

# INTERNATIONAL JOURNAL OF RESEARCH IN COMPUTER APPLICATION & MANAGEMENT

IJRCM



A Monthly Double-Blind Peer Reviewed Refereed Open Access International e-Journal - Included in the International Serial Directories

Indexed & Listed at:

Ulrich's Periodicals Directory ©, ProQuest, U.S.A., EBSCO Publishing, U.S.A., Index Copernicus Publishers Panel, Poland,

Open J-Gate, India [link of the same is duly available at Infilbnet of University Grants Commission (U.G.C.)]

as well as in Cabell's Directories of Publishing Opportunities, U.S.A.

Circulated all over the world & Google has verified that scholars of more than Hundred & Thirty Two countries/territories are visiting our journal on regular basis.

Ground Floor, Building No. 1041-C-1, Devi Bhawan Bazar, JAGADHRI – 135 003, Yamunanagar, Haryana, INDIA

[www.ijrcm.org.in](http://www.ijrcm.org.in)

# CONTENTS

Sr. No.	TITLE & NAME OF THE AUTHOR (S)	Page No.
1.	SOCIO-ECONOMIC INFLUENCE OF SHARI'AH ON CONSUMERS' MOTIVES AND PERCEPTION IN ZAMFARA STATE, NIGERIA DR. HALIRU BALA	1
2.	EFFECTIVENESS OF COMPUTER ASSISTED INSTRUCTION IN RELATION TO THE LEARNING OUTCOMES OF THE ENGINEERING MANAGEMENT STUDENTS OF UNIVERSITY X MA. TEODORA E. GUTIERREZ	4
3.	IDENTIFYING TECHNOLOGICAL PARAMETERS EFFECTIVE ON COMPETITIVENESS OF SMALL AND MEDIUM-SIZED RESIN COMPANIES ACCORDING TO UNIDO MODEL: CASE STUDY OF IRAN KEATON POLYESTER MANUFACTURING COMPANY EHSAN GHASEMI, SEYED REZA HEJAZI, ABOLGHASEM ARABIOUN & REZA ALIBAKHSHI	6
4.	IMPACT OF ISLAMIC BUSINESS ETHICS ON FAMILY CONSUMPTION DECISION MAKING IN ZAMFARA STATE, NIGERIA DR. HALIRU BALA	12
5.	ETHICAL ISSUES AND CONSUMER PERCEPTION ABOUT BRANDED AND UNBRANDED MILK PRODUCTS: THE EMERGING SCENARIO DR. ASHOK AIMA & NARESH SHARMA	15
6.	SOFTWARE PROJECT MANAGEMENT - BEST PRACTICES DR. K. A. PARTHASARATHY	19
7.	RECALLING ANCIENT WISDOM FOR A SUSTAINABLE DEVELOPMENT DR. PADMA SHANKAR	23
8.	RADIO FREQUENCY IDENTIFICATION (RFID) TANAJI D. DABADE, DR. SHIVAJI U. GAWADE & ALEKHA CHANDRA PANDA	27
9.	SERVICE QUALITY MODELS IN HEALTHCARE - A REVIEW (1990-2010) K. VIDHYA, DR. C. SAMUDHRA RAJKUMAR & DR. K. TAMILIYOTHI	34
10.	A I R E P: A NOVEL SCALED MULTIDIMENSIONAL QUANTITATIVE RULES GENERATION APPROACH SAPNA JAIN, DR. M. AFSHAR ALAM & DR. RANJT BISWAS	45
11.	AN ANALYSIS OF ONLINE IDENTITY MANAGEMENT TECHNIQUES APARAJITA PANDEY & DR. JATINDERKUMAR R. SAINI	53
12.	PAPR REDUCTION OF OFDM BASED ON ADAPTIVE ACTIVE CONSTELLATION EXTENSION NEELAM DEWANGAN & MANGAL SINGH	56
13.	ANALYZING THE OUTPERFORMING SECTOR IN THE VOLATILE MARKET DR. SANDEEP MALU, DR. UTTAM RAO JAGTAP & RAHUL DEO	60
14.	AN ANALYTICAL STUDY OF JOB STRESS AMONG SOFTWARE PROFESSIONALS IN INDIA DR. SURENDRA KUMAR	65
15.	PROCESS FRAMEWORK FOR BUSINESS VALUE ENHANCEMENT BY IMPROVING OPERATIONAL EFFICIENCY RAMAKRISHNAN. N	71
16.	AN OVERVIEW OF SUPPLY CHAIN MANAGEMENT PRACTICES IN INDIAN AUTOMOBILE SECTOR R.VENKATESHWAR RAO	75
17.	AN EMPIRICAL STUDY OF BRAND PREFERENCE OF MOBILE PHONES AMONG COLLEGE AND UNIVERSITY STUDENTS DR. DINESH KUMAR	81
18.	ICT IN BANKING SECTOR: DISASTER AND RECOVERY OF INFORMATION GAGAN DEEP, SANJEEV KUMAR & ROHIT KUMAR	86
19.	CREDIT CARDS AND ITS IMPACT ON BUYING BEHAVIOUR: A STUDY WITH REFERENCE TO RURAL MARKET P.MANIVANNAN	89
20.	EMERGING APPLICATIONS AND SECURITY FOR VoIP: A STUDY HEMA JANDSALAR & DR. B. S. JANGRA	93
21.	SUCCESSION PLANNING IN INDIAN BANKING SYSTEM: A STUDY CONDUCTED AMONG BANK OFFICERS OF COIMBATORE DR. RUPA GUNASEELAN & S.DHANA BAGIYAM	96
22.	A CONCEPTUAL STRUCTURE FOR KNOWLEDGE MANAGEMENT MODEL IN HIERARCHICAL DISTRIBUTED ENVIRONMENT: CASE STUDY OF KNOWLEDGE SHARING AMONG DIFFERENT GOVERNMENT ORGANIZATION WORKING FOR PLANNING AND FACILITATING WATER RESOURCES IN UTTARAKHAND STATE JATIN PANDEY & DARSHANA PATHAK JOSHI	99
23.	A DNA-BASED ALGORITHM FOR MINIMUM SPANNING TREE PROBLEM USING TEMPERATURE GRADIENT TECHNIQUE B.S.E.ZORAIDA	102
24.	MARKET BASKET ANALYSIS: A DATA MINING TOOL FOR MAXIMIZING SALES & CUSTOMER SUPPORT KALPANA BABASO SALUNKHE, MURLIDHAR S. DHANAWADE & SACHIN PATIL	107
25.	FAULT DETECTION IN NETWORKS BASED ON DYNAMIC INTERVAL BASED ACTIVE PROBING BANUMATHI R	110
26.	ISSUES AND CHALLENGES IN ELECTRONIC WASTE DR. KUNTAL PATEL & NIRBHAY MEHTA	113
27.	STUDY ON CSR OF WIPRO, TATA & RIL SHWETA PATEL & ZARNA PATEL	116
28.	EMPOWERING RURAL WOMEN – ROLE OF MICROFINANCE DR. NANU LUNAVATH	119
29.	ROLE OF E-LEARNING IN EDUCATION: A STUDY OF UNIVERSITY OF JAMMU ANJU THAPA	126
30.	ADVERTISING: DO THEY HELP CONSUMERS IN MAKING SOUND PURCHASE DECISIONS? PINKI	130
	REQUEST FOR FEEDBACK	132

## CHIEF PATRON

**PROF. K. K. AGGARWAL**

Chancellor, Lingaya's University, Delhi  
Founder Vice-Chancellor, Guru Gobind Singh Indraprastha University, Delhi  
Ex. Pro Vice-Chancellor, Guru Jambheshwar University, Hisar

## PATRON

**SH. RAM BHAJAN AGGARWAL**

Ex. State Minister for Home & Tourism, Government of Haryana  
Vice-President, Dadri Education Society, Charkhi Dadri  
President, Chinar Syntex Ltd. (Textile Mills), Bhiwani

## CO-ORDINATOR

**MOHITA**

Faculty, Yamuna Institute of Engineering & Technology, Village Gadholi, P. O. Gadholi, Yamunanagar

## ADVISORS

**DR. PRIYA RANJAN TRIVEDI**

Chancellor, The Global Open University, Nagaland

**PROF. M. S. SENAM RAJU**

Director A. C. D., School of Management Studies, I.G.N.O.U., New Delhi

**PROF. S. L. MAHANDRU**

Principal (Retd.), Maharaja Agrasen College, Jagadhri

## EDITOR

**PROF. R. K. SHARMA**

Professor, Bharti Vidyapeeth University Institute of Management & Research, New Delhi

## CO-EDITOR

**MOHITA**

Faculty, Yamuna Institute of Engineering & Technology, Village Gadholi, P. O. Gadholi, Yamunanagar

## EDITORIAL ADVISORY BOARD

**DR. RAJESH MODI**

Faculty, Yanbu Industrial College, Kingdom of Saudi Arabia

**PROF. PARVEEN KUMAR**

Director, M.C.A., Meerut Institute of Engineering & Technology, Meerut, U. P.

**PROF. H. R. SHARMA**

Director, Chhatrapati Shivaji Institute of Technology, Durg, C.G.

**PROF. MANOHAR LAL**

Director & Chairman, School of Information & Computer Sciences, I.G.N.O.U., New Delhi

**PROF. ANIL K. SAINI**

Chairperson (CRC), Guru Gobind Singh I. P. University, Delhi

**PROF. R. K. CHOUDHARY**

Director, Asia Pacific Institute of Information Technology, Panipat

**DR. ASHWANI KUSH**

Head, Computer Science, University College, Kurukshetra University, Kurukshetra

**DR. BHARAT BHUSHAN**

Head, Department of Computer Science & Applications, Guru Nanak Khalsa College, Yamunanagar

**DR. VIJAYPAL SINGH DHAKA**

Dean (Academics), Rajasthan Institute of Engineering & Technology, Jaipur

**DR. SAMBHAVNA**

Faculty, I.I.T.M., Delhi

**DR. MOHINDER CHAND**

Associate Professor, Kurukshetra University, Kurukshetra

**DR. MOHENDER KUMAR GUPTA**

Associate Professor, P. J. L. N. Government College, Faridabad

**DR. SAMBHAV GARG**

Faculty, M. M. Institute of Management, Maharishi Markandeshwar University, Mullana

**DR. SHIVAKUMAR DEENE**

Asst. Professor, Dept. of Commerce, School of Business Studies, Central University of Karnataka, Gulbarga

**DR. BHAVET**

Faculty, M. M. Institute of Management, Maharishi Markandeshwar University, Mullana

**ASSOCIATE EDITORS****PROF. ABHAY BANSAL**

Head, Department of Information Technology, Amity School of Engineering & Technology, Amity University, Noida

**PROF. NAWAB ALI KHAN**

Department of Commerce, Aligarh Muslim University, Aligarh, U.P.

**DR. ASHOK KUMAR**

Head, Department of Electronics, D. A. V. College (Lahore), Ambala City

**ASHISH CHOPRA**

Sr. Lecturer, Doon Valley Institute of Engineering & Technology, Karnal

**SAKET BHARDWAJ**

Lecturer, Haryana Engineering College, Jagadhri

**TECHNICAL ADVISORS****AMITA**

Faculty, Government M. S., Mohali

**MOHITA**

Faculty, Yamuna Institute of Engineering & Technology, Village Gadholi, P. O. Gadholi, Yamunanagar

**FINANCIAL ADVISORS****DICKIN GOYAL**

Advocate & Tax Adviser, Panchkula

**NEENA**

Investment Consultant, Chambaghat, Solan, Himachal Pradesh

**LEGAL ADVISORS****JITENDER S. CHAHAL**

Advocate, Punjab & Haryana High Court, Chandigarh U.T.

**CHANDER BHUSHAN SHARMA**

Advocate & Consultant, District Courts, Yamunanagar at Jagadhri

**SUPERINTENDENT****SURENDER KUMAR POONIA**

## **CALL FOR MANUSCRIPTS**

We invite unpublished novel, original, empirical and high quality research work pertaining to recent developments & practices in the area of Computer, Business, Finance, Marketing, Human Resource Management, General Management, Banking, Insurance, Corporate Governance and emerging paradigms in allied subjects like Accounting Education; Accounting Information Systems; Accounting Theory & Practice; Auditing; Behavioral Accounting; Behavioral Economics; Corporate Finance; Cost Accounting; Econometrics; Economic Development; Economic History; Financial Institutions & Markets; Financial Services; Fiscal Policy; Government & Non Profit Accounting; Industrial Organization; International Economics & Trade; International Finance; Macro Economics; Micro Economics; Monetary Policy; Portfolio & Security Analysis; Public Policy Economics; Real Estate; Regional Economics; Tax Accounting; Advertising & Promotion Management; Business Education; Management Information Systems (MIS); Business Law, Public Responsibility & Ethics; Communication; Direct Marketing; E-Commerce; Global Business; Health Care Administration; Labor Relations & Human Resource Management; Marketing Research; Marketing Theory & Applications; Non-Profit Organizations; Office Administration/Management; Operations Research/Statistics; Organizational Behavior & Theory; Organizational Development; Production/Operations; Public Administration; Purchasing/Materials Management; Retailing; Sales/Selling; Services; Small Business Entrepreneurship; Strategic Management Policy; Technology/Innovation; Tourism, Hospitality & Leisure; Transportation/Physical Distribution; Algorithms; Artificial Intelligence; Compilers & Translation; Computer Aided Design (CAD); Computer Aided Manufacturing; Computer Graphics; Computer Organization & Architecture; Database Structures & Systems; Digital Logic; Discrete Structures; Internet; Management Information Systems; Modeling & Simulation; Multimedia; Neural Systems/Neural Networks; Numerical Analysis/Scientific Computing; Object Oriented Programming; Operating Systems; Programming Languages; Robotics; Symbolic & Formal Logic and Web Design. The above mentioned tracks are only indicative, and not exhaustive.

Anybody can submit the soft copy of his/her manuscript **anytime** in M.S. Word format after preparing the same as per our submission guidelines duly available on our website under the heading guidelines for submission, at the email addresses: [infoijrcm@gmail.com](mailto:infoijrcm@gmail.com) or [info@ijrcm.org.in](mailto:info@ijrcm.org.in).

## **GUIDELINES FOR SUBMISSION OF MANUSCRIPT**

### 1. **COVERING LETTER FOR SUBMISSION:**

DATED: \_\_\_\_\_

**THE EDITOR**  
IJRCM

**Subject:** SUBMISSION OF MANUSCRIPT IN THE AREA OF \_\_\_\_\_.

(e.g. Finance/Marketing/HRM/General Management/Economics/Psychology/Law/Computer/IT/Engineering/Mathematics/other, please specify)

**DEAR SIR/MADAM**

Please find my submission of manuscript entitled ' \_\_\_\_\_ ' for possible publication in your journals.

I hereby affirm that the contents of this manuscript are original. Furthermore, it has neither been published elsewhere in any language fully or partly, nor is it under review for publication elsewhere.

I affirm that all the author (s) have seen and agreed to the submitted version of the manuscript and their inclusion of name (s) as co-author (s).

Also, if my/our manuscript is accepted, I/We agree to comply with the formalities as given on the website of the journal & you are free to publish our contribution in any of your journals.

#### **NAME OF CORRESPONDING AUTHOR:**

Designation:

Affiliation with full address, contact numbers & Pin Code:

Residential address with Pin Code:

Mobile Number (s):

Landline Number (s):

E-mail Address:

Alternate E-mail Address:

#### **NOTES:**

- a) The whole manuscript is required to be in **ONE MS WORD FILE** only (pdf. version is liable to be rejected without any consideration), which will start from the covering letter, inside the manuscript.
- b) The sender is required to mention the following in the **SUBJECT COLUMN** of the mail:  
**New Manuscript for Review in the area of** (Finance/Marketing/HRM/General Management/Economics/Psychology/Law/Computer/IT/Engineering/Mathematics/other, please specify)
- c) There is no need to give any text in the body of mail, except the cases where the author wishes to give any specific message w.r.t. to the manuscript.
- d) The total size of the file containing the manuscript is required to be below **500 KB**.
- e) Abstract alone will not be considered for review, and the author is required to submit the complete manuscript in the first instance.
- f) The journal gives acknowledgement w.r.t. the receipt of every email and in case of non-receipt of acknowledgment from the journal, w.r.t. the submission of manuscript, within two days of submission, the corresponding author is required to demand for the same by sending separate mail to the journal.

### 2. **MANUSCRIPT TITLE:** The title of the paper should be in a 12 point Calibri Font. It should be bold typed, centered and fully capitalised.

### 3. **AUTHOR NAME (S) & AFFILIATIONS:** The author (s) **full name, designation, affiliation (s), address, mobile/landline numbers**, and **email/alternate email address** should be in italic & 11-point Calibri Font. It must be centered underneath the title.

### 4. **ABSTRACT:** Abstract should be in fully italicized text, not exceeding 250 words. The abstract must be informative and explain the background, aims, methods, results & conclusion in a single para. Abbreviations must be mentioned in full.

5. **KEYWORDS:** Abstract must be followed by a list of keywords, subject to the maximum of five. These should be arranged in alphabetic order separated by commas and full stops at the end.
6. **MANUSCRIPT:** Manuscript must be in **BRITISH ENGLISH** prepared on a standard A4 size **PORTRAIT SETTING PAPER**. It must be prepared on a single space and single column with 1" margin set for top, bottom, left and right. It should be typed in 8 point Calibri Font with page numbers at the bottom and centre of every page. It should be free from grammatical, spelling and punctuation errors and must be thoroughly edited.
7. **HEADINGS:** All the headings should be in a 10 point Calibri Font. These must be bold-faced, aligned left and fully capitalised. Leave a blank line before each heading.
8. **SUB-HEADINGS:** All the sub-headings should be in a 8 point Calibri Font. These must be bold-faced, aligned left and fully capitalised.
9. **MAIN TEXT:** The main text should follow the following sequence:

**INTRODUCTION**

**REVIEW OF LITERATURE**

**NEED/IMPORTANCE OF THE STUDY**

**STATEMENT OF THE PROBLEM**

**OBJECTIVES**

**HYPOTHESES**

**RESEARCH METHODOLOGY**

**RESULTS & DISCUSSION**

**FINDINGS**

**RECOMMENDATIONS/SUGGESTIONS**

**CONCLUSIONS**

**SCOPE FOR FURTHER RESEARCH**

**ACKNOWLEDGMENTS**

**REFERENCES**

**APPENDIX/ANNEXURE**

It should be in a 8 point Calibri Font, single spaced and justified. The manuscript should preferably not exceed **5000 WORDS**.

10. **FIGURES & TABLES:** These should be simple, centered, separately numbered & self explained, and **titles must be above the table/figure**. Sources of data should be mentioned below the table/figure. It should be ensured that the tables/figures are referred to from the main text.
11. **EQUATIONS:** These should be consecutively numbered in parentheses, horizontally centered with equation number placed at the right.
12. **REFERENCES:** The list of all references should be alphabetically arranged. The author (s) should mention only the actually utilised references in the preparation of manuscript and they are supposed to follow **Harvard Style of Referencing**. The author (s) are supposed to follow the references as per the following:
  - All works cited in the text (including sources for tables and figures) should be listed alphabetically.
  - Use (ed.) for one editor, and (ed.s) for multiple editors.
  - When listing two or more works by one author, use --- (20xx), such as after Kohl (1997), use --- (2001), etc, in chronologically ascending order.
  - Indicate (opening and closing) page numbers for articles in journals and for chapters in books.
  - The title of books and journals should be in italics. Double quotation marks are used for titles of journal articles, book chapters, dissertations, reports, working papers, unpublished material, etc.
  - For titles in a language other than English, provide an English translation in parentheses.
  - The location of endnotes within the text should be indicated by superscript numbers.

**PLEASE USE THE FOLLOWING FOR STYLE AND PUNCTUATION IN REFERENCES:**

**BOOKS**

- Bowersox, Donald J., Closs, David J., (1996), "Logistical Management." Tata McGraw, Hill, New Delhi.
- Hunker, H.L. and A.J. Wright (1963), "Factors of Industrial Location in Ohio" Ohio State University, Nigeria.

**CONTRIBUTIONS TO BOOKS**

- Sharma T., Kwatra, G. (2008) Effectiveness of Social Advertising: A Study of Selected Campaigns, Corporate Social Responsibility, Edited by David Crowther & Nicholas Capaldi, Ashgate Research Companion to Corporate Social Responsibility, Chapter 15, pp 287-303.

**JOURNAL AND OTHER ARTICLES**

- Schemenner, R.W., Huber, J.C. and Cook, R.L. (1987), "Geographic Differences and the Location of New Manufacturing Facilities," Journal of Urban Economics, Vol. 21, No. 1, pp. 83-104.

**CONFERENCE PAPERS**

- Garg, Sambhav (2011): "Business Ethics" Paper presented at the Annual International Conference for the All India Management Association, New Delhi, India, 19-22 June.

**UNPUBLISHED DISSERTATIONS AND THESES**

- Kumar S. (2011): "Customer Value: A Comparative Study of Rural and Urban Customers," Thesis, Kurukshetra University, Kurukshetra.

**ONLINE RESOURCES**

- Always indicate the date that the source was accessed, as online resources are frequently updated or removed.

**WEBSITE**

- Garg, Bhavet (2011): Towards a New Natural Gas Policy, Political Weekly, Viewed on January 01, 2012 <http://epw.in/user/viewabstract.jsp>



## PAPR REDUCTION OF OFDM BASED ON ADAPTIVE ACTIVE CONSTELLATION EXTENSION

NEELAM DEWANGAN

M.TECH SCHOLAR

DEPARTMENT OF ELECTRONICS AND TELECOMMUNICATION ENGINEERING

CHHATRAPATI SHIVAJI INSTITUTE OF TECHNOLOGY

DURG

MANGAL SINGH

HEAD

DEPARTMENT OF ELECTRONICS AND TELECOMMUNICATION ENGINEERING

CHHATRAPATI SHIVAJI INSTITUTE OF TECHNOLOGY

DURG

## ABSTRACT

One of the main disadvantages of Orthogonal Frequency Division Multiplexing (OFDM) is its high peak-to-average power ratio (PAPR). As the simplest approach to reducing the PAPR, Clipping based Active Constellation Extension (CB-ACE) exhibits good practicability, and the repeated clipping-and-filtering (RCF) algorithm proposed by Jean Armstrong provides a good performance in PAPR reduction and out-of-band power's filtering. However, its way of filtering in frequency-domain requires RCF operations to control the peak regrowth, which degrades the bit error rate (BER) performance and greatly increases the computational complexity. Therefore, this paper put forward a new method of utilizing Adaptive Active Constellation extension to reduce PAPR by controlling both clipping level and the convergence factor at each step and thereby minimize the peak power signal. The simulation results show that, this method can still limit the out-of-band power to meet the requirement of transmit spectrum mask specified in the IEEE802.11a standard. Moreover, it dramatically reduces the PAPR as well as provides lower BER and computational complexity.

## KEYWORDS

CB-ACE, OFDM, PAPR, RCF.

## INTRODUCTION

As a promising technique, OFDM has been widely used in many new and emerging broadband communication systems, such as digital audio broadcasting (DAB), high-definition television (HDTV), wireless local area network (IEEE 802.11a and HIPERLAN/2). However, as the OFDM signals are the sum of signals with random amplitude and phase, they are likely to have large PAPR that requires a linear high-power-amplifier (HPA) with an extremely high dynamic range, which is expensive and inefficient. Furthermore, any amplifier nonlinearity causes intermodulation products resulting in unwanted out-of-band power. A number of approaches have been proposed to deal with the PAPR problem, including clipping, clipping-and-filtering (CF), coding, companding transform, active constellation extension (ACE), selected mapping (SLM), partial transmit sequence (PTS), and so on [1]. Compared with other methods, clipping is the simplest and of good practicality. In particular, Jean Armstrong has proposed a RCF Algorithm which is also called Clipping Based Active Constellation Extension, which dramatically reduces the PAPR and limits the out-of-band power to a low level, but excessively increases the computational complexity as well. Based on Jean Armstrong's method, this paper describes an improved approach which can provide good performance and lower complexity.

## DEFINITION OF OFDM SIGNALS AND PAPR

In OFDM, a block of  $N$  symbols,  $\{X_k, k=0, 1, \dots, N-1\}$ , is formed with each symbol modulating one of a set of subcarriers,  $\{f_n, n=0, 1, \dots, N-1\}$  with equal frequency separation  $1/T$ , where  $T$  is the original symbol period. An inverse discrete Fourier transform (IDFT) can efficiently generate the multicarrier symbols. The IDFT of vector  $X[k] = [X_0, X_1, \dots, X_{N-1}]$  results in  $T/N$  spaced discrete time signal  $x[n] = [x_0, x_1, \dots, x_{N-1}]$ . Thus, the transmitted signal is

$$x_n = \frac{1}{\sqrt{N}} \sum_{k=0}^{N-1} \exp(j \frac{2\pi k n}{N}) \quad 0 \leq k \leq N-1 \quad (1)$$

The PAPR of the transmitted signal can be written as

$$PAPR = \frac{\max_{0 \leq n \leq N-1} |x_n|^2}{E\{|x_n|^2\}} \quad (2)$$

The complementary cumulative distribution function (CCDF) is one of the most frequently used performance measures for PAPR reduction techniques, which denotes the probability that the PAPR of a data block exceeds a given threshold  $z$ . The CCDF of the PAPR of a data block of  $N$  symbols with Nyquist rate sampling is derived as

$$P(PAPR > z) = 1 - P(PAPR \leq z) = 1 - (1 - e^{-z})^N \quad (3)$$

## THE CB-ACE ALGORITHM

The basic principle of Clipping-Based Active Constellation Extension (CB-ACE) algorithm involves switching between the time domain and the frequency domain. Filtering and applying the ACE constraint in the frequency domain, after clipping in the time domain, both require iterative processing to suppress the subsequent regrowth of the peak power [3]. The CB-ACE algorithm is first used to clip the peak amplitude of the original Orthogonal Frequency Division Multiplexing (OFDM) signal. The clipping sample obtained after clipping the peak signals, denoted by  $c_n^{(0)}$ , is given by

$$c_n^{(0)} = \begin{cases} (|x_n^{(0)}| - A)e^{j\angle x_n^{(0)}}, & |x_n^{(0)}| > A \\ 0, & \text{otherwise} \end{cases} \quad (4)$$

where  $c_n^{(i)}$  is the Clipping sample of  $i$ th iteration,  $x_n^{(i)}$  is the oversampled OFDM signal,  $A$  is predetermined clipping level. The equation (4) says that the clipping sample is reduced to a value equal to zero when the peak amplitude of the original OFDM signal is less than or equal to the predetermined clipping level,  $A$ . If the peak amplitude of the original OFDM signal is greater than the predetermined clipping level, then the clipping sample is given by  $(|x_n^{(i)}| - A)e^{j\theta_n}$ , where the predetermined clipping level is subtracted from the oversampled OFDM signal and is then multiplied by an exponential value [3]. The predetermined clipping level, denoted by  $A$ , is related to the target clipping ratio,  $\gamma$  and is given by the equation 5 [3].

$$\gamma = \frac{A^2}{E[|x_n|^2]} \quad (5)$$

Where,  $\gamma$  is the target clipping ratio and  $A$  is predetermined clipping level. The clipping of the peak signal results to distortion of the original OFDM signal, namely In-Band Distortion and Out-of-Band Distortion. [3], [4]. The in-band distortion results in the system performance degradation and cannot be reduced, while, the out-of-band distortion can be minimized by filtering the clipped signals. The signal obtained after filtering the clipped signal is given by [3].

$$x^{(i+1)} = x^{(i)} + \mu \tilde{x}^{(i)} \quad (6)$$

where,  $\mu$  is positive real number ( $\mu$  varies from 0.1 to 1) and  $\tilde{x}^{(i)}$  is the anti-peak signal at the  $i$ th iteration given by

$$\tilde{x}^{(i)} = T^{(i)} c^{(i)} \quad (7)$$

where,  $T^{(i)}$  is transfer matrix at the  $i$ th iteration which is given by

$$T^{(i)} = \tilde{Q}^{(i)} \tilde{Q}^{(i)} \quad (8)$$

where,  $\tilde{Q}^{(i)}$  is conjugate of constellation order and  $\tilde{Q}^{(i)}$  is the constellation order

Though, the process of filtering completely eliminates the distortions caused by the clipping process, it introduces peak regrowth at some of the peak signals of the OFDM signal. The peak regrowth can be reduced by repeating the filtering process, which may again introduce some distortions. Therefore, the clipping and filtering processes are to be repeated until the peak signals are completely reduced. Hence, the Clipping-Based Active Constellation Extension (CB-ACE) Algorithm is also named as the Repeated Clipping and Filtering (RCF) process [3]

## THE PROPOSED ALGORITHM

The main objective of the Adaptive Active Constellation Extension (Adaptive ACE) algorithm for reducing the Peak-to-Average Power Ratio (PAPR) is to control both the clipping level and the convergence factor at each step and thereby minimize the peak power signal whichever is greater than the initial target clipping level [3]. The Adaptive Active Constellation Extension (Adaptive ACE) algorithm can be initialized by selecting the parameters namely the target clipping level, denoted by  $A$  and the number of iterations, denoted by  $i$ . In the first step, the iteration is taken as two i.e.,  $i = 2$  and the initial target clipping level is to be taken as  $A$  [3]. The predetermined clipping level, denoted by  $A$ , is related to the target clipping ratio,  $\gamma$  and is given by the equation (5) [3].

$$\gamma = \frac{A^2}{E[|x_n|^2]} \quad (9)$$

where,  $\gamma$  is the target clipping ratio and  $A$  is predetermined clipping level. The clipping of the peak signal results to distortion of the original OFDM signal, namely In-Band Distortion and Out-of-Band Distortion. [3]. The in-band distortion results in the system performance degradation and cannot be reduced, while, the out-of-band distortion can be minimized by filtering the clipped signals. The signal obtained after filtering the clipped signal is given by [3].

$$x^{(i+1)} = x^{(i)} + \mu \tilde{x}^{(i)} \quad (10)$$

The Convergence Factor (CF), denoted by  $\mu$  can be estimated by using the equation

$$\mu = \frac{R(x^{(i)}, \tilde{x}^{(i)})}{(x^{(i)}, \tilde{x}^{(i)})} \quad (11)$$

Where  $R$  is the real part,  $x^{(i)}$  is the peak signal above the predetermined level,  $\tilde{x}^{(i)}$  is the anti-peak signal at the  $i$ th iteration,  $(\cdot)$  is complex inner part. the anti-peak signal at the  $i$ th iteration given by

$$\tilde{x}^{(i)} = T^{(i)} c^{(i)} \quad (12)$$

where,  $T^{(i)}$  is transfer matrix at the  $i$ th iteration which is given by

$$T^{(i)} = \tilde{Q}^{(i)} \tilde{Q}^{(i)} \quad (13)$$

where,  $\tilde{Q}^{(i)}$  is conjugate of constellation order and  $\tilde{Q}^{(i)}$  is the constellation order. The original Orthogonal Frequency Division Multiplexing (OFDM) signal, denoted by  $x_n$ , is to be clipped in order to reduce the peak signals. The clipping signal is given by the equation

$$c_n^{(i)} = \begin{cases} (|x_n^{(i)}| - A)e^{j\theta_n}, & |x_n^{(i)}| > A \\ 0, & \text{otherwise} \end{cases} \quad (14)$$

where  $c_n^{(i)}$  is the Clipping sample of  $i$ th iteration,  $x_n^{(i)}$  is the oversampled OFDM signal,  $A$  is predetermined clipping level and for the next iteration is given by

$$A^{(i+1)} = A^{(i)} + \mu \nabla_A \quad (15)$$

where  $A^{(i+1)}$  is the next iteration level,  $A^{(i)}$  is the present iteration level,  $\mu$  is the convergence factor and  $\nabla_A$  is the gradient with respect to  $A$  which is given by

$$\nabla_A = \frac{E_{|x_n| > A} c_n^{(i+1)}}{N_p} \quad (16)$$

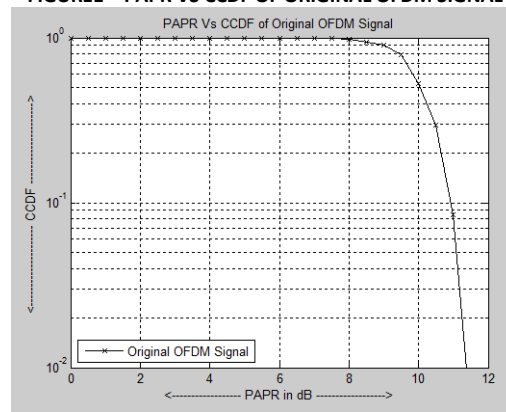
where  $N_p$  is the number of peak samples larger than  $A$ . The Peak-to-Average Power Ratio (PAPR) is to be calculated to the signal obtained by the equation (10), which reduces the PAPR than the PAPR calculated for the original OFDM signal or PAPR obtained of the OFDM signal obtained by using the Clipping-Based Active Constellation Extension (CB-ACE) algorithm.

## SIMULATION RESULTS

The Peak-to-Average Power Ratio (PAPR) of the original Orthogonal Frequency Division Multiplexing (OFDM) signal i.e., the PAPR is to be calculated by using the equations (1), (2) and (3). From the Figure 1, the Peak-to-Average Power Ratio (PAPR) of the original Orthogonal Frequency Division Multiplexing (OFDM) signal is equal to 11.8 dB with a Complimentary Cumulative Distribution Function (CCDF) of 10<sup>-2</sup> or 0.01. The Peak-to-Average Power Ratio (PAPR) of the original Orthogonal Frequency Division Multiplexing (OFDM) signal is very high, which is evident from the Screen Shot 2.1. The high PAPR results to the increase in the complexity of the Analog-to-Digital Convertors (ADCs) and Digital-to-Analog Convertors (DACs), also reduces the efficiency of the power amplifiers.

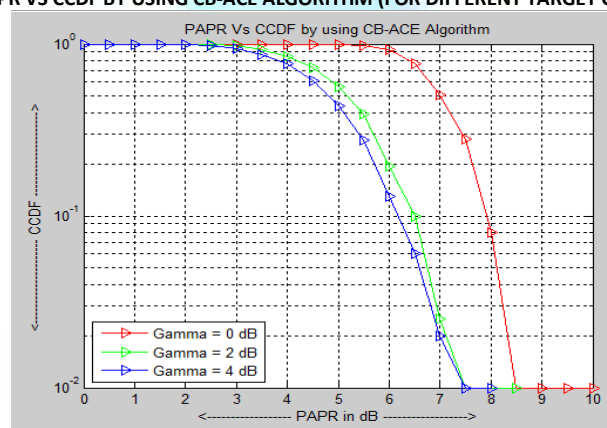


FIGURE1 – PAPR VS CCDF OF ORIGINAL OFDM SIGNAL



The Peak-to-Average Power Ratio (PAPR) by the Clipping-Based Active Constellation Extension (CB-ACE) algorithm is to be calculated for the Orthogonal Frequency Division Multiplexing (OFDM) signal which is obtained after filtering the clipped signal i.e., the PAPR is to be calculated for the equation (5) by using the equations (1), (2) and (3). The Complimentary Cumulative Distribution Function (CCDF) by the Clipping-Based Active Constellation Extension (CB-ACE) algorithm is to be calculated for the Orthogonal Frequency Division Multiplexing (OFDM) signal which is obtained after filtering the clipped OFDM signal. From the Figure 2, the Peak-to-Average Power Ratio (PAPR) of the Orthogonal Frequency Division Multiplexing (OFDM) signal obtained by using the Clipping-Based Active Constellation Extension (CB-ACE) algorithm is equal to 10 dB, 8.5 dB and 8.0 dB for the target clipping ratios of 0 dB, 2 dB and 4 dB respectively with a Complimentary Cumulative Distribution Function (CCDF) of  $10^{-2}$  or 0.01.

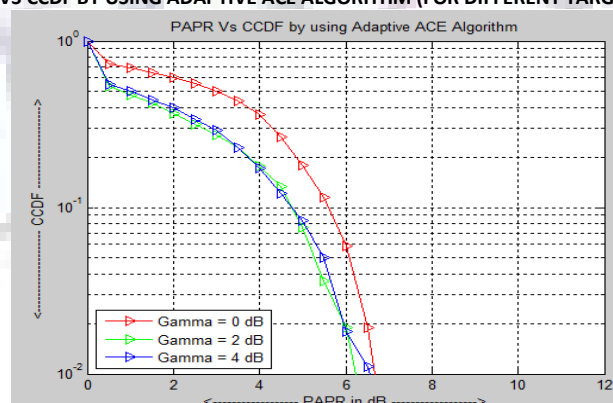
FIGURE 2 – PAPR VS CCDF BY USING CB-ACE ALGORITHM (FOR DIFFERENT TARGET CLIPPING RATIOS)



The Peak-to-Average Power Ratios is increasing as the target clipping ratios is decreasing i.e., minimum PAPR cannot be achieved, when the target clipping level is set below an initially unknown optimum value, which results to low clipping ratio problem.

The other problems faced by the Clipping-Based Active Constellation Extension (CB-ACE) algorithm are Out-of-Band Interference (OBI) and peak regrowth. Here, the Out-of-Band Interference (OBI) is a form of noise or an unwanted signal, which is caused when the original Orthogonal Frequency Division Multiplexing (OFDM) signal is clipped for reducing the peak signals which are outside to the predetermined area and the peak regrowth is obtained after filtering the clipped signal. The peak regrowth results to, increase in the computational time and computational complexity. To evaluate the performance of the proposed method we choose the software MATLAB completing the simulation based on Adaptive Active Constellation Extension (adaptive ACE) is to be calculated for the Orthogonal Frequency Division Multiplexing (OFDM) signal which is obtained after filtering the clipped signal i.e., PAPR is to be calculated for the equation (10) by using the equations (1), (2) and (3).

FIGURE 3 – PAPR VS CCDF BY USING ADAPTIVE ACE ALGORITHM (FOR DIFFERENT TARGET CLIPPING RATIOS)



From the figure 3, the Peak-to-Average Power Ratio (PAPR) of the Orthogonal Frequency Division Multiplexing (OFDM) signal obtained by using the Adaptive Active Constellation Extension (Adaptive ACE) algorithm is equal to 6.8 dB for all the target clipping ratios i.e., for  $\gamma = 0$  dB or  $\gamma = 2$  dB or  $\gamma = 4$  dB with a Complimentary Cumulative Distribution Function (CCDF) of  $10^{-2}$  or 0.01.

TABLE 5.1 – COMPARISON OF PAPR (IN DB) AND CCDF FOR DIFFERENT TECHNIQUES

Different Techniques	PAPR (in dB)	CCDF
Original OFDM Signal	11.8	$10^{-2}$ or 0.01
Clipping-Based Active Constellation Extension (CB-ACE) Algorithm	10.0 (For $\gamma = 0$ dB) 8.5 (For $\gamma = 2$ dB) 8.0 (For $\gamma = 4$ dB)	$10^{-2}$ or 0.01
Adaptive Active Constellation Extension (Adaptive ACE) algorithm	6.8 (For $\gamma = 0$ dB, 2 dB or 4 dB)	$10^{-2}$ or 0.01

From the table 5.1, the Peak-to-Average Power Ratio of the Orthogonal Frequency Division Multiplexing systems is reduced or minimized by using the existing methods namely Clipping-Based Active Constellation Extension (CB-ACE) and the proposed method namely Adaptive Active Constellation Extension (Adaptive ACE) Algorithm at a Complimentary Cumulative Distribution Function of  $10^{-2}$  or 0.01.

## CONCLUSIONS

In this paper, we have proposed a new algorithm based on Adaptive Active Based Constellation Extension to reduce the PAPR of OFDM signal. Compared with the CB-ACE algorithm, this method can dramatically reduce the peak regrowth and the computational complexity by avoiding RCF operations. Moreover, it can still meet the requirement of transmit spectrum mask specified in the IEEE802.11a standard, and greatly improve the BER performance even when the initial target clipping ratio is set below the unknown optimum clipping point. Hence, the proposed algorithm avoids the problem of low clipping ratio, which is caused in the process of reducing the PAPR by using the Clipping-Based Active Constellation Extension (CB-ACE) Algorithm

## REFERENCES

- [1] Seung Hee Han, Jae Hong Lee. An overview of peak-to-average power ratio reduction techniques for multicarrier transmission. Wireless Communications, IEEE, Vol.12, Issue 2, pp.56–65, April, 2005
- [2] J. Armstrong. New OFDM Peak-to-Average Power Reduction Scheme. IEEE cnf vehicular technology, Vol.1, pp.756-760, May, 2001
- [3] J. Armstrong. Peak-to-average power reduction for OFDM by repeated clipping and frequency domain filtering. Electronics letters, Vol.38, No.5, pp.246-247, Feb.2002
- [4] IEEE Standard, 802.11a. Part 11: Wireless LAN medium access control (MAC) and physical layer (PHY) specifications. IEEE, 1999

## **REQUEST FOR FEEDBACK**

**Dear Readers**

At the very outset, International Journal of Research in Computer Application and Management (IJRCM) acknowledges & appreciates your efforts in showing interest in our present issue under your kind perusal.

I would like to request you to supply your critical comments and suggestions about the material published in this issue as well as on the journal as a whole, on our E-mails i.e. **infoijrcm@gmail.com** or **info@ijrcm.org.in** for further improvements in the interest of research.

If you have any queries please feel free to contact us on our E-mail [infoijrcm@gmail.com](mailto:infoijrcm@gmail.com).

I am sure that your feedback and deliberations would make future issues better – a result of our joint effort.

Looking forward an appropriate consideration.

With sincere regards

Thanking you profoundly

**Academically yours**

Sd/-

**Co-ordinator**

## ABOUT THE JOURNAL

In this age of Commerce, Economics, Computer, I.T. & Management and cut throat competition, a group of intellectuals felt the need to have some platform, where young and budding managers and academicians could express their views and discuss the problems among their peers. This journal was conceived with this noble intention in view. This journal has been introduced to give an opportunity for expressing refined and innovative ideas in this field. It is our humble endeavour to provide a springboard to the upcoming specialists and give a chance to know about the latest in the sphere of research and knowledge. We have taken a small step and we hope that with the active co-operation of like-minded scholars, we shall be able to serve the society with our humble efforts.

## *Our Other Journals*

