar, Gujarat, India

Abstract

Introduction: Bovine-derived collagen membrane is usually and regularly used as a temporary cover or dressing for extraoral wounds and burns. It has wide applications because of its usefulness and biocompatibility. This has provoked us to do a study with the use of collagen membrane even for minor intraoral surgical defects. The aim of this evaluative study was to evaluate the clinical efficacy of collagen membrane in intraoral wounds created by removal of various soft tissue lesions. **Materials and Methods:** A total of 25 healthy patients (16 males and 9 females) were taken for this study. This study was confined to secondary defects of the oral mucosa, which occur after excision of premalignant lesions and other conditions, such as benign lesions, reactive proliferations, and incisional biopsy wounds. Only those lesions that were sufficiently large and could not be closed primarily were included in the study. **Results:** The results were evaluated on the day of surgery and in the postoperative period. The usefulness of collagen membrane as an intraoral temporary wound dressing material to promote haemostasis, relieve pain, induce granulation, and assist in rapid epithelialization at the wound site and prevent infection, contracture, scarring, and donor-site morbidity was evaluated, and finally, the efficacy of collagen membrane was tested by the use of Chi-square test and P < 0.001, which is a statistically and clinically significant value. **Discussion:** Collagen membrane was observed as both biological dressing material and drug carrier. It was found to be a suitable alternative to other graft materials mentioned for the repair of defects in the mucous membrane created by surgical excision of lesions. Therefore, when used judiciously in a controlled clinical situation, collagen membrane is biologically acceptable in nature. It is an alternative to autologous grafts rather than a replacement of other grafts used in the oral cavity.

Keywords: Collagen membrane, grafting, oral mucosa, wound healing

INTRODUCTION

42

Oral and maxillofacial surgical procedures often result in open wounds. A dressing material should cover these wounds to prevent microbial infection, foreign material contamination, wound contracture and to improve healing. The existence of a variety of wound types with varied healing modes and phases led to the evolution of different types of wound dressings.^[1-4] Wound dressings before the 1960s were considered passive products that had a minimum role in the healing process.^[1]

Currently, a variety of approaches have been used including split and full-thickness skin grafts, oral mucosa free grafts, oral connective tissue grafts, and the tissue-engineered grafts.^[1-4] One of these materials is collagen which is extensively used as temporary dressing material in a lot of surgical fields.^[5-7]

Various uses of collagen in intraoral surgeries are as an interpositional graft material during palatoplasty, for guided

A	ccess this article online
Quick Response Code:	Website: www.amsjournal.com
	DOI: 10.4103/ams.ams_192_20

bone regeneration during maxillary sinus lift for inducing bone formation along with/without certain medicaments, bone augmentation of posterior atrophic mandibular ridge for placement of dental implants. It can also be used as a reconstructive material for orbital floor fractures, in treatment of localized gingival recession, as a scaffold in tissue engineering to generate dental pulp, for coverage of small intraoral soft tissue defects of the oral cavity, and much more. Collagen is also used as a medium for culturing cells such as osteoblasts.^[8,9]

Address for correspondence: Dr. Pratap N. Movaniya, Department of Oral and Maxillofacial Surgery, Karnavati School of Dentistry, Uvarsad, Gandhinagar - 382 422, Gujarat, India. E-mail: drpratapm@gmail.com

Received: 21-05-2020 Accepted: 14-12-2020 Last Revised: 04-12-2020 Published: 24-07-2021

This is an open access journal, and articles are distributed under the terms of the Creative Commons Attribution-NonCommercial-ShareAlike 4.0 License, which allows others to remix, tweak, and build upon the work non-commercially, as long as appropriate credit is given and the new creations are licensed under the identical terms.

For reprints contact: WKHLRPMedknow_reprints@wolterskluwer.com

How to cite this article: Movaniya PN, Makwana TR, Desai NN, Makwana KG, Patel HB. Efficacy of collagen membrane graft in intraoral surgery - An evaluative study. Ann Maxillofac Surg 2021;11:42-8.

© 2021 Annals of Maxillofacial Surgery | Published by Wolters Kluwer - Medknow

Unilateral Condylar Fracture with Review of Treatment Modalities in 30 Cases - An Evaluative Study

Hirakben Bhagyendrakumar Patel, Nimisha N. Desai, Ridhi G. Matariya, Kalpesh G. Makwana, Pratap N. Movaniya Department of Oral and Maxillofacial Surgery, Karnavati School of Dentistry, Gandhinagar, Gujarat, India

Abstract

Introduction: The treatment of subcondylar mandible fractures is a topic of debate and can be variable even though these fractures are commonly seen. The present study aimed at evaluation of various treatment modalities for unilateral condylar fracture in adults. Materials and Methods: Thirty patients with unilateral condylar fractures between the age of 18 and 60 years were evaluated. Treatment protocol included closed reduction for 15 patients and open reduction for 15 patients. Results: Assessment was done functionally for maximum interincisal mouth opening, deviation on maximum interincisal mouth opening, occlusion and facial nerve function, and radiologically for ramus height shortening. In general, there were no statistically significant differences between closed and open methods. Discussion: Both the treatment options for condylar fractures. Although the open group, in general, showed similar outcomes, this treatment should be reserved for limited indications. The present study has confirmed that both treatment options can yield acceptable results. On clinical examination, there was no significant difference of occlusal disturbances or in the degree of pain perception.

Keywords: Closed reduction, open reduction, unilateral mandibular condylar fracture

INTRODUCTION

The mandible is the most prominent facial bone and a common site of trauma, constituting 12-56% of facial fractures.^[1] Condylar fractures account for about 29-52% of all mandibular fractures.^[1,2] Injury to the condylar region deserves special consideration apart from the rest of the mandible because of its unique anatomy and healing potential.^[3]

Treatment of condylar fractures primarily aims at the re-establishment of undisturbed joint function with physiologic occlusion and recovery of the osseo-discoligamentary structures. Complications of trauma to the condylar region are far reaching in their effects and not always immediately apparent. Disturbance of occlusal function, deviation of the mandible, internal meniscal derangements of the temporomandibular joint (TMJ), ankylosis of the joint with a resultant inability to move the jaw, and growth disruption are all sequel of this injury.^[4] Thus, proper assessment and choosing an appropriate treatment strategy is of paramount importance.

Broadly, the two main treatment modalities for fractured condyle are defined as conservative (closed reduction) or

А	ccess this article online	
Quick Response Code:	Website: www.amsjournal.com	
	DOI: 10.4103/ams.ams_312_20	

surgical (open reduction and direct fixation).^[4] Although there are equal studies supporting both open and closed reductions, there is still a dilemma about clear guidelines for treatment and precise functional evaluation of surgical treatment of condylar fractures and long-term complications associated with closed reductions. For any given patient, fracture, or incident, advantages and disadvantages are specific to each potential treatment plan.

In this study, 30 patients of unilateral condylar fracture either alone or with associated other mandibular fractures have been included. Patients were treated either by closed or open reduction and the results were then evaluated.

Address for correspondence: Dr. Hirakben Bhagyendrakumar Patel, Department of Oral and Maxillofacial Surgery, Karnavati School of Dentistry, Uvarsad, Gandhinagar - 382 422, Gujarat, India. E-mail: hirakpatel24@gmail.com

Received: 09-08-2020	Last Revised: 02-03-2021	
Accepted: 10-03-2021	Published: 24-07-2021	

This is an open access journal, and articles are distributed under the terms of the Creative Commons Attribution-NonCommercial-ShareAlike 4.0 License, which allows others to remix, tweak, and build upon the work non-commercially, as long as appropriate credit is given and the new creations are licensed under the identical terms.

For reprints contact: WKHLRPMedknow_reprints@wolterskluwer.com

How to cite this article: Patel HB, Desai NN, Matariya RG, Makwana KG, Movaniya PN. Unilateral condylar fracture with review of treatment modalities in 30 cases - An evaluative study. Ann Maxillofac Surg 2021;11:37-41.

© 2021 Annals of Maxillofacial Surgery | Published by Wolters Kluwer - Medknow

37

Case Report



J Res Adv Dent 2021:11:3:1-6.

1	Diagnostic Dilemma in Maxillary Osteomyelitis: A Case Report
2	
3	Bijal Bhavsar ^{1*} Hiren Patel ² Haren Pandya ³ Hitesh Dewan ⁴ Urvi Shah ⁵ Palak Mehta ⁶
4	
5	¹ Readert, Department of Oral and Maxillofacial Surgery, Faculty of Dental Sciences, Dharmsinh Desai University, Nadiad, India.
6	² Dean, Department of Oral and Maxillofacial Surgery, Faculty of Dental Sciences, Dharmsinh Desai University, Nadiad, India.
7	³ Professor, Department of Oral and Maxillofacial Surgery, Faculty of Dental Sciences, Dharmsinh Desai University, Nadiad, India.
8	⁴ Professor, Department of Oral and Maxillofacial Surgery, Faculty of Dental Sciences, Dharmsinh Desai University, Nadiad, India.
9	⁵ Reader, Department of Oral and Maxillofacial Surgery, Faculty of Dental Sciences, Dharmsinh Desai University, Nadiad, India.
10	⁶ PG Resident, Department of Oral and Maxillofacial Surgery, Faculty of Dental Sciences, Dharmsinh Desai University, Nadiad, India.
11	

12 ABSTRACT

13 Background: Maxillary osteomyelitis is rare compared to mandibular osteomyelitis owing to its extensive blood 14 supply and unique structure. We present case report of maxillary osteomyelitis, where clinical, radiographical, 15 histopathological features were perplexing, hence leading to dilemma in diagnosis. A 62-year-old male patient 16 came with chief complain of painful swelling near his left maxillary molars along with pus discharge. His main 17 concern was cessation of pus discharge and removal of the pathology without long-term morbidity. On 18 examination, multiple draining sinuses were present with segmental mobility of left maxillary arch with unusual 19 paper-thin bone texture. Incisional biopsy suggested tuberculous osteomyelitis. After initial biopsy Anti Koch 20 therapy was initiated. Later surgical excision and debridement was performed which led to final diagnosis of 21 fungal osteomyelitis. To establish definitive treatment plan, it is necessary to assess credibility of current

22 methods of investigations.

23 Keywords: Maxilla; osteomyelitis; tuberculosis; case report.

24 INTRODUCTION

25 Osteomyelitis" (OM) is inflammation of bone. In 26 maxillofacial skeleton, it occurs when both 27 medullary and bone cortical undergoes 28 inflammatory process¹. Thus, osteomyelitis is 29 inflammation of basal and alveolar bone². Mandible 30 is more commonly invaded by infection³. However, 31 OM of maxilla is a rare entity due to its rich 32 vascularity⁴.

33 **CASE REPORT**

34 Patient concerns

35 A 62-year-old male with complaint of swelling near 36 upper left posterior teeth since one month came to 37 our centre. The patient's history revealed pus 38 discharge since eight days from the same region, 39 forming multiple draining sinuses. Patient was 40 known case of Type II Diabetes, on medication since 41 two years [Tab Glynase MF (USV private limited) 1 42 BD]. Patient had fluctuating glycaemic control despite medication. Patient had no deleterious 43 44 habit.

45 On clinical examination a tender swelling was 46 present over his palate in relation to left maxillary 47 molars approximately 1.5 x 1.5 cm in size. Multiple 48 draining sinuses were present with active pus 49 discharge in relation to 24, 25, 26 region (figure 1). 50 On digital palpation, segmental mobility of the left 51 posterior maxillary arch was noted which was 52 unusual, the texture of bone was paper-thin bone.

53 Diagnostic aids

54 Basic investigations revealed, Haemoglobin (Hb) 55 10.5gm/dl, high neutrophil count. Erythrocyte

56 sedimentation rate (ESR) value was very high, 58

Received: Feb. 13, 2021: Accepted: Mar. 17, 2021 *Correspondence Dr. Bijal Bhavsar. Department of Oral and Maxillofacial Surgery, Faculty of Dental Sciences, Dharmsinh Desai University, Nadiad, India. Email: bhavsar_bijal@rediffmail.com

Copyright ©2021

www.jrad.co.in



Volume 5 Issue 8 August 2021

Is Transition to E-Learning Effective amongst Dental Students during Covid-19 Era??

Urvi Shah, Dhwani Ranveria*, Hiren Patel, Haren Pandya, Hitesh Dewan and Bijal Bhavsar

Department of Oral and Maxillofacial Surgery, Faculty of Dental Sciences, Dharmasinh Desai University, Nadiad, Gujarat, India

*Corresponding Author: Dhwani Ranveria, Lecturer, Department of Oral and Maxillofacial Surgery, Faculty of Dental Sciences, Dharmasinh Desai University, Nadiad, Gujarat, India. Received: June 26, 2021 Published: July 28, 2021 © All rights are reserved by Dhwani Ranveria., *et al.*

Abstract

Background: Dental education has more or less relied upon traditional classroom teaching where a face to face interaction exists amongst educators and students. However, emergence of worldwide pandemic due to covid-19 as declared by WHO in January 2020 has necessitated the need of social distancing. Consequently, all the education institutes have faced a dire situation of conducting the studies online via virtual classrooms, dentistry being no exemption.

Material and Method: To analyze the impact of e learning among dental students a survey was carried out amongst undergraduate students of various dental colleges. Structured questionnaire was prepared in Google form including 15 questions and circulated amongst them. The collected data was tabulated using Microsoft excel. After that relevant Chi-square test was performed and the results were analyzed. Some results are shown in absolute percentages.

Results: In our study 78.4% dental students found virtual classrooms helpful for study during this covid-19 era.

Conclusion: Practical knowledge is utmost important in dentistry though when everything was shut down and social distancing was of great necessity for the sake of survival of individuals virtual classrooms were found helpful. Well-structured implementation of virtual study is essential to be incorporated in dental curriculum for better synchronous format that is formulated keeping the best interest of students in mind.

Keywords: Transition; E-Learning; Dental Students; Covid-19

Introduction

Commensurate with the advances in digital world, Pedagogical spectrum in dentistry has been implementing digital tools within its armamentarium depending upon their efficacy and availability. These applications range from web based knowledge transfer to using practical oriented trainings in terms of using digital radiography, use of 3D models, CAD-CAM based impression taking and so on. That being said, traditional classroom teaching is still the preferred mode of education delivery across the dental institutes in India, with little inclination to shift towards an online format [1].

However, the global crisis due to Covid 19 pandemic in 2020 (as declared by WHO) posed an unprecedented challenge to the edu-

cation sector as it led to a shutdown of the campuses thus severing the physical connect between the faculty and students [2].

As per DCI advisory issued on 16th April 2020 all the professional educational institutes were asked to close completely or suspend classes and offer e-learning and work from home, maintain social distancing. The educators were instructed to continue dental education using various digital platforms as per availability [3].

Aiming to cope with this emergency, the dental institutes saw a sudden shift from traditional classroom learning to computer-based learning which might be one of the largest educational experiments to date [2].

Citation: Dhwani Ranveria, et al. "Is Transition to E-Learning Effective amongst Dental Students during Covid-19 Era??". Acta Scientific Dental Sciences 5.8 (2021): 128-134.

Scanned with CamScanner

ORAL SIGNS AS A DIAGNOSTIC TOOL FOR MORBID DISEASE

Author: Dr Bijal Bhavsar, Dr Hiren Patel, Dr Haren Pandya,

Dr Bhavinkumar D Masariya

ABSTRACT:

Introduction

Many systemic diseases present with signs and symptoms related to oral cavity. Since these oral manifestations are detectable early in the progress of such diseases, they often contribute to the diagnosis of the corresponding systemic disease like leukemia[1]. Gingival and periodontal lesions are relatively frequent, often associated with mobility of the offending teeth and swelling. In such patients extraction sockets may not heal well and may lead to further progression of the infection and complications. The clinical manifestation of gingival enlargement differs based on its etiology.

ORIGINAL STUDY

Periodontics

A quesstionaire survey on understanding of the possible factors that could contritube to the student's successful performance in the clinical posting during undergraduate training

Gunjan Barot¹, Krupa Amin², Shalini Gupta³

Abstract

Undergraduate academic years are very important in the dental professional life. It forms the basis of his/her future clinical skills. As these years are crucial; one really needs to pay attention to minute factors that could accentuate the excellence of the clinical skills. These factors might not seem that significant but if considered can bring a major change in student's clinical life. Nowadays, abundant literature is found upon such survey for the specialty students, but this survey focuses upon the factors and the solutions to the problems that could lead to successful performance in clinical posting during undergraduate training.

Aim

To come out with the factors which could help to understand and improve the experience and treatments given by undergraduate students in their clinical postings.

Materials and Methods

The present study is a self-designed questionnaire based cross-sectional study performed among the undergraduate students (third year, fourth year and internship) of the DCI registered colleges of Gujarat. A digital version of questionnaire was prepared and sent to the subjects via E-mails and through generated Google form links.

Results

A huge range of undergraduate students of third year (29.3%), fourth year (38.3%) and internship (32.4%) participated in the survey. Majority of the subjects (70.3%) finds faculty the best option for gaining knowledge and understanding in the clinics, while 59% of the subjects feel stress to be reduced via small breaks in between as a necessity. In the digitalized era 62.1% of the subjects feel the patient's records to be kept in both the hard as well as the soft copies. 81.3% of the respondents showed positive response towards extensive learning.

Summary and Conclusions

Many of the small factors that extracted during the survey should be considered and given a thought as small changes during the academic clinical years can lead to better professional clinical skills tomorrow.

Key Words

Clinics, Knowledge, Patient, Skills, Stress, Undergraduate Students.

JIDA - Journal of Indian Dental Association - Vol 15 - Issue 8 - August 2021

1. Intern, BDS

2. Intern, BDS

3. Senior Professor, MDS, Periodontics

Faculty of Dental Sciences Dharmsinh Desai University Nadiad, Gujarat



DOI: 10.33882/JIda.15.29902

How to cite this article: Gunjan Barot, Krupa Amin, Shalini Gupta. A quesstionaire survey on understanding of the possible factors that could contritube to the student's successful performance in the clinical posting during undergraduate training .JIDA 2021; XV; 13-19. https://doi.org/10.33882/jida.15.29902.

This is an open-access article distributed under the terms of the Creative Commons Attributon-Non Commercial-Share Alike 4.0 License, which allows others to remix, tweak, and build upon the work non-commercially, as long as the author is credited and the new creations are licensed under the identical terms

REVIEW

Taylor & Francis

A review on synthetic investigation for quinoline- recent green approaches

Ashish Patel^a, Stuti Patel^a, Meshwa Mehta^a, Yug Patel^a, Rushi Patel^a, Drashti Shah^a, Darshini Patel^a, Umang Shah^a, Mehul Patel^a, Swayamprakash Patel^a, Nilay Solanki^a, Tushar Bambharoliya^b, Sandip Patel^c, Afzal Nagani^d, Harnisha Patel^d, Jitendra Vaghasiya^d, Hirak Shah^d, Bijal Prajapati^d, Mrudangsinh Rathod^d, Bhargav Bhimani^c, Riddhisiddhi Patel^f, Vashisth Bhavsar^a, Brijesh Rakholiya^a, Maitri Patel^a and Prexa Patel^a

^aRamanbhai Patel College of Pharmacy, Charotar University of Science and Technology, CHARUSAT- Campus, Changa, Anand, India; ^bNorth Carolina State University, North Carolina, USA; ^cL.M.College of Pharmacy, Department of Pharmacology, Ahmedabad, India; ^dDepartment of Pharmaceutical Chemistry, Parul University, Vadodara, India; ^ePiramal Pharma Limited, Pharmaceutical Special Economic Zone, Ahmedabad, India; ^fDepartment of Pharmaceutical Sciences, Saurashtra University, Rajkot, India; ^gFaculty of Pharmacy, Dharmsinh Desai University, Nadiad. India

ABSTRACT

Quinolines are a prominent heterocyclic motif and crucial building blocks in creating physiologically active compounds. Due to the fast development of novel medicines with a quinoline nucleus, numerous research papers have been published in a short amount of time. Therefore, to comprehend the present state of the quinoline nucleus in medicinal chemistry science, it is necessary to combine new information with older data. So far, several traditional synthesis techniques have been reported in the literature to synthesize this scaffold. Pfitzinger, Gould-Jacob, Friedlander, Skraup, Doebner-von Miller, and Conrad-Limpach are examples of old synthetic methods. However, they need expensive and demanding conditions, such as high temperature, the use of non-biodegradable chemical compounds degrade the ecosystem, create irritation or harm as pollutants, and represent a threat to the environment. However, traditional synthesis processes need a difficult and time-consuming apparatus set-up, resulting in high costs and pollutants. As a result, scientists are presently developing new and innovative techniques to decrease the use of chemicals, solvents, and catalysts, which are detrimental to both humans and the environment. Therefore, we have attempted to shed light in this current review on various reactions to produce quinolines and their derivatives using various green synthetic methods.



ARTICLE HISTORY Received 22 September 2021 Accepted 4 April 2022

KEYWORDS Quinoline; green chemistry; microwave synthesis; solvent-free approach; multicomponent reaction

1. Introduction

Heterocyclic compounds have been extensively used in medicinal chemistry. Their uses are escalating by the day since they are being analyzed in multifold architectures of the bioactive compound. Quinoline and derivatives belong to the N-containing heterocycles family that has lately attracted the interest of researchers due to their wide variety of applications, such as the diverse spectrum of activities and their numerous uses in industrial and synthetic organic chemistry (1–5). Outpoline is a

CONTACT Ashish Patel ashishpatel2388@gmail.com R Ramanbhai Patel College of Pharmacy, Charotar University of Science and Technology, CHAT USAT- Campus, Changa-388421, Anand, Gujarat, India © 2022 The Author(s). Published by Informa UK Limited, trading as Taylor & Francis Group This is an Open Access article distributed under the terms of the Creative Commons Attribution License (http://creative.commons.org/incenses/by/JCA-websch.nerm/h.uk.res/Dt. Dure distribution, and reproduction in any medium, provided the original work is properly cited.



Journal of Pharmaceutical Research International

33(60B): 570-584, 2021; Article no.JPRI.81465 ISSN: 2456-9119 (Past name: British Journal of Pharmaceutical Research, Past ISSN: 2231-2919, NLM ID: 101631759)

Development and Validation of RP-HPLC Stability Indicating Method for Simultaneous Estimation of Dolutegravir and Lamivudine in Bulk and Pharmaceutical Dosage Form

Khushboo Patel ^a, Ujashkumar Shah ^a, Darshak Patel ^a, Jayvadan K. Patel ^a and Tejas B. Patel ^b

* Faculty of Pharmacy, Nootan Pharmacy College, Sankalchand Patel University, Visnagar-384315, Gujarat, India.
b Faculty of Pharmacy, Dharmsinh Desai University, Nadiad, Gujarat, India.

Authors' contributions

This work was carried out in collaboration among all authors. Author KP designed the study, performed the statistical analysis, wrote the protocol, and wrote the first draft of the manuscript. Authors US and DP managed the analyses of the study. Authors JKP and TBP managed the literature searches. All authors read and approved the final manuscript.

Article Information

DOI: 10.9734/JPRI/2021/v33i60B34656

Open Peer Review History:

This journal follows the Advanced Open Peer Review policy. Identity of the Reviewers, Editor(s) and additional Reviewers, peer review comments, different versions of the manuscript, comments of the editors, etc are available here. https://www.sdiarticle5.com/review-history/81465

Original Research Article

Received 15 October 2021 Accepted 20 December 2021 Published 22 December 2021

ABSTRACT

Aims: Dolutegravir (DVR) and Lamivudine (LMN) is anti-viral drug combination used in treatment of HIV-I infection. FDA approved dosage regime for DVR and LMN is 50mg and 300mg respectively. The aim of present research work is to develop and validate a reverse phase high performance liquid chromatography (RP-HPLC) method for simultaneous estimation of DVR and LMN in bulk and pharmaceutical dosage forms. Further the stability indicating nature of method has been evaluated.

Methodology: A chromatographic separation was achieved on Hypersil BDS C18, 250×4.6 mm 3.5 µm particle size, column as stationary phase and mobile phase composed of Phosphate Buffer pH 3.0: Acetonitrile (60:40%V/V) with flow rate of 1.5mL/min with 20µL injection volume. The analytes were estimated at 232nm using PDA detector. The DVR and LMN solutions were exposed to various forced degradation stress conditions to evaluate the stability behavior of the product. The method was also validated as per ICH Guideline (Q2R).

*Corresponding author: E-mail: shahujashkumar@gmail.com;

Journal of Pharmaceutical Research International



33(43A): 37-46, 2021; Article no.JPRI.73176 ISSN: 2456-9119 (Past name: British Journal of Pharmaceutical Research, Past ISSN: 2231-2919, NLM ID: 101631759)

Development, Validation and Forced Degradation Study of Emtricitabine and Tenofovir Alafenamide in its Pharmaceutical Dosage Form Using RP-HPLC

Khushboo Patel^{1*}, Ujashkumar Shah¹, Hirak Joshi¹, Jayvadan K. Patel¹ and Tejas B. Patel²

¹Faculty of Pharmacy, Sankalchand Patel University, Visnagar-384315, Gujarat, India. ²Faculty of Pharmacy, Dharmssinh Desai University, Nadiad, Gujarat, India.

Authors' contributions

This work was carried out in collaboration among all authors. Author KP designed the study, performed the statistical analysis, wrote the protocol, and wrote the first draft of the manuscript. Authors US and HJ managed the analyses of the study. Authors JKP and TBP managed the literature searches. All authors read and approved the final manuscript.

Article Information

DOI: 10.9734/JPRI/2021/v33i43A32462 <u>Editor(s)</u>. (1) Rafik Karaman Al-Quds University Medical School, Palestine. <u>Reviewers</u> (1) Naveen Kumar, Lady Hardinge Medical College and Associated Hospital, India. (2) Pattana Sripalakit, Naresuan University, Thailand. Complete Peer review History: <u>https://www.sdiarticle4.com/review-history/73176</u>

Original Research Article

Received 26 June 2021 Accepted 01 September 2021 Published 03 September 2021

ABSTRACT

Aims: The present research was aimed to develop and validate a reverse phase high performance liquid chromatographic (RP-HPLC) method for the quantification of Emtricitabine (EMT) and Tenofovir Alafenamide (TEN) in combination.

Methodology: Separation was achieved under optimized chromatographic condition on an Inertsil C18, 250 x 4.6 mm, 5µm column. Various composition of mobile phase was tried. Separation of EMT and TEN was started with Methanol: Buffer and Methanol finally using solvent system of Buffer (pH 3.5) and Methanol in ratio of (30:70) and flow rate adjust at 1.0 ml/min was used as solvent system, the detection was carried out at 262nm using Shimazdu UV-visible detector. The mobile phase run time for the developed analytical method was 10 minutes.

Results: The standard curve was found linear in the concentration range of 20-60 μ g/ ml (0.09994) and 2.5-7.5 μ g/ ml (r^2 -0.9992) for EMT and TEN respectively. The %RSD was found to the 0.80-0.95% and 0.63-1.09 for EMT and TEN respectively. Percentage (%) recoveries for LML and

*Corresponding author: E-mail. khushbu0118@gmail.com.



Available online at www.sciencedirect.com





IFAC PapersOnLine 55-1 (2022) 715-721

Fuzzy Logic Based Metaheuristic Algorithm for Optimization of Type-1 Fuzzy Controller: Fault-Tolerant Control for Nonlinear System with Actuator Fault * Himanshukumar R. Patel* Vipul A. Shah**

* Department of Instrumentation and Control Engineering, Faculty of Technology, Dharmsinh Desai University, Nadiad-387001, Gujarat, India. (e-mail: himanshupatel.ic@ddu.ac.in). ** Department of Instrumentation and Control Engineering, Faculty of

Technology, Dharmsinh Desai University, Nadiad-387001, Gujarat, India. (e-mail: vashah.ic@ddu.ac.in)

Abstract: This research offers a fuzzy-based harmonic search (HS) metaheuristic technique for optimizing type-1 fuzzy controller for Fault-Tolerant Control (FTC) for nonlinear level control application subject to two uncertainties (i.e. actuator fault and external process disturbances), using type-1 and interval type-2 fuzzy-based HS algorithms. The effectiveness of a fuzzy logic-based adaptive HS algorithm in a nonlinear two-tank level control process with the primary actuator has dwindled (LOE). The work key contribution is the discovery of the best technique for constructing an optimal vector of values for the fuzzy controller's membership functions (MFs) optimization. This is made to improve dynamic response by bringing the process value of the two-tank level control process close to the target process value (set-point). It's worth noting that the type-1 fuzzy controller's optimized MFs use an interval type-2 fuzzy system for parameter adaptation of the HS algorithm, which can handle greater uncertainty than a type-1 fuzzy system. In this case, the limiting MFs of interval type-2 fuzzy sets are type-1 fuzzy sets, which define the footprint of uncertainty (FOU). Simulation results show that FHSO using an interval type-2 fuzzy system in the optimal design of a type-1 fuzzy controller.

Copyright © 2022 The Authors. This is an open access article under the CC BY-NC-ND license (https://creativecommons.org/licenses/by-nc-nd/4.0/)

Keywords: Harmonic Search algorithm, Fuzzy controller, Type-2 fuzzy system, Fuzzy sets

1. INTRODUCTION

Fuzzy controllers are presently being optimized using metaheuristic algorithms, and these controllers need to be optimized because they frequently do not attain the best performance possible in real-world applications. Because they use the original concept of fuzzy sets, these controllers are known as type-1 fuzzy logic controllers (T1 FLCs) Zadeh (1965).Lotfi Zadeh presented fuzzy logic for the first time in 1988 and presented Zadeh (1988), when he explored fuzzy sets (FSs) and fuzzy logic (FL). In this circumstance, the members of a set are given a numeric value as a measurement of the uncertainty in the socalled membership functions. The membership functions of a fuzzy set's linguistic variable are discussed. Type-2 fuzzy logic was created with the purpose of solving more challenging problems, i.e., circumstances with a higher degree of uncertainty, than type-1 fuzzy logic can handle Zadeh (1996).

Zadeh created Type-2 fuzzy sets as an expansion of standard fuzzy sets (type-1). The membership degrees of a type-2 fuzzy collection are also ambiguous. Because its secondary membership function is only one subset, a type-1 fuzzy set is a special case of a type-2 fuzzy set in this perspective Liang and Mendel (2000).Type-2 fuzzy logic systems can manage more uncertainty because they are made up of type-1 fuzzy logic systems. The articles in Patel and Shah (2021a,b,c, 2019c,d,e) show how type-2 fuzzy systems may be used to handle a wide range of control problems with outstanding results.

Type-1 fuzzy systems have already been optimized using metaheuristic algorithms; for example, the optimization of type-1 fuzzy controllers is investigated in Lagunes et al. (2019), which uses the firefly technique to optimize fuzzy controllers of autonomous mobile robots. The dynamic alteration of the most critical parameters for the GSO algorithm's operation was discussed in Bernal et al. (2019). GSO algorithm was also utilized to optimize a fuzzy controller for an autonomous robot following a trajectory in Bernal et al. (2019). The GSO algorithm was also employed in the optimization of the liquid level fuzzy controller in Bernal et al. (2020).

Alternative metaheuristic techniques are used in other studies to optimize fuzzy controllers. Wagner and Hagras (2007) uses the genetic algorithm (GA) to evolve the

2405-8963 Copyright © 2022 The Authors. This is an open access article under the CC BY-NC-ND license.

^{*} The author(s) received funding for the ACODS-2022 registration fees from Dharmsinh Desai University, Nadiad-387001, Gujarat, India.

Fuzzy-based metaheuristic algorithm for optimization of fuzzy controller: fault-tolerant control application

Himanshukumar Rajendrabhai Patel Department of Instrumentation and Control Engineering, Faculty of Technology, Dharmsinh Desai University, Nadiad, India Fuzzy-based metaheuristic algorithm

Received 15 September 2021 Revised 21 October 2021 5 November 2021 26 November 2021 21 December 2021 Accepted 21 December 2021

Abstract

Purpose – Fuzzy-based metaheuristic algorithm is used to optimize the fuzzy controllers for the nonlinear level control system subject to uncertainty specially in the main actuator that has lost effectiveness (LOE). To optimize the fuzzy controller, type-1 harmonic search (HS) and interval type-2 (HS) will be used.

Design/methodology/approach – The type-1 and type-2 fuzzy-based HS algorithms are designed for optimization of fuzzy controllers for Fault-Tolerant Control (FTC) applications, and this research proposes a fuzzy-based HS metaheuristic method. The performance of a fuzzy logic-based HS algorithm applied to a nonlinear two-tank level control process with a main actuator that has lost effectiveness (LOE) and also the same controller will be tested on DC motor angular position control with and without noise.

Findings – The key contribution of this work is the discovery of the best approach for generating an optimal vector of values for the fuzzy controller's membership function optimization. This is done in order to improve the controller's performance, bringing the process value of the two-tank level control process closer to the target process value (set point). It is worth noting that the type-1 fuzzy controller that has been optimized is an interval type-2 fuzzy system, which can handle more uncertainty than a type-1 fuzzy system.

Originality/value – The type-1 and type-2 fuzzy-based HS algorithms are designed for optimization of fuzzy controllers for FTC applications, and this research proposes a fuzzy-based HS metaheuristic method. The performance of a fuzzy logic-based HS algorithm applied to a nonlinear two-tank level control process with a main actuator that has LOE will be tested on DC motor angular position control with noise. Two nonlinear uncertain processes are used to demonstrate the effectiveness of the proposed control scheme.

Keywords Harmonic search algorithm, Fuzzy controller, Type-2 fuzzy systems, Fuzzy sets

Paper type Research paper

1. Introduction

Fuzzy controllers are now optimized using metaheuristics, and these controllers need to be optimized because they often do not attain the best performance possible necessary for real-world applications. Because they employ the original concept of fuzzy sets Zadeh (1965), these controllers are commonly referred to as type-1 fuzzy logic controllers (FLCs). Lotfi Zadeh first presented fuzzy logic in Zadeh (1988), where he presented the ideas of fuzzy sets and fuzzy logic. The members of a set are assigned a numeric value as a measurement of the uncertainty in the so-called membership functions in this situation. The membership functions of a fuzzy set's linguistic variable are described. In addition to the existing fuzzy logic (type-1) that was suggested from the inception, type-2 fuzzy logic was later developed with the objective of handling more difficult problems, that is, problems with a higher high degree of uncertainty, than type-1 fuzzy logic can solve (Zadeh, 1996).



1756-378X

International Journal of Intelligent

Computing and Cybernetics © Emerald Publishing Limited

DOI 10.1108/IJICC-09-2021-0204

The project outcome is post PhD work of the corresponding author of this article. This research received no external funding. The authors would also like to thank the Department of Instrumentation and Control, Faculty of Technology, Dharmsinh Desai University, Nadiad-387001, Gujarat, India.

Funding: This research received no external funding.

Type-2 fuzzy logic applications designed for active parameter adaptation in metaheuristic algorithm for fuzzy fault-tolerant controller

Himanshukumar R. Patel

Department of Instrumentation and Control, Dharmsinh Desai University, Nadiad, India, and

Vipul Shah

Dharmsinh Desai University, Nadiad, India

Abstract

AQ: 4

AQ: 2

AQ

Purpose – In recent times, fuzzy logic is gaining more and more attention, and this is because of the capability of understanding the functioning of the system as per human knowledge-based system. The main contribution of the work is dynamically adapting the important parameters throughout the execution of the flower pollination algorithm (FPA) using concepts of fuzzy logic. By adapting the main parameters of the metaheuristics, the performance and accuracy of the metaheuristic have been improving in a varied range of applications.

Design/methodology/approach – The fuzzy logic-based parameter adaptation in the FPA is proposed. In addition, type-2 fuzzy logic is used to design fuzzy inference system for dynamic parameter adaptation in metaheuristics, which can help in eliminating uncertainty and hence offers an attractive improvement in dynamic parameter adaptation in metaheuristic method, and, in reality, the effectiveness of the interval type-2 fuzzy inference system (T12 FIS) has shown to provide improved results as matched to type-1 fuzzy inference system (T1 FIS) in some latest work.

AQ:6 Findings – One case study is considered for testing the proposed approach in a fault tolerant control problem without faults and when actuator, system component faults are considered. For comparison between the type-1 fuzzy FPA and interval type-2 fuzzy FPA is presented using statistical analysis which validates the advantages of the interval type-2 fuzzy FPA. The statistical Z-test is presented for comparison of efficiency between two fuzzy variants of the FPA optimization method.

Originality/value – The main contribution of the work is a dynamical adaptation of the important parameters throughout the execution of the flower pollination optimization algorithm using concepts of type-2 fuzzy logic. By adapting the main parameters of the metaheuristics, the performance and accuracy of the metaheuristic have been improving in a varied range of applications.

Keywords Interval Type-2 fuzzy logic, Flower pollination algorithm, Fuzzy fault tolerant controller **Paper type** Research paper

1. Introduction

AQ: 7

Fault tolerant control is an active research area in recent times, attributable to gives acceptable control performance under the exogenous uncertainty like actuator, system component and sensor faults or process disturbances. And so this work is done for optimization of fuzzy fault tolerant controller (Patel and Shah, 2018, 2019a, b).

Author contributions: H. R. Patel analyzed the results; H. R. Patel conceived of the presented idea and developed the framework of this study; H. R. Patel carried out the experiments and H. R. Patel and V. A. Shah wrote the article. All authors discussed the results and contributed to the final manuscript.

Funding: This research received no external funding.

Conflict of interest: The authors declare no conflict of interest.

Type-2 fuzzy logic applications

Received 19 January 2022 Revised 6 March 2022 27 March 2022 7 May 2022 Accepted 10 May 2022



International Journal of Intelligent Computing and Cybernetics © Emerald Publishing Limited 1756-378X DOI 10.1108/IJICC-01-2022-0011





Automatika Journal for Control, Measurement, Electronics, Computing and Communications

ISSN: (Print) (Online) Journal homepage: https://www.tandfonline.com/loi/taut20

A metaheuristic approach for interval type-2 fuzzy fractional order fault-tolerant controller for a class of uncertain nonlinear system*

Himanshukumar R. Patel & Vipul A. Shah

To cite this article: Himanshukumar R. Patel & Vipul A. Shah (2022) A metaheuristic approach for interval type-2 fuzzy fractional order fault-tolerant controller for a class of uncertain nonlinear system*, Automatika, 63:4, 656-675, DOI: 10.1080/00051144.2022.2061818

To link to this article: https://doi.org/10.1080/00051144.2022.2061818

© 2022 The Author(s). Published by Informa UK Limited, trading as Taylor & Francis Group.



0

Published online: 15 Apr 2022.

_	_
Γ	
L	CT 1
-	

Submit your article to this journal 🗹



💽 View related articles 🗹



View Crossmark data 🗹

👌 OPEN ACCESS !

Check for updates

Taylor & Francis

A metaheuristic approach for interval type-2 fuzzy fractional order fault-tolerant controller for a class of uncertain nonlinear system*

Himanshukumar R. Patel 💿 and Vipul A. Shah

Faculty of Technology, Instrumentation & Control, Dharmsinh Desai University, Nadiad, Gujarat, India

ABSTRACT

A new optimum interval type-2 fuzzy fractional-order controller for a class of nonlinear systems with incipient actuator and system component faults is introduced in this study. The faults of the actuator and system component (leak) are taken into account using an additive model. The Interval Type-2 Fuzzy Sets (IT2FS) is used to design an optimal fuzzy fractional order controller, and two different nature inspired metaheuristic algorithms, Follower Pollination Algorithm (FPA) and Genetic Algorithm (GA), are used to optimize the parameters of the fuzzy PID controller and Interval Type-2 Fuzzy Tilt-Integral-Derivative Controller (IT2FTID) for nonlinear system. The suggested control approach consists of two parts: an Interval Type-2 Fuzzy Logic Controller (IT2FLC) controller and a fractional order TID controller. Additionally, the two inputs of the IT2FLC are also calibrated using two fine tuning parameters β_1 and β_2 , respectively. The stability of the proposed controller is presented with some conditions. In addition to unknown dynamics, some unknown process disturbances, such as rapid changes in the control variable, are taken into account to check the efficacy of the proposed control scheme. Two nonlinear conical two-tank level systems are used in the simulation as a case study. The performance of the suggested approach is also compared to that of a widely recognized Interval Type-2 Fuzzy Proportional-Integral-Derivative (IT2FPID) Controller. Finally, the proposed control scheme's fault-tolerant behaviour is demonstrated using fault-recovery time results and statistical Z-tests for both controllers, and the proposed IT2FTID controller's effectiveness is demonstrated when compared to IT2FPID and existing passive fault tolerant controllers in recent literature.

1. Introduction

Due to the intricacy of problems, solving them using traditional procedures in a fair amount of time becomes difficult. Metaheuristic strategies have been developed in recent years to address this issue. The strategies can handle complex issues in an acceptable amount of time. Metaheuristic strategies are based on concepts from biological science, physics, animal and insect behaviour, and other fields [1]. In the literature, a variety of metaheuristic algorithms have been created. Genetic algorithm (GA), ant colony optimization (ACO), follower pollination algorithm (FPA), particle swarm optimization (PSO), grey wolf optimization (GWO), harmony search algorithm (HSA), and many others are examples of well-known methodologies. Follower Pollination Algorithm (FPA) is recently developed and a well-known metaheuristic algorithm, which is proposed by Yang in 2012 [2] in 2012. Additionally, interval type-2 fuzzy logic has been shown to be one of the most cited and used methods in the field of robotics and control due to better ability to handle uncertainty and adding human intelligence based on expertise. And

ARTICLE HISTORY

Received 27 July 2020 Accepted 25 March 2022

KEYWORDS

Actuator fault; conical two-tank; follower pollination algorithm; genetic algorithm; interval type-2 fuzzy system; system component fault; tilt-integral-derivative controller; frustum two-tank; fuzzy fault-tolerant control

hence, we proposed FPA-based interval type-2 fuzzy fractional order fault-tolerant controller for uncertain nonlinear system.

The control of the nonlinear systems (NSs) in presence of unmodelled dynamics (NSs-UD) and in faulty situation are one of the most challenging problems in control engineering. The problem of the uncertain parameters or uncertain functions in the dynamics of the nonlinear systems have been considered in adaptive control techniques, but the problem of the control of NSs with faulty situation has been quite rarely investigated in literature, and thereafter we proposed optimal fuzzy fault-tolerant controller using IT2FTID with FPA metaheuristic approach.

One of the real-world second-order systems (SOS) [3–7] frequently utilized in many industrial production processes [8] is the two-tank level control system. According to the literature, the PID controller [8,9], fuzzy controller [8], fuzzy-PID controller [10], and neural network [11,12] can effectively control the level of a non-interacting (single-tank, two-tank) system. For single-tank or multi-tank level control, the

* This work was not supported by any organization.

© 2022 The Author(s). Published by Informa UK Limited, trading as Taylor & Francis Group.

CONTACT Himanshukumar R. Patel Alpha himanshupatelp32@gmail.com, himanshupatel.ic@ddu.ac.in Faculty of Technology, Instrumentation & Control, Dharmsinh Desai University, Nadiad, 387001, Gujarat, India

This is an Open Access article distributed under the terms of the Creative Commons Attribution License (http://creativecommons.org/licenses/by/4.0/), which permits unrestricted use, distribution, and reproduction in any medium, provided the original work is properly cited.

Optimal Wireless Technology Selection Approach for Sustainable Indian Smart Grid

Jignesh Bhatt^{1,*}, Omkar Jani² and V.S.K.V. Harish³

¹Dharmsinh Desai University, Nadiad, India and Pandit Deendayal Energy University, Gandhinagar, India ²Kanoda Energy Systems Pvt. Ltd., Ahmedabad, India ³Netaji Subhas University of Technology, Delhi, India E-mail: jigneshgbhatt@gmail.com; omkar.jani@kanoda.com; vskvharish@ieee.org *Corresponding Author

> Received 06 April 2021; Accepted 16 November 2021; Publication 14 December 2021

Abstract

The smart grid is playing a game-changing role in achieving clean and green energy, infrastructure, and cities, which are all part of the sustainable development goals. The significance of communication infrastructure in the reliable design and operation of the smart grid is well recognized, notably for renewable integration, facilitating distributed energy resources and storage, demand response, and energy efficiency. Since choosing the optimal communication technology is a strategic decision, the problem needs careful investigation, taking into account realistic data traffic estimates to fulfill the communication needs of the applications envisaged. Even though a vast array of technologies with diverse capabilities is available to meet such communication needs, choosing the optimal wireless technology for a smart grid project remains a difficult challenge. In this context, to achieve and maximize the benefits of the smart grid and its applications, a systematic and efficient approach is necessary. This study proposes a data-driven decision-making approach for evaluating the capabilities of viable wireless technology

Strategic Planning for Energy and the Environment, Vol. 40_3, 255–278. doi: 10.13052/spee1048-4236.4033 © 2021 River Publishers Contents lists available at ScienceDirect



Sustainable Energy Technologies and Assessments



journal homepage: www.elsevier.com/locate/seta

Performance based optimal selection of communication technologies for different smart microgrid applications

Jignesh Bhatt^{a,b}, V.S.K.V. Harish^{c,*}, Omkar Jani^d, Gaurav Saini^{e,f}

^a Department of Instrumentation and Control Engineering, Faculty of Technology, Dharmsinh Desai University (DDU), Nadiad 387 001, Gujarat, India

^b Department of Electrical Engineering, School of Technology, Pandit Deendayal Energy University (PDEU), Gandhinagar 382 007, Gujarat, India

^c Department of Electrical Engineering, Netaji Subhas University of Technology (NSUT), Dwarka Sector 3, Dwarka, Delhi 110078, India

^d Kanoda Energy Systems Pvt. Ltd., Ahmedabad 380 015, Gujarat, India

e School of Advanced Materials, Green Energy and Sensor System, Indian Institute of Engineering Science and Technology, Shibpur, Howrah, West Bengal 711103, India

^f Department of Mechanical Engineering, Harcourt Butler Technical University Kanpur, Kanpur - 208002, Uttar Pradesh, INDIA

ARTICLE INFO

Keywords: Cyber-Physical System Data-driven decision-making Instrumentation Telemetry System Microgrid Optimization Sustainable wireless communication

ABSTRACT

Transforming a traditional microgrid to a smart microgrid involves deploying a cost-effective and suitable communication system. Realistic data traffic estimates need to be computed at the design level for the optimum choice of wireless technologies to satisfy the communication demands, which is strategically an arduous problem. The present study involves the development of a data-driven decision-making strategy based on performance evaluation of various wireless network technology options to optimally select the technology for an associative smart microgrid application. A cost function integrating various smart microgrid applications and different wireless communication technologies is developed as the objective function. Major Performance Metric-based weights, such as data rate and delay, are incorporated into the cost function to enhance the performance of the developed strategy. The potential and adequacy of the developed strategy are examined by implementing a real-world smart microgrid case study in India. Based on the performance assessment results, it is suggested that existing RF and GPRS technologies be replaced by LTE 4G technology. The mathematical tool presented with the suggested approach is viable for decision-making in field applications because of its simplicity, ease of adaptation, and scalability.

Introduction

techniques [3].

Smart grids enable the transition or re-structuring of traditional power grids, using Information and Communication Technologies (ICTs) for intelligent operation supporting interoperability amongst different utilities, devices, systems, businesses, regulatory environments, and other stakeholders [1]. A smart microgrid is a group of interconnected loads and distributed energy resources that act as a single controllable entity, with a capability to operate in both grid-connected or island mode [2], enabled through integrated communication and control Microgrids can be classified based on size, application, operation, architecture, sectoral, and source [4,5]. However, a typical microgrid incorporating a three-level architecture showcasing the conceptual interconnection of smart microgrid's prosumers, taking benefits of different useful applications through the Internet of Things (IoTs) is depicted in Fig. 1. In microgrid communication design, there are three main network levels: (i) Primary level, (ii) Secondary level, and (iii) Tertiary level. Each of these levels possesses its salient fundamental functioning with different microgrid applications and hence, its specific

https://doi.org/10.1016/j.seta.2022.102495

Abbreviations: AMI, Advanced Metering Infrastructure; DA, Distribution Automation; DERS, Distributed Energy Resources and Storage; DGM, Distributed Generation Management; DR, Demand Response; DTM, Distribution Transformer Monitoring; GPRS, General Packet Radio Service; GSM, Global System for Mobile; HAN, Home Automation Network; HEM, Home Energy Management; IoT, Internet of Things; LEO, Low Earth Orbit; LTE, Long Term Evolution; MDMS, Meter Data Management System; MPM, Major Performance Metric; OM, Outage Management; OT, Operational Telephony; OTLM, Overhead Transmission Line Monitoring; PHEV, Plug-in Hybrid Electric Vehicle; PLM, Peal Load Management; PQM, Power Quality Management; QoSv, Quality of Service; RTT, Round Trip Time; SA, Substation Automation; SCADA, Supervisory Control And Data Acquisition; UTC, Coordinated Universal Time; Wi-Fi, Wireless Fidelity; WiMAX, Worldwide inter-operability for Microwave Access.

^{*} Corresponding author.

E-mail address: vskvharish@ieee.org (V.S.K.V. Harish).

Received 28 January 2022; Received in revised form 15 June 2022; Accepted 9 July 2022 2213-1388/© 2022 Elsevier Ltd. All rights reserved.

1



ISSN: 2349-5162 | ESTD Year : 2014 | Monthly Issue JOURNAL OF EMERGING TECHNOLOGIES AND INNOVATIVE RESEARCH (JETIR)

An International Scholarly Open Access, Peer-reviewed, Refereed Journal

SMART HELMET WITH NOTIFICATION SCREEN, ALCOHOL DETECTOR, AND BLUETOOTH SPEAKER

Yash Pandav, Darshan Siroya, Keyur Gajera, Shweta Gaur Student, Student, Student, Professor (Guide) Department of Instrumentation and Control engineering B.Tech Dharmsinh Desai University Nadiad, Gujarat, India

Abstract: Almost everyone in India who ridden a bike or scooter has done so without a helmet at least once in their lives and over 30% of road accident fatalities during 2019 were on account of not wearing helmets. Wearing a helmet can lead to a reduction reduces in the risk of fatal injury and a 69% reduction in the risk of head injuries according to the WHO. So, the main objective of this device is to make a safe ride. There are two modules, one in the helmet (transmitter) and another in a bike (receiver), to ensure that rider is wearing a helmet or not. Now, as per the National Crime Records Bureau (NCRB), data also shows that mostly 2% of the all-over accidents that happen in India are due to drunk driving. In 2019 alone, nearly 3,000 people lost their lives in road accidents related to drunk driving, while 6,675 people were left injured in such drunk driving-related road accidents, so we put an alcohol sensor close to the mouth and detect the amount of alcohol. If both conditions are true; the rider wearing a helmet and the alcohol level is normal then, the transmitter will send a signal to the receiver and the bike ignition circuit will compete. If anyone's condition is not fulfilled, for example, the rider is over drunk, then the transmitter will send a signal and ignition circuit. Now the third major reason for accidents is due to phones. On average, nearly 29 accidents and about 13 deaths took place every day on Indian roads due to the use of phones in 2019, to solve this we added a small notification screen on the front of the helmet which is connected to the phone via Bluetooth and smart helmet app. If there is a phone incoming call the notification screen will show you whose call is coming, not only calls it will also notify messages. And if the rider wants to pick up that call then he or she has to take off his/her helmet and because one condition is not fulfilled, so the bike is not going to start. This device should come inbuilt into a bike/scooter. If the helmet had lost then the rider needs to buy a new helmet just needs to set the same address in the encoder (IC HT12E) by dip 8 pin switch.

IndexTerms- RF modules, Bluetooth OLED Screen, Call Answering, Speaker, Mic, Alcohol Sensor, Clock (RTC).

I. INTRODUCTION

The purpose of this project by us is to try to do some good thing for society. Nowadays, accidents are increasing and lots of people are losing their life. The behind that insufficient knowledge of driving, fault of the rider's fault, talking on the phone while driving fast speed of the two-wheelers, drunk alcohol occur accounts of head injuries, so to forestall head injuries in 1914 British physician Dr. Eric Gardner introduce shellacked canvas to safeguard the head while riding and this can be how the helmet was introduced. Almost everything we use is smart: smartphones, smartwatches even smart toothbrushes so why not a smart helmet. So we developed a helmet that incorporates safety still as comfort. The four features are given below

- The main feature of this smart helmet is if the rider doesn't wear a helmet then the bike won't start. The circuit of ignition won't complete.
- Inbuilt Bluetooth speakers system.
- Transparent display for notification which is connected with phone and telephone, message notification.



Available online at www.sciencedirect.com

ScienceDirect



IFAC PapersOnLine 55-7 (2022) 507-512

Comparative Analysis Between Two Fuzzy Variants of Harmonic Search Algorithm: Fuzzy Fault Tolerant Control Application Himanshukumar R. Patel* Vipul A. Shah**

* Dharmsinh Desai University, Nadiad-387001, Gujarat, India (e-mail: himanshupatel.ic@ddu.ac.in). ** Dharmsinh Desai University, Nadiad-387001, Gujarat, India (e-mail: vashahic@ddu.ac.in)

Abstract: The goal of this research is to improve the harmonic search (HS) algorithm by using type-1 and interval type-2 fuzzy systems to dynamically change one of the evolutionary method's parameters. We have previously used both sorts of fuzzy systems in a variety of benchmark challenges and discovered that using fuzzy logic in conjunction with the harmonic search algorithm produces good results. In some of the experiments, it is clearly demonstrated that our methodology is statistically superior to other algorithms. Using type-1 and interval type-2 fuzzy systems, the harmony memory (HMR) parameter is dynamically changed during the evolution process in this example. The fundamental contribution of this work is the capacity to establish, by experimentation in a benchmark control issue, which of the two types of fuzzy systems employed with the harmonic search method produces better results. This is because there are no previous studies to our idea that employ and compare type-1 and interval type-2 fuzzy system to assess the performance of both fuzzy systems, simulating the disturbances that may present in the actual world and therefore allowing statistical validation if there are substantial differences between type-1 and interval type-2 fuzzy systems.

Copyright © 2022 The Authors. This is an open access article under the CC BY-NC-ND license (https://creativecommons.org/licenses/by-nc-nd/4.0/)

Keywords: Harmonic Search algorithm, Fuzzy controller, Type-2 fuzzy systems, Fuzzy sets

1. INTRODUCTION

Over the last four decades, a slew of novel meta-heuristics have evolved. They have used their strengths to solve crucial optimization challenges in areas including resource allocation, industrial planning, scheduling, medical, engineering, and computer engineering, among others. The objective of the proposed algorithm is one of the key features used to categorise meta-heuristics, and it may be classed based on the judgments of technique presentation. The majority of meta-heuristics are based on physics, biology, and ethology, in which random variables and several parameters are used to attain the target function. Over the last four decades, a slew of novel meta-heuristics have evolved. The objective of the proposed algorithm is one of the key features used to categorise meta-heuristics, and it may be classed based on the judgments of technique presentation.

Natural and physical processes, as well as animal behavioral patterns, are now inspiring algorithm ideas, such as the Genetic Algorithm Patel et al. (2021), Ant Colony Optimization (ASO), Particle Swarm Optimization (PSO), Bee Colony Optimization (BCO) Olivas (2019), Simulated Annealing (SA), and Harmony Search (HS) Algorithm Patel (2022). The Harmony Search Algorithm is one of the most recent meta-heuristic algorithms (HS). This design is based on the idea of music spontaneity, and it keeps polishing its pitches to achieve better harmony. In terms of simplicity, flexibility, adaptability, and scalability, the HS has various advantages Patel (2022). It also features a novel stochastic derivative and requires a simpler mathematical equation to generate new solutions at each iteration, especially when an existing solution is taken into account Patel (2022). When dealing with optimization performance in particular numerical optimization issues to search local optima, adjusting the parameters of the HS method becomes the important task. In the case of PSO and the Differential Evolution Optimization (DEO) method, a similar difficulty arises.

The harmonic memory rate (HMR), pitch adjusting rate (PAR), and range bandwidth (BW) are three factors that have prompted researchers to work on the HS algorithm Patel (2022). Since the inception of HS, much of the work has been devoted to fine-tuning the parameters and their impact on the algorithm's efficiency. Each of these parameters has a role to play in supporting HS in finding the optimal solutions. The HMR parameter, for example, is important for accomplishing a faster convergence rate, PAR is responsible for increasing solution variety, and BW is used to improve the diversity of exact solution at the conclusion of the iteration Patel (2022).

Fuzzy controllers are now optimized using metaheuristics, and these controllers need to be optimised because they often do not attain the best performance possible necessary for real-world applications. Because they employ

2405-8963 Copyright © 2022 The Authors. This is an open access article under the CC BY-NC-ND license.



Resources and components for gujarati NLP systems: a survey

Nikita P. Desai¹ · Vipul K. Dabhi¹

© The Author(s), under exclusive licence to Springer Nature B.V. 2022

Abstract

Natural Language Processing (NLP) represents the task of automatic handling of natural human language by machines. There is a large spectrum of possible NLP applications which aid in automating tasks like text translation amongst languages, retrieving and summarizing data from very huge and complex repositories, spam email filtering, identifying fake news in digital media, finding political opinions, views and sentiments of people on various government policies, providing effective medical assistance based on past history records of patients etc. Gujarati language is an Indian language with more than sixty million users worldwide. At present, many efforts are laid for developing NLP applications and resources for Indian languages. This survey gives a taxonomy and comprehensive report regarding component and resource development for Gujarati NLP systems. Also, few prominent tools available in open domain are tested, and their posterior analysis is presented. Possible measures to handle the issues in resource and component development of Gujarati NLP system are also discussed. This report might be useful for industry, researchers and academicians to have a clear picture of the research gaps, challenges and opportunities in Gujarati NLP systems.

Keywords Indian language \cdot Gujarati \cdot Natural language processing \cdot Tools \cdot Lexical resources \cdot Corpus \cdot Components

1 Introduction

Natural Language Processing (NLP) is a subfield of artificial intelligence with blend of linguistics and computer science fields. It focuses on facilitating communication with computers in human language. It targets to make computers read, process, understand and write text in a language which is natural for humans.

The field of Natural Language Processing can be formally described as a field where theoretically motivated computational techniques are used, for analyzing and

Nikita P. Desai nikitadesai.it@ddu.ac.in
 Vipul K. Dabhi vipuldabhi.it@ddu.ac.in

¹ Department of IT, DDU, Nadiad, Gujarat 387001, India



International Journal of Science, Engineering and Management (IJSEM) Vol 6, Issue 5, May 2021

Automatic Detection and Classification of Corona Infection (COVID-19) from X-Ray Images Using Convolution Neural Network

^[1]Kinjal A. Patel, ^[2]Tanvi Goswami

 ^[1] Department of Computer Application and IT, Gujarat Law Society University, Ahmedabad, India
 ^[2] Department of Information Technology, Dharmsinh Desai University, Nadiad, India Email: ^[1] kinjal5721@gmail.com, ^[2] Goswami.tanvi@gmail.com

Abstract—The novel coronavirus universally known as the COVID-19 outbreak arises at the end of 2019 in one of the East Asian countries and it is subjected to widespread discussion and debate. There are almost 200 countries affected across the globe by COVID-19. And, it has ruined many lives and the global economy. The virus is spreading very rapidly at the pace of around 10 fold in less than a month. Also, in the case of COVID-19, it is critical to detect the infection, as it employs various symptoms which may differ from person to person. Hence, diagnosis in starting stage and treatment are very much important for such type of infectious disease. The chest x-ray is one of the primary techniques among blood tests and Computed Tomography contributes a major role in the early diagnosis of COVID-19. There is a rising need for automated and auxiliary diagnostic tools for early diagnosis, as there are no accurate and truthful automated toolkits on hand. In this research study, we have designed a Convolution Neural Network architecture – a deep net for the classification of x-ray images of chest among two classes: COVID-19 or Non-COVID-19 infection. The anticipated model is expected to provide accurate diagnostic results and produced classification accuracy of 99%, 100%, and 100% with 70%-30%,75%-25% and 80%-20% train-test data split respectively, for the binary classification of the x-ray image to be COVID-19 or Non-COVID-19 infection category. We have designed the CNN with optimized parameters with 3 convolution layers and optimized number of filters in each layer.

Key Words--- Deep Learning, COVID-19, Chest X-ray, Convolutional Neural Network, Instinctive detection

I. INTRODUCTION

The coronaviruses (CoVs) are most infectious in birds but, from several decades it is capable to change host and infecting the humans as well. The coronavirus also known as SARS-CoV-2 is a new member of SARS (severe acute respiratory syndrome) virus spices recognized by its genome sequences [1]. The novel coronavirus epidemic arises in one of the East Asian countries during December 2019 and has extensively blowout across the countries. The coronavirus is rapidly spread from humans to humans. The novel coronavirus indications vary from one person to another person. The extreme symptoms of the COVID-19 are high body temperature, dry cough, and weariness as well as few symptoms are sore throat, diarrhea, and headache [2]. The serious symptoms of the COVID-19 are chest aching and struggle in breath [2]. There are 7818 coronavirus positive cases and 170 deaths are confirmed across the globe during the end of January [3]. The "Public Health Emergency of International Concern" has been declared by The World Health Organization (WHO) on Janyary 30, 2020 due to the extensive increment in coronavirus positive cases [4]. WHO entitled this disease as COVID-19 by February 2020 [5]. As

of 25 May 2020, 53,04,772 COVID-19 positive cases and 3,42,029 deaths are confirmed across the globe and 1,50,762 COVID-19 positive cases, and 4,349 deaths are confirmed across India [6] [7].

The COVID-19 is transmissible, thus many countries are applied lockdown to prevent the spreading of COVID-19. Due to this kind of situation, the Government of India has launched many competitions to get innovative ideas from intelligent minds to deal with every domain such as patient care management, fake news detection, movement tracking, large scale sterilization, stabilizing affected business, virus containment and video conferencing for online education [8]-[11].

The numbers of researchers are working on finding proper treatment, antivirus drugs, and therapeutic vaccines of COVID-19. The detection of COVID-19 infection at a premature stage and isolation of the disease infected people is mandatory as the antivirus drug and therapeutic vaccine was not available. The unexpected hike in a positive COVID-19 leads to the need for a massive amount of medical resources. The real-time reverse transcriptionpolymerase chain reaction (RT-PCR) test is used to detect COVID-19 infection. But, RT-PCR test takes more time to

Massive MIMO: Energy Efficient Solution for Increasing Coverage and Capacity

Brijesh Shah¹, Gaurav Dalwadi¹, Deepak Gupta¹, Hardip Shah², Nikhil Kothari²

Abstract – In this paper, the energy efficiency of 32T32R Massive MIMO product has compared with the conventional 2T2R evolved node B (eNB) and identified the improvement in terms of both coverage and capacity. Initial field trial and hardware design analysis indicates that 32T32R massive MIMO will reduce the power consumption per bit by half.

Keywords – **32T32R massive MIMO**, Energy efficiency, **Downlink capacity, Power consumption per bit.**

I. INTRODUCTION

Many services such as high-speed internet, video streaming, video conferencing, video downloading, interactive gaming, and group chat, have significantly contributed to the increase in smartphone usage and mobile data traffic in cellular networks in the last few years. In the USA alone, the number of smartphone users increased from 60 million in 2010 to 164 million in 2014 [1]. Additionally, there were 3.9 billion smartphone users worldwide in 2016, and this number is likely to double by 2022 [2]. The concept of fully networked society with applications like augmented reality, virtual reality, and connected homes, and cars, machine to machine communication requires plenty of data. As a result, the amount of mobile data traffic is projected to be eight times the current level by 2022, according to the Ericsson Mobility Report [2].

High channel bandwidth, increase in several sites, deployment of heterogeneous networks are the possible solutions to achieve the desired data capacity in the coming years. Larger channel bandwidth is possible at the highfrequency band which has higher penetration losses and requires a large number of sites to provide the coverage. More sites led to higher operational expenditure (OPEX) and capital expenditure (CAPEX) for the operator. The revenue per customer is decreased in recent years hence operators need a cost-effective solution that fulfills the requirement of data capacity without increasing the sites and without adding the new spectrum. Massive Multiple Input Multiple Output (MIMO) is a pre-5G potential solution to meet the immediate need by replacing the existing sites with massive MIMO eNB

Article history: Received August 21, 2018; Accepted July 23, 2020

¹Brijesh Shah, Gaurav Dalwadi and Deepak Gupta are the research engineers in the Reliance Jio, Navi Mumbai, India, E-mails: Brijesh.i.shah@ril.com, Gaurav.dalwadi@ril.com, Deepak.l.gupta@ril.com

²Dr. Nikhil Kothari is the HOD and Dr. Hardip Shah is the associate professor with the Faculty of Electronics at DD University, India, E-mails: nil_kothari@ddu.ac.in, echardip@ddu.ac.in that leverage the data capacity by 3-4 times in the field [3]. Massive MIMO is an extension of multi-user MIMO (MU-MIMO) with a large number of antenna elements (AEs) in both vertical and horizontal directions. Several AEs in both directions can provide the 3D beamforming which allows the beam to be sharpened in both azimuth and elevation plane [4]. The narrow beam improves the signal to interference and noise ratio (SINR) by pointing the desired main lobe of an antenna in the direction of users and null lobe in the direction of interferers. Thus, improves the inter-cell interference that enhances the SINR at the user equipment (UE).

Channel reciprocity in the time divisional duplexing (TDD) allows massive MIMO eNB to estimate the sounding reference signal (SRS) in uplink that able to identify the optimal weights for user-specific beamforming. MU-MIMO is defined up to 8 layers in 3GPP release 10 which can be extended to more layers in both downlink and uplink based on the processing capability in the LTE eNB [5, 6]. More number of AEs provide more directivity with a narrow beamwidth which in-turn facilitates less correlation amongst the received signal at UEs. Hence, eNB can transmit multiple layers to the different UEs simultaneously in the same time and frequency slot and increases the physical resource block (PRB) reuse that leads to the enhancement of the capacity of the network [7]. Since massive MIMO can transmit a greater number of layers with the concept of space division multiplexing within the same frequency and time, it increases the spectral efficiency of the network [8].

A large number of AEs can use the multiple low power transceiver chains that allow the use of radio frequency integrated circuit (RFIC) for transceiver and low power amplifier for the front end design. Low power design has several advantages including low cost, low power consumption, distributed heat across multiple low power amplifiers, reducing the insertion losses between the RF port and antenna port by using blind mate connector, etc. Although total power consumption of massive MIMO may increase in comparison with 2T2R and 4T4R macro eNB because of a greater number of transceiver chains, power consumption per bit will reduce significantly due to higher spectrum efficiency supported by massive MIMO eNB.

The remainder of this paper is organised as follows. 3D beamforming using a large number of AEs is explained in Section 2. The hardware design of massive MIMO is described in Section 3. The expected performance comparison of 2T2R conventional macro eNB with 32T32R massive MIMO is described in Section 4. Section 5 provides initial field test results and a comparison of 32T32R massive MIMO with respect to 2T2R. Section 6 concludes the power efficiency per bit for 32T32R massive MIMO.

Secondary and Backscattered Electron Current Induced Differential Charging on a Triple Junction of Spacecraft

Ashish B. Pandya[®], Nikhil Kothari[®], Rizwan H. Alad[®], Rashmi S. Joshi[®], Suryakant B. Gupta, and Prarthan D. Mehta, *Senior Member, IEEE*

Abstract-This article discusses and analyzes the quantification of differential potential developed due to the effect of secondary electron yield (SEY) and backscattered electron yield (BEY) at adjacent dissimilar material surfaces present in a spacecraft. Subsequently, the differential potential creates electrostatic discharge (ESD). The threshold potential for generating the ESD is captured for the generalized case of differential charging on metallic patches embedded over a thin layer of the dielectric surface with the help of Spacecraft Plasma Interaction Experiments-II (SPIX-II) facilities. In view of the limitations of the experimental setup, numerical modeling is implemented to compute the differential charging for the recommended cases of plasma environment. The threat of an ESD event is indicated when the computed differential charging exceeds the ESD inception threshold voltage obtained from the experiments. Evaluation of the capacitance between material surfaces, which governs the timescale of differential charging, is carried out using the method of moments (MoM). The impact of diverse SEY and BEY of different materials on steady-state body potential is investigated. The validity of the analysis is also established with the results available in the open literature.

Index Terms—Backscattered electron yield (BEY), electrostatic discharge (ESD), inverted potential gradient (IPG), primary arc, secondary electron yield (SEY).

I. INTRODUCTION

S PACECRAFT charging is caused by the incidence of energetic (up to few tens of keV) geomagnetic substorm electrons and ions in geostationary earth orbit (GEO). Spacecraft surfaces accumulate charges and develop potentials on the surfaces [1]. Since spacecraft surfaces are of different materials with dissimilarity in secondary electron yield (SEY) and backscattered electron yield (BEY), surfaces obtain different absolute potentials relative to the spacecraft ground. This, in turn, can lead to differential charging across the surfaces of different materials [2]. Most prominently, differential charging creates electrostatic discharge (ESD) or arc discharge between

Manuscript received July 15, 2019; revised November 18, 2019 and February 14, 2020; accepted February 28, 2020. Date of publication March 20, 2020; date of current version April 10, 2020. The review of this article was arranged by Senior Editor S. T. Lai. (*Corresponding author: Ashish B. Pandya.*)

Ashish B. Pandya, Nikhil Kothari, Rizwan H. Alad, and Prarthan D. Mehta are with the Department of Electronics and Communication, Dharmsinh Desai University, Nadiad 387001, India (e-mail: ashish.ec@ddu.ac.in).

Rashmi S. Joshi and Suryakant B. Gupta are with FCIPT, Institute of Plasma Research, Ahmedabad 382024, India (e-mail: rashmi.joshi.2189@gmail.com). Color versions of one or more of the figures in this article are available

online at http://ieeexplore.ieee.org.

Digital Object Identifier 10.1109/TPS.2020.2978907

neighboring surfaces through layers of the solar arrays. In the recent past (2011), spacecraft had anomalies because of differential charging induced ESD [3]. Moreover, it is reported in the literature that more than 33% of the spacecraft failures have been occurred due to ESD on solar panels [4], [5]. This demands a critical examination of differential charging on the most arc plausible structure of a spacecraft.

The metallic interconnectors on the solar panel of a spacecraft are in close proximity to cover glass (dielectric). Both, metallic interconnectors and cover glass, accompanied by the ambient plasma, form a triple junction, which is a favorable site for ESD to occur [1]–[6]. A high SEY of dielectric due to charged particle bombardment from ambient plasma makes the dielectric surface more positive as compared to metal. Such an inverted potential gradient (IPG) situation resulting from differential charging increases the probability of arcing event considerably. The ensuing primary arc may short-circuit the adjacent positive and negative ends of solar array strings. The ends are situated in a very short distance of 1 mm and have a large voltage difference (output voltage of the solar array) [6]. Note that, a large voltage difference in a short distance creates a high electric field and, in turn, gives rise to ESD. Accordingly, the most susceptible locations for ESD on a spacecraft are triple junctions which include sharp corners, intersection of cables, differentially charged surfaces with short separation, and nearby solar cells. If the arc plasma resistance is adequately small, it can steal the solar array power which should actually be delivered to the spacecraft load. The resultant secondary arc can lead to catastrophic consequences such as dissipation of extensive energy and permanent damage of Kapton substrate used for mounting solar cells [6].

looseness-1Typically, the differential charging and capacitance between surfaces (coupled capacitance) greater than several orders of 100 V and 10 pF, respectively, are the major factors leading to ESD [7]. Numerous computational tools such as NASCAP-2K [8], spacecraft plasma interaction software (SPIS) [9], multiutility spacecraft charging analysis tool (MUSCAT) [10], PTetra [11], and COLOUMB-2 [12] have been developed to estimate the spacecraft charging. The details of absolute and coupled body capacitance formed in a spacecraft are not available in any of these tools. The coupled capacitance is a crucial parameter for the investigation of body potential transient profile and subsequently differential charging. The study and analysis of variations in the results

0093-3813 © 2020 IEEE. Personal use is permitted, but republication/redistribution requires IEEE permission. See https://www.ieee.org/publications/rights/index.html for more information.

Performance Analysis of NOMA in Vehicular Communications Over i.n.i.d Nakagami-*m* Fading Channels

Dhaval K. Patel[®], *Member, IEEE*, Hetal Shah[®], Zhiguo Ding[®], *Fellow, IEEE*, Yong Liang Guan[®], *Senior Member, IEEE*, Sumei Sun[®], *Fellow, IEEE*, Yoong Choon Chang, and Joanne Mun-Yee Lim[®], *Member, IEEE*

Abstract-This paper investigates the performance of non-orthogonal multiple access (NOMA) in vehicular networks where a base station (BS) communicates with the vehicles moving away from the BS with single-input multiple-output. To combine the signals received at the antennas, diversity combining techniques such as maximal ratio combining (MRC) and selection combining (SC) are performed at the receiver of each vehicle. However, in practice, the expected performance from the diversity techniques may not be achieved due to the fact that all the diversity branches are not independent and identically distributed (i.i.d) all the time. In this context, analytical expressions of the outage probability and ergodic sum rate are derived for the considered vehicular networks with the assumption of independent but not necessarily identically distributed (i.n.i.d) Nakagami-*m* fading channels. The performance analysis of NOMA vehicular networks is also extended for multiple-input multiple-output antenna configurations and evalu-

Manuscript received November 12, 2019; revised June 18, 2020 and December 6, 2020; accepted April 5, 2021. Date of publication April 20, 2021; date of current version October 11, 2021. This work was supported in part by the Department of Science and Technology-Association of Southern East Asian Nations (DST-ASEAN), India, under Grant IMRC/AISTDF/R&D/P-09/2017, in part by the A*STAR through its RIE2020 Advanced Manufacturing and Engineering (AME) Industry Alignment Fund-Pre Positioning (IAF-PP) under Grant A19D6a0053. Any opinions, findings and conclusions or recommendations expressed in this material are those of the author(s) and do not reflect the views of A*STAR. This work was also supported in part by the H2020-MSCA-RISE-2020 under Grant 101006411. The associate editor coordinating the review of this article and approving it for publication was R. Hu. (*Corresponding author: Dhaval K. Patel.*)

Dhaval K. Patel is with the School of Engineering and Applied Science, Ahmedabad University, Ahmedabad 380009, India (e-mail: dhaval.patel@ahduni.edu.in).

Hetal Shah is with the Faculty of Technology, Dharmsinh Desai University, Nadiad 387001, India (e-mail: shahhetal.ec@ddu.ac.in).

Zhiguo Ding is with the School of Electrical and Electronic Engineering, The University of Manchester, Manchester M13 9PL, U.K. (e-mail: zhiguo.ding@manchester.ac.uk).

Yong Liang Guan is with the School of Electrical and Electronic Engineering, Nanyang Technological University (NTU), Singapore 639798 (e-mail: eylguan@ntu.edu.sg).

Sumei Sun is with the Institute of Infocomm Research, Singapore 138632 (e-mail: sunsm@i2r.a-star.edu.sg).

Yoong Choon Chang is with the Lee Kong Chian Faculty of Engineering and Science, Universiti Tunku Abdul Rahman (UTAR), Kajang 43000, Malaysia (e-mail: ycchang@utar.edu.my).

Joanne Mun-Yee Lim is with the School of Engineering, Monash University Malaysia, Bandar Sunway 47500, Malaysia (e-mail: Joanne.Lim@monash.edu).

Color versions of one or more figures in this article are available at https://doi.org/10.1109/TWC.2021.3073050.

Digital Object Identifier 10.1109/TWC.2021.3073050

ated in the presence of successive interference cancellation (SIC) error propagation. The obtained analytical results are validated by Monte Carlo simulations. Furthermore, the performance of NOMA is verified with conventional orthogonal multiple access (OMA) for fading parameter m = 1 and m = 2 with perfect channel knowledge and channel estimation. Numerical results show that NOMA outperforms the conventional OMA by approximately 20% and has high sum rate with i.n.i.d as well as i.i.d channel consideration. However, i.n.i.d consideration degrades the performance of NOMA and OMA as the diversity gain achieved with i.n.i.d consideration is less as compared to i.i.d consideration. The performance is further deteriorated with SIC error and channel estimation.

Index Terms—V2I communications, non-orthogonal multiple access, i.n.i.d, outage probability, sum rate.

I. INTRODUCTION

TEHICLE-to-infrastructure (V2I) and vehicle-to-vehicle (V2V) communications are the essential elements of vehicular communications to reach the goals set by intelligent transport system (ITS) such as driver's safety, traffic management and infotainment applications [1]. The dissemination of safety messages in V2I and V2V communications demands high reliability [2] and low latency, while the Internet access for traffic management and infotainment applications needs high spectrum efficiency and reliable Internet connectivity. Various infotainment applications such as connected driving and smart transportation will rely on the Internet of Vehicles, which will increase the requirement of spectrum efficiency many folds [3]. However, technologies currently used in vehicular communications such as IEEE 802.11p, long term evolution (LTE), and LTE-Advanced are based on orthogonal multiple access (OMA) and not capable of providing the high bandwidth efficiency and reliability requirements of growing vehicular communications [4].

Non-orthogonal multiple access (NOMA) serves multiple users at the same time or frequency resources by providing multiplexing in the power domain and thus shows significant improvement in spectrum efficiency over OMA [5], [6]. NOMA is an optimistic solution to fulfill the capacity requirements and user access imposed by the multimedia applications and Internet of Things [7]–[9]. NOMA is a promising technique to address the needs of 5G wireless communications such as high spectrum efficiency, massive connectivity and low

1536-1276 © 2021 IEEE. Personal use is permitted, but republication/redistribution requires IEEE permission. See https://www.ieee.org/publications/rights/index.html for more information.



Simulation based Analysis of Non-Cooperative Spectrum Sensing Techniques in Cognitive Radio

Narendrakumar Chauhan ^{1*}, Aasnil Shah ², Purav Bhatt ³, Dr. Purvang Dalal ⁴

 ¹ Department of Electronics & Communication Engineering, Faculty of Technology, Dharmsinh Desai University, Nadiad, Gujarat 387001, India.
 ² B.Tech. (E&C), Department of Electronics & Communication Engineering, Faculty of Technology, Dharmsinh Desai University, Nadiad, Gujarat 387001, India.
 ³ B.Tech. (E& C), Department of Electronics & Communication Engineering, Faculty of Technology, Dharmsinh Desai University, Nadiad, Gujarat 387001, India.
 ⁴ Professor, Department of Electronics & Communication Engineering, Faculty of Technology, Dharmsinh Desai University, Nadiad, Gujarat 387001, India.
 ⁴ Professor, Department of Electronics & Communication Engineering, Faculty of Technology, Dharmsinh Desai University, Nadiad, Gujarat 387001, India.

Abstract— Increasing number of wireless applications and users has led to dearth of bandwidth for such applications. Static frequency allocation utilizes the spectrum inefficiently, fostering the requirement for dynamic spectrum allocation. One of such application of dynamic spectrum allocation is a Cognitive Radio. A Cognitive Radio senses and understands its radio environment, to recognize vacant spectrum and utilize it, hence leading to increased spectrum efficiency. In Cognitive radio networks, the secondary (unlicensed) user (SU) opportunistically exploits the radio spectrum, without causing intrusion to primary (licensed) user (PU). Therefore, Spectrum Sensing is a crucial step in a Cognitive Radio based systems. In this paper, we perform analysis of various Spectrum-Sensing techniques by performing simulations and plotting the curve between probabilities of detection (P_d) and signal to noise ratio (SNR). Based on the practical results, we conclude for the most suitable Spectrum Sensing technique in Cognitive Radio.

Keywords— Cognitive Radio, Spectrum Sensing, Probability of detection.

I. INTRODUCTION

The Federal Communication Commission (FCC) divides the radio spectrum into various frequency bands, and statically allocates them to various wireless applications [01]. The assigned frequency can only be exploited by the application licensed by the agency, and not by any other category of user. This leads to inefficient use of resources, because many applications do not need employment of large bandwidth, as shown in figure 1. Moreover, the evolution from voice-only communications to multimedia applications has increased the requirement of allotted radio spectrum. The aforementioned reasons have led to unwanted denial of services.

To solve the spectrum scarcity issue, the deployment of dynamic allotment based radio system has gained momentum. One such type of system is a Cognitive Radio system - A fascinating emerging technology promising the solution of the scarcity problem by strategic spectrum access. According to Federal Communication Commission, a Cognitive Radio is defined as: "Cognitive radio: A radio or system that senses its operational electromagnetic environment and dynamically and autonomously adjust its radio operating parameters to modify system operation, such as maximize throughput, mitigate interference, facilitate interoperability,



Structures <u>Volume 29</u>, February 2021, Pages 1154-1164

Strength, Deformation and Fragility assessment of Reinforced Concrete Moment Resisting frame designed by Force Based Design and the Performance Based Plastic Design method for Seismic loads

Sejal P. Dalal ^a 은 쩓, Purvang Dalal ^b

Show more ∨ ⋮ Outline def contraction of the state of t

https://doi.org/10.1016/j.istruc.2020.11.029

Get rights and content

Abstract

A 20 storied Reinforced Concrete (RC) Moment Resisting Frame (MRF) has been analysed and designed by Force Based Design (FBD) method and the Performance Based Plastic Design (PBPD) method. The PBPD frames were designed for all the three performance levels namely Immediate Occupancy, Life safety and Collapse Prevention of the basic safety objective. The guidelines of the Indian <u>Standard codes</u> along with established principles of design have been incorporated in the study. Nonlinear static <u>pushover analysis</u> was the tool used to evaluate the <u>seismic performance</u> of the frames in terms of strength and deformation. The fragility assessment has been carried out in terms of Spectral displacement obtained from the pushover analysis results for different specified damage states. Results indicate that PBPD method excels the FBD method, both in terms of seismic performance and fragility.



Previous

Next

Keywords

Reinforced Concrete Moment Resisting Frame; Force Based Design; Performance Based Plastic Design; Performance Objectives; Performance Levels; Fragility

Bearing Capacity of Isolated Square Skirted Foundation on Cohesionless Soil: An Experimental and Analytical Study

Samir Parmar^{1*}, R.M. Patel²

¹Assistant Professor, DDU, Nadiad, Gujarat, India. ²Retd. Professor, L.D.Engg. Collage, Ahmedabad, India. ***Email id:** samirddu@gmail.com

ABSTRACT

Skirted foundations are being used increasingly for foundations of offshore structures, the popular name of that foundations is bucket foundations. The provision of skirts on the periphery of shallow foundation will result in increasing confinement of soil and hence improvement in state of stress as well as soil structure interaction. The present paper describes study of model square skirted foundation for axial loads in cohesionless soils. The parameters like aspect ratio of skirt (skirt length), skirt angle α , depth of placement of foundation are considered in experiments and compared with model plane footing without skirts. Bearing capacity of the model foundations were carried out by stress controlled plate load test. Results shows considerable increase in bearing capacity because of provision of skirts, hence skirted foundations is suitable for on shore structures also. The governing mechanism for the behaviour of skirted foundations is explained.

Keywords:-Skirted foundations, mechanism of skirted footing, confinement effect, model plate load test

INTRODUCTION

Footings are used to transfer the loads and moments from the columns to the soil. It is necessary to ensure that while performing this job neither soil should fail nor the footing. Another aspect of preventing failure of the soil-footing system is to improve interaction between the soil and the footing structure. To increase the interaction between soil foundation system researchers provided different geometrical profile to the base of the foundation. Some of them are Hyperbolic paraboloid shell foundation, conical shell foundation for isolated footings and Inverted Spherical dome raft, inverted Dom cum raft, Folded cone ring raft etc. for the circular structures as shallow foundations.

LITERATURE REVIEW

Kurian and Varghese (1969) introduced the idea of hyperbolic shell as a column foundation. Individual Square footing of this type were investigated theoretically as well as experimentally for vertical load. Rao and Narhari (1979) developed a skirted plug and ring foundations where the skirts are not built in with footing but located at further distance. Alam Singh, Ohri and Moorthy (1982) used a skirted footing in which skirtes are bolted to the RCC footing, whereas Kurian (1982) and Alam singh and Chaudhary (1987) used skirts as built in component with the parent considerable footing and noted improvement in bearing capacity. Adel Hunna and El-Rehman (1990) investigated foundation triangular shell strip experimentally theoretically. and Borthakur (1992) used RCC skirts for ring foundations as a ground improvement technique. Al Aghbari and Mohmaedzein (2004) investigated skirted strip footing for the skirt roughness factor, skirt depth ratio as well as foundation base friction.

Shah and Shroff (1991) studied skirted strip footing experimentally and



SPT, SCPT, and DCPT Correlation for SC, CL, and SM-SC Soils: A Case Study of Nadiad Soil

Chintan Patel¹, Samirsinh P Parmar²

¹M. Tech Geotechnical Engineering Student, Dharmsinh Desai University, Nadiad, Gujarat, India. ²Assistant Professor, Department of Civil Engineering, Dharmsinh Desai University, Nadiad, Gujarat, India.

INFO

Corresponding Author:

Samrish P Parmar, Department of Civil Engineering, Dharmish Desai University, Nadiad, Gujarat, India.

E-mail Id:

spp.cl@ddu.ac.in

How to cite this article:

Patel C, Parmar SP. SPT, SCPT, and DCPT Correlation for SC, CL, and SM-SC Soils: A Case Study of Nadiad Soil. *Int J Adv Res Civil Stru Engg* 2021; 3(1): 1-7.

Date of Submission: 2021-06-06 Date of Acceptance: 2021-07-27

A B S T R A C T

A number of different static & dynamic penetration tests are used nowadays in site investigation. The Standard Penetration Test (SPT) is the most common in situ test for soil investigations. On the other hand, the cone penetration test is considered one of the best investigation tools. Due to the fast and accurate result that can be obtained it complaints the SPT in many applications like field explorations, design parameters and quality control assessments. SCPT-DCPT are becoming very popular because it provides continuous details of the strata and it is also quick. In this study, correlation of Standard penetration test, Static cone penetration test, and Dynamic cone penetration test results will be carried out. On the basis of soil classification and variability with depth, the major correlations are developed between the SPT value - ϕ , SPT value - settlement, SPT value - R, there are no more direct co relation between the SPT- SCPT- DCPT because this relation depended on local soil parameters. So far very few correlations have been made between SCPT and DCPT test results as compared to the correlations between SPT-SCPT-DCPT. A positive liner relationship will be found between q,, N, q_{p} for various sandy soils.

Keywords: Standard Penetration Test, Dynamic Cone Penetration Test, Static Cone Penetration Test, Sand, Silt, Correlation

Introduction

Soil is naturally heterogeneous and discontinuous material which is composed of degraded organic matter and minerals due to mechanical or chemical weathering actions on different rocks. These phenomena produce various layers of sedimentation patterns and the geological events further produces different formations.

The soil in Charotar region of Kheda district of Gujarat, for instance, is varying in types and stratigraphy. Therefore, it is difficult task for geotechnical engineers to understand stratigraphy and resulting profile of soil layers for foundation design. In-situ site investigation gives readily, reliable results with visual soil samples for further testing aid geotechnical engineer for decision and judgement for choice of foundation type.

The SPT and CPT tests are believed to be most reliable test among all in-situ test to design foundations. Most of the design theories demands SPT- N value with depth of stratum. The N value available is per meter value and is not varying continuous as the soil strata changes. To achieve accuracy in design continuous ground penetration resistance can be measured and then converted to respective N value at respective depth. To establish correlation between above three in-situ tests, first preliminary auger boring carried out followed by performing SPT, CPT and DCPT tests. 10 different locations were selected in the Dharmasinh Desai

International Journal of Advanced Research in Civil & Structural Engineering Copyright (c) 2021: Author(s). Published by Advanced Research Publications



Triaxial Test on Soil - Important Insights for Stress-Controlled and Strain-Controlled Test

Samirsinh P Parmar*

QIP Research Scholar, Department of Civil Engineering, IIT Kanpur, U.P., India. & Assistant Professor, Department of Civil Engineering, Dharmasingh Desai University, Nadiad, Gujarat, India.

*Corresponding Author E-mail Id:-samirddu@gmail.com (Orcid Id:-https://orcid.org/0000-0003-0196-2570)

ABSTRACT

Triaxial testing of soils is carried out under various loading methods to simulate field loading conditions or to analyze the fundamental behavior of soil material. The objective of this paper is to review the triaxial testing of soil under stress control and strain control loading mode. The triaxial shear test simulates 3- dimensional stress condition including pore water pressure is an identical condition that occurred in situ on soil specimen; this is the advantage of the triaxial test over other shear tests on soil. The triaxial test apparatus, procedures, and sample preparation is explained in brief. The analysis of results over drainage conditions and shearing phase is incorporated. The modern triaxial tests contain thorough control over test setup and accurate results are determined which makes the triaxial test versatile and used for research in geotechnical engineering. The different loading modes are used to simulate the field stress, strain condition and to understand the response of the soil by many researchers. They analyzed test results of the same soil specimen tested under both modes of loading (i.e., stress and strain-controlled) will focus on parameters like progressive failure, peak strength, and residual strength behavior of soil. Monotonic loading under strain control test gives post-peak behavior of soil necessary to understand the progressive failure. Similarly, the stress-controlled test is useful to study timedependent deformation in clay. The comprehensive study presented here for the stress and strain control triaxial test and finally, it focuses on recent advancement of technologies in respective loading modes.

Keywords:-Triaxial test, stress-strain controlled triaxial test, recent development.

INTRODUCTION BRIEF REVIEW

The failure in soil generally governs by shear failure, hence determination of shear strength parameters for soil and soil inclusion is very important in geotechnical engineering. The factors that affect the shear strength of the soil are drainage conditions, stress pattern (loading condition), rate of strain, the density of the particles and the strain's direction. Triaxial test on soil is now a days preferred to determine shear parameters for important construction as well as research purpose because of the better simulation of soil samples with field conditions. Here field conditions include various factors such as pore pressure, confinement, direction of strain and stress conditions (3D) (extension, compression, cyclic, increment decrement of load etc.). (After Castellanos B.A., Brandon T.L, 2013).

The Triaxial shear device was discovered over a period of years. The initial triaxial device was invented by Buisman and Hveem (1924) which was having some of the characteristics similar to the present-





Journal of Sustainable Finance & Investment

ISSN: (Print) (Online) Journal homepage: https://www.tandfonline.com/loi/tsfi20

India's Social Stock Exchange (ISSE) – A 360° Analysis - Today's commitment for tomorrow's action

C. S. Divyesh Patel & Naresh K. Patel

To cite this article: C. S. Divyesh Patel & Naresh K. Patel (2022): India's Social Stock Exchange (ISSE) – A 360° Analysis - Today's commitment for tomorrow's action, Journal of Sustainable Finance & Investment, DOI: 10.1080/20430795.2022.2061404

To link to this article: <u>https://doi.org/10.1080/20430795.2022.2061404</u>



Published online: 11 Apr 2022.



Submit your article to this journal 🕑



View related articles



🌔 View Crossmark data 🗹

Measuring Online Brand Experience & it's impact on Consumer Satisfaction and Loyalty

¹Mitesh Piyush Jadav, ²Dr. Naresh K. Patel

¹Assistant Professor, Faculty of Management Studies, Marwadi University, Rajkot, Gujarat, India. Email: mitesh.jadav@marwadieducation.edu.in

²Professor & Dean, Faculty of Management & Information Science, Dharmsinh Desai University, Nadiad, Guiarat, India. Email: deanmis@ddu.ac.in

Abstract

The authors of this article apply (Brakus J J, Schmitt B H and Zarantonello L, 2009) model of four brand dimensions and the impact on customer satisfaction and loyalty to the online brand Google to verify these findings. The authors conducted empirical research during July 2021 with 147 University students at Marwadi University, Rajkot, Gujarat, through an online questionnaire using Google Form®. The authors applied SEM & could only verify the model of (Brakus J J, Schmitt B H and Zarantonello L, 2009) partially with online brand. The findings concludes that online brand experience significantly influencing brand personality positively which in turns impact satisfaction & loyalty significantly. Hence, it can be said that brand personality plays an important mediating role. Online Brand Experience doesn't have any significant impact on satisfaction & loyalty directly. Additional research is needed to further test the online brand experience model.

Keywords: Experience marketing, Experiential marketing, Brand experience, Google, Google Experience.

Introduction

Consumers nowadays no longer buy products and services in order to fulfill a functional need but instead purchase the emotional experiences around it (Morrison S and Crane F G, 2007), (Zarantonello L and Schmitt B H, 2010). For the "Starbucks experience" consumers are willing to pay almost \$3 for a small cup of coffee - double the price compared to a traditional eatery. Experience marketing theory tries to find answers to what exactly makes a purchase an experience and what impact experience marketing has. The brand experience model of (Brakus J J, Schmitt B H and Zarantonello L, 2009) provides meaningful answers to these two questions. On the one hand it proves that brand experience positively affects consumer satisfaction and loyalty. On the other hand, it provides an empirically validated brand experience scale based on the dimensions sensory, affective, intellectual, and behavioral. The scale is meaningful in academic research, but even more important "as marketers engage in projects to understand and improve the experience their brand provides for their customers, they can use the scale for assessment, planning, and tracking purposes." (Brakus J J, Schmitt B H and Zarantonello L, 2009).

This article attempts to examine the relationship between (Brakus J J, Schmitt B H and Zarantonello L, 2009) four brand experience dimensions, five brand personality dimensions, customer satisfaction and loyalty for the online brand Google. However, the findings of this research reveal that, when applied to the Google brand, the model developed by (Brakus J J, Schmitt B H and Zarantonello L, 2009) suggests that brand personality plays a very significant mediating



Antecedents of Online Brand Experience & its consequences: A study on Amazon E-Commerce

Mitesh Piyush Jadav

Assistant Professor, Faculty of Management Studies, Marwadi University, Rajkot, Gujarat, India. Email: mitesh.jaday@marwadieducation.edu.in

*Corresponding Author: Mitesh Piyush Jadav

Dr. Naresh K. Patel

Professor & Dean, Faculty of Management & Information Science, Dharmsinh Desai University, Nadiad, Gujarat, India. Email: <u>deanmis@ddu.ac.in</u>

Abstract

To provide an integrative model of online brand experience, this paper combines findings from brand management, marketing, and information systems research. In this model, various factors such as brand love, perceived ease of use, perceived usefulness, brand trust, customer effort, event marketing, brand clues, marketing communication combines to affect consumer experience online & it's impact on satisfaction and loyalty. The empirical tests involve structural equation modeling and primary data from a survey of 419 users of online e-commerce giant Amazon. The results demonstrate all the factors positively affect online brand experience. Positive experiences result in satisfaction and loyalty, which affects the profitability of the firm.

Keywords: Online Brand Experience, Antecedent, Consequence, Brand Experience, Amazon, E-Commerce.

Number: 10.14704/nq.2022.20.7.NQ33419

Neuro Quantology 2022; 20(7):3375-3393

3375

1. Introduction

Global branding has undergone a significant transformation thanks to the internet and related technology. Online companies have emerged from obscurity over the past 15 years to become well-known names with market valuations that rank them among the top 100 most valuable brands in the world. In fact, one such name (Amazon) now tops global ratings with an estimated worth of \$260.5 billion in brand value. (forbes, 2022). The main factor driving this accomplishment is traffic, or the recurring encounters between an online business and its users. (Song, Zhang, & Huang, 2010). Keeping the consumer engaged through frequent encounters is still a crucial problem for the online brand. (Bart, Shankar, Sultan, & Urban, 2005) (Bridges & Florsheim, 2008) (Christodoulides, 2009) (Helm, 2007) (Kollmann & Suckow, 2008). Within two distinct areas of academic study, it is nevertheless of utmost importance to comprehend what factors lead to

a pleasant online brand experience and how to create those conditions. Online brands are conceptualised as technological components according to the information systems (IS) tradition, in particular studies based on the technology acceptance model (Davis,1989). According to the system usability viewpoint, this research tends to concentrate on brand elements that are task-related and takes user outcomes such as utility or functioning into account (Kim, 2005; Koufaris, 2002; Pavlou, Huigang, & Yajiong, 2007). On the other hand, online brands are typically viewed in marketing literature as enhanced goods or services that help consumers connect in computer-mediated environments to suit specific needs. (Hoffman & Novak, 1996, 2009). Marketing academics place a strong emphasis on the subjective brand assessments and the emotional elements of the brand experience, stressing the importance of brand personality (Okazaki, 2006), image (Da Silva & Syed Alwi, 2008a, 2008b; Kwon & Lennon, 2009)



www.neuroquantology.com

International Journal of Early Childhood Special Education (INT-JECSE) DOI: 10.9756/INT-JECSE/V14I2.488 ISSN:1308-5581 Vol 14, Issue 02, 2022

ONLINE BRAND EXPERIENCE: SCALE DEVELOPMENT AND VALIDATION

Mitesh Piyush Jadav

Assistant Professor, Faculty of Management Studies, Marwadi University, Rajkot, Gujarat, India Email:mitesh.jadav@marwadieducation.edu.in

Dr.Naresh K. Patel

Professor & Dean, Faculty of Management & Information Science, Dharmsinh Desai University, Nadiad, Gujarat, India Email:deanmis@ddu.ac.in

Abstract

The research aims to develop a multi-dimensional scale that focuses on retail brand experience and its measurement. It has been seen that online brand communities have failed to maintain the quality of the consumer engagements, and it has impacted the overall profitability of the brands. Therefore, implementation of a scale is necessary to measure the overall level of engagement. Overall, it will also help the brand to improve their strategic outcomes. Along with that, overall quality of the online brand community engagement and quality of consumer interaction will also get improved.

Keywords: Online Brand experience, satisfaction, loyalty, Amazon, scale development

Introduction

It can be observed in the last couple of decades that a powerful research stream has come into play that focuses on the development of consumer-brand relationship. Consumer brand involvement is observed significantly in this line of research that reflects the overall interest level of the consumers towards the product. On the other hand, even after the insights gained from the consumer involvement research, shifting of scholarly emphasis can be seen towards different perspectives. A need for assessing the dynamic characteristics of consumer -brand relationships is observed, that are located explicitly in marketing settings.

Within the research context, interactive brand-related dynamics observed within the brand experienceis gaining a lot of attention. It is also associated with the consumer culture theory and the service dominant logic, associated with relationship marketing. The rationale regarding this process can be termed as the growing scholarly recognition towards consumer brand interaction and brand-based processes. Therefore, effective brand performance is gradually associated with Consumer brand experience (CBE). The research rationale aims to evaluate the importance of CBE scale development, and its relationship with sales growth, consumer relationship and brand referrals.

Most of the brand communities in the segment provide a unique purpose. However, the universal goal of the brands is to conduct explicit marketing investment towards ensuring long term business relationship with potential customers. As mentioned by Padmavathyet al. (2019), as a way to ensure viable returns from these investments, better consumer insights need to be extracted from the consumer interaction segment. It is more likely to provide financial and attitudinal benefits towards the brand, resulting in improved financial performance. Improved measurement of the CBE will also result in operational standards of excellence, resulting in an enhanced brand communication. Even after these needs, consumer motivation regarding brand community participation has failed to cope up with the ever-changing landscape of the industry (Lu et al. 2019). The CBE scale can be presented as an effective option in this regard, as a way to measure the overall consumer interaction with the brand. The research aims to present CBE as a key metric towards assessing brand performance. It can be observed that empirical research related to CBE has lagged, resulting in a limited understanding related to the concept. The main research factors can be termed as consumer engagement with brands, brand experience in self-concept and overall engagement.

The research objectives can be termed as:

1. To develop a scale which measures Online Brand experience.

2. To assess the impact of Online brand experience on satisfaction and loyalty.

The research questions can be termed as:

4429

Shivali Chirag Shah* Naresh K. Patel**

* Shivali Chirag Shah is an assistant professor at R.B. Institute of Management Studies (MBA) and Research Scholar (pursuing Ph.D. at DDU –Nadiad- Under the guidance of Dr. Naresh Patel)

** Naresh K. Patel is a professor & Dean, Faculty of Management and Information Sciences, Dharmsinh Desai University, Nadiad.

NUJBMS, Vol. 4, Nos. 1 & 2, January - June 2021

INVESTIGATING THE ROLE OF BEHAVIOURAL BIASES IN THE FORMULATION OF THE INTENT TO INVEST IN GOLD: A STUDY OF GUJARAT STATE

ABSTRACT

In recent years, the average income of Indians has increased significantly (Chaudhuri and Ghosh, 2021). Although it is well established that rising income drives up gold demand (World Gold Council, 2017), the relationship between gold purchase and income in India is more complex. Many factors influence the gold investment decision, and behavioural biases are among them. The primary goal of this research paper was to determine impact of behavioural biases on the intention to engage in gold investment. Overconfidence bias, loss aversion bias, and recency bias are the three behavioural biases examined in this study. 250 retail investors were selected through judgmental sampling techniques. According to the findings, all three biases are statistically significant and have a significant impact on gold investment intentions. Overconfident, risk averse, and recency biased respondents invest in gold.

Keywords: Gold Investment Intention, Overconfidence bias, loss aversion bias, recency bias

"GREEN SHOE OPTION IN INDIA: A REVIEW"

Ms. Agnya Patel

Research Scholar, Shri G.H. Patel P.G. Institute of Business Management, Sardar Patel University Vallabh Vidyanagar Dist- Anand, Gujarat

Dr. P.K. Priyan

Professor Shri G.H. Patel P.G. Institute of Business Management, Sardar Patel University Vallabh Vidyanagar Dist- Anand, Gujarat

Abstract

The primary market is an important constituent of the Indian financial system. It plays a fundamental role in promoting the economic growth and development of a nation by mobilizing the savings with the public towards investing it in the securities market. Investors invest in an IPO in anticipation to lock the profits by the differential between the issue price and listing price. But after the listing of shares on the stock market, when the listing price falls below the issue price in the secondary market, it harms the confidence of the investor, the reputation of the issuer company and the capital market. It also deters potential investors from investing in the capital market, which altogether hampers the development of an economy. Hence, this study is an attempt to understand and review the price stabilisation mechanism, the Green Shoe option in an IPO in India.

Key words - IPO, Green Shoe Option, over allotment option, Price stabilisation

"Effectiveness of Green Shoe Option as a price stabilisation mechanism in India by GARCH model"

Dr. P.K. Priyan^{#1}, Ms. Agnya Patel^{#2} ^{#1}Professor, Shri G.H. Patel P.G. Institute of Business Management, Sardar Patel University Vallabh Vidyanagar, Dist- Anand, Gujarat ^{#2}Research Scholar, Shri G.H. Patel P.G. Institute of Business Management, Sardar Patel University, Vallabh Vidyanagar, Dist- Anand, Gujarat

Abstract

The option of GSO introduced by SEBI allows the investment bankers to perform price stabilization of securities. The idea behind the introduction of the GSO option was to increase investor confidence and reduce the price volatility. This study is an attempt to determine the effectiveness of Over Allotment Option in the IPOs in its purpose of stabilising the aftermarket prices. This paper seeks to evaluate and estimate the volatility of IPOs with Green Shoe Option and IPOs without Green Shoe Option issued and listed in the National Stock Exchange (NSE), Mumbai, during the period 2004 to 2016 using GARCH Model.

Key words – Green Shoe Option, over allotment option, Price stabilisation, GARCH, Volatility

Aftermarket Performance of IPOs in India: A Comparison between IPOs with Green Shoe Option & IPOs without Green Shoe Option

Dr. P.K. Priyan¹, Ms. Agnya Patel²

¹Professor, G.H. Patel P.G. Institute of Business Management, Sardar Patel University, Vallabh Vidyanagar, Dist- Anand, Gujarat

²Research Scholar, G.H. Patel P.G. Institute of Business Management, Sardar Patel University, Vallabh Vidyanagar, Dist- Anand, Gujarat

Abstract

Several studies reflect that the IPOs are normally underpriced in short run, however there are certain securities which are observed to be overpriced and hence the stabilizing option comes into existence. The price stabilization protects the IPO from huge price fluctuations and protects investors from significant loss. Such concept is known as Green Shoe Option (GSO) in the industry and is internationally recognized system to stabilize the aftermarket prices of IPOs. GSO is accountable to improvise the imbalance raised in the market and stabilize the stock price in the respective market. This study is an attempt to study the aftermarket performance of IPOs listed on National Stock Exchange in India during the period of 2004 to 2016. It seeks to evaluate and compare the short term performance and long term performance of IPOs with GSO and IPOs without GSO. The findings suggest that there is no significant difference in the performance of IPOs with GSO and without GSO.

Keywords – aftermarket performance, green shoe option, IPO

Introduction

There are various other studies that examine the long and short run performance of the firms issuing the IPOs. There have been instances that indicate that in case of Indian IPOs, the initial returns have been very high and this substantiates the fact that the phenomenon of under pricing exists in the capital markets of India. In cases where the investor holds the money till the end of fifth year, his earnings would have been more than the market returns

From an Indian context, there have been multiple researches that have been done to

gauge the long-run performance and majority of the instances were taken within a period of three years of listing. In a study conducted by (Madhusoodan & Thiripalraju, 1997)on BSE IPOs during the period of 1992-1995, the results showed that there is a higher return yielded in comparison to the negative returns recorded in most parts of the globe. Another research showed that the IPOs in India are underpriced and there has been a long-run underperformance reported. As per the academicians, the phenomenon of IPO under pricing has been observed in each country across the globe.

It was analyzed that there is a list of mixed findings concluded by the different researchers in case of IPO and its market performance in long run. The findings were different across the different countries across the globe. (Levis, The long-run performance of initial public offerings: The UK experience 1980-88, 1993)And (Espenlaub, Gregory, & Tonks, 1998)(Aggarwal & Rivoli, Fads in the initial public offering market, 1990)stated that there is a limited description over the existence of long-run performance evaluation of overpriced IPOs in UK. Furthermore, (Aggarwal & Rivoli, Fads in the initial public offering market, 1990), (Ritter, 1987) and (Loughran & Ritter, 1995)had conducted similar research studies in US and analyzed that there is a similar output received in that region. Research conducted by Ibbotson stated that there is a negative relation between initial return on IPO and long run performance in US (Price, 1975). The study conducted in Australia show that overpriced IPOs result in poor performance in the long run (Lee, Taylor, & Walter, 1996). As per the research of (Hwang & Jayaraman, 1992) and (Kim, Krinsky, & Lee, 1995), the overall performance of IPO stocks in the region of Japan, Spain, Malaysia and Korea **Copernican Journal of Finance & Accounting**



e-ISSN 2300-3065 p-ISSN 2300-1240

2021, volume 10, issue 1

Divyesh Patel, C.S., & Patel, N.K. (2021). India Gas Exchange Today's Reality and Path Ahead. Copernican Journal of Finance & Accounting, 10(1), 31–51. http://dx.doi.org/10.12775/CJFA.2021.002

C.S. DIVYESH PATEL*

C.K. Shah Vijapurwala Institute of Management Dharmsinh Desai University

NARESH K. PATEL^{**}

Dharmsinh Desai University

INDIA GAS EXCHANGE TODAY'S REALITY AND PATH AHEAD

Keywords: Indian Gas Exchange (IGX), Indian Energy Exchange (IEX), Oil and Gas sector of India.

J E L Classification: Q4, P28, O13.

Abstract: This research aims to study structure, functioning and operational mechanism of India's first gas exchange i.e. Indian Gas Exchange (IGX) which is a subsidiary of Indian Energy Exchange (IEX). Exploratory research is used to study and investigate conceptual framework and operational mechanism of IGX. The results of the study show that IEX has unveiled the nation's first automated natural gas exchange trading platform called IGX for well organized and hefty Gas market and to stimulate gas trading in the country. IGX would lead India towards Gas Based Economy by designing and providing robust solution for natural gas trading and access. So far as price mechanism

Date of submission: November 7, 2020; date of acceptance: January 3, 2021.

^{*} Contact information: csdpatel@gmail.com, C. K. Shah Vijapurwala Institute of Management (CKSVIM), R. V. Desai Road, Nr, Goya Gate Circle, Pratapnagar, Vadodara, Gujarat, India, phone: (+91) 9998685685; ORCID ID: https://orcid.org/0000-0002-2357-9786.

^{**}Contact information: nareshpatel13@gmail.com, Faculty of Management and Information Sciences, Dharmsinh Desai University, Nadiad, Gujarat, India, phone: (+91) 9426699665; ORCID ID: https://orcid.org/0000-0001-9032-5295.

INTERNATIONAL RESEARCH JOURNAL OF EDUCATION AND TECHNOLOGY

<u>A CENACENACENACENACE</u>



CERTIFICATE OF PUBLICATION

This is to certify that **Prof. (Dr.) Frince C Thomas**

Assistant Professor, Centre for Management Studies, Dharmsinh Desai University

NADIAD. - 387 001 Dist. Kheda - Gujarat - India

Published a paper entitled To determine preference of working Women for investment in Stock Market and Mutual Fund Has been Published in

Volume: 02 Issue: 02 June 2021 Page No- 59-65



(www.irjweb.com)

International Innovative Journal Impact Factor (IIJIF)

My Man

authorized signature





INTERNATIONAL RESEARCH JOURNAL OF EDUCATION AND TECHNOLOGY

(www.irjweb.com)

CERTIFICATE OF PUBLICATION

This is to certify that

DR. FRINCE C THOMAS

ASSISTANT PROFESSOR, CENTER FOR MANAGEMENT STUDIES, DHARMSINH DESAI UNIVERSITY, NADIAD = 387 001

Published a paper entitled

To Evaluate Scope of Product Placement in Bollywood Movies on Audience

Has been Published in

Volume: 01 Issue: 02







authorized signature