

# Experimental Investigation on Evaluation of Minimum Flexural Reinforcement in RC Beams

Syed Jakeer Hussain, P. Poluraju

**Abstract:** Generally Reinforced concrete (RC) beams are designed with different percentages of flexural reinforcement depending on capacity demand. The amount of reinforcement provided affects the behavior i.e. crack propagation and failure process in RC beam. Minimum reinforcement ratios for RC beams should provide enough ductility after loss of tensile stress in concrete due to cracking. In this present study experimental work has carried out to understand behavior of RC beam. This study has carried out by varying different percentages of tension reinforcement i.e. 0.25%, 0.37%, 0.39%, 0.50%, 0.59%, 0.79% with size 2200mm × 150mm × 300mm. The beams were tested under four-point loading with loading frame (force controlled). The behavior of RC beams was assessed through load-deflection curve, flexural strength, ductility resulted from four point bending test. From experimental study it has been observed that flexural cracking strength is size dependent.

**Index Terms:** fracture mechanics, four-point bending, flexural cracking strength, minimum reinforcement, size effect.

## I. INTRODUCTION

Concrete beams are provided with steel reinforcement to bear tensile stresses. The percentage of steel reinforcement provided control the behavior and failure process in reinforced concrete (RC) beam. The failure can be of steel yielding followed by crushing of concrete in case of under reinforced beams and crushing of concrete in case of over reinforced beams. While designing reinforced concrete (RC) beam, minimum ductility needs to be assured to perform satisfactorily. This can be attained by providing sufficient quantity of tensile reinforcement. If beam is provided with less amount of steel than required, the failure turn to brittle. Minimum reinforcement in reinforced concrete (RC) beam should prevent brittle failure and must give proper warning before failure. For a reinforced concrete (RC) beams Assume if the beam is provided with less area of steel reinforcement than required then failure tends to brittle. This stimulates instability in overall response of beam. Prior to concrete cracking the load deflection response of PCC beam and RC beam is same. If ultimate strength generated with the reinforcement provided is less than the flexural cracking strength ( $\rho < \rho_{min}$ ). This will create immediate crack growth and leads to brittle failure. Therefore, certain amount of minimum tension reinforcement is necessary for ductile behavior ( $\rho > \rho_{min}$ ). provisions for minimum flexural reinforcement specified by most codes of practice is based on empirical approach without any theoretical background. Most of the codal provisions incorporate two parameters

mainly compressive strength of concrete and yield strength of steel. They neglect other parameters such as fracture energy of concrete and size of member. However, behavior of RC beams does not depend only on material properties but also on the size as well. The criteria for evaluating minimum reinforcement is beam should not fail instantly up on concrete crushing. To obtain this condition, ultimate capacity ( $M_u$ ) of RC beam should be greater than or equal to its cracking moment ( $M_{cr}$ ). most of the codes use flexural strength to evaluate cracking stress in beam. But large-scale specimens have less cracking bending strength than that of flexural strength. The benchmark for evaluating minimum flexural reinforcement in RC beams specified by some national standards are mentioned in Table 1. Flexural cracking strength of concrete is always higher than uniaxial tensile strength of concrete. Assume if concrete is a brittle material, thereupon after the extreme tension fibres reaches uniaxial tensile strength, right away it should fail. However, concrete is a quasi brittle material due to its tension softening nature. It can transmit stress across crack faces. This nature can be created using nonlinear fracture mechanics model (NLFM). cohesive crack model and fictitious crack model are able to carry quasi brittle nature of concrete. In traditional design method, tests on cylinder split tensile test, compression test and modulus of rupture are used to define concrete properties. These properties only cannot characterize the behavior of concrete. The utilization of fracture mechanics principles is essential to examine fracture and crack growth behavior of concrete. as percentage of flexural reinforcement increases, ultimate strength and ductility of RC beam increases. Using fracture mechanics principles minimum percentage of flexural reinforcement is inversely proportional to beam depth. Ductility number of RC beam increases with increasing beam depth [1]. Codal provision equations are independent of beam depth. But from experimental studies it has proved reinforced concrete beam responses are size dependent. It has been observed that flexural cracking strength is size dependent. Flexural cracking strength is inversely proportional to beam depth [2]. Experimental studies were conducted on beams by varying depth and length of specimens. Reinforcement percentage is taken as 0.15%. from studies it has been observed that load bearing capacity increases with decrease in member size. Another observation identified in this study is when a member size

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# Behavior of Circular CFST Columns with Central Wood Piece under Axial Loading

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**Abstract:** Over the past few years various studies are conducted to identify the behavior of concrete-filled steel tubular (CFST) columns. An investigation was conducted on a CFST column under axial loading. This paper mainly explores the carrying of the ultimate load in wood in filled CFST columns. The utilization of wood as inner core material to reduce the amount of concrete. For this research considering three pairs of specimens in each pair one specimen consist of wood. The dimensions of the three pairs are different and the two specimens in each pair have the same dimensions. Tests were conducted by loading frame. The confinement effect of steel tube and concrete filled in it guides the behavior of CFST columns. By the application of wood in CFST column properties like capacity, ductility, energy absorption will be enhanced. Experimental results are compared with Euro and Australian codes.

**Index Terms:** Axial Loading, CFST, Composite tubular columns, Wood Piece.

## I. INTRODUCTION

Concrete filled steel tubular columns are broadly used as structural component utilized in structures because of their performance characteristics which incorporate high ductility and strength.

There are two types of composite members are the concrete filled steel tubular column, In which concrete is filled in steel tube and the steel reinforced concrete column, In which consists of steel section encased in strengthened or unreinforced concrete. The CFST columns which decrease development cost. For the concrete core, the tube acts as longitudinal and lateral reinforcement so no need for extra reinforcement. When compared to the conventional procedure CFST column will contain high strength, durability and service life of the structure increases. Its mainly describes the axial load behavior of tubular column with central wood piece filled with concrete.

Over the past few years, various studies are conducted to identify the behavior of concrete-filled steel tubular column (CFST) columns. Analytical studies and tests about CFST columns exposed to joint flexure and axial load 1. Tests and analytical model an explanatory model for the strong force qualities of the flexural behavior of CFT sections is proposed and is found to repeat trial results, for example, the synergistic association between the steel tube and filled concrete with great accuracy 2. The load carrying capacities of bamboo in filled CFST samples have a low load in comparison with CFST samples 3. Confined concrete-filled

tubular columns in which extra confinement is accommodated the potential plastic hinge regions to enhance seismic execution 4. A proposed axial force proportion and torsional moment relationship utilizing extreme torsional quality of torsion were additionally explored 5. Concrete-encased CFST samples showed magnificent deformability under axial tension. Contrasted and RC samples enhanced break design was watched for the concrete-encased CFST samples 6. Various performance parameters are evaluated and discussed, and the influence of compressive strength of the concrete core applied axial loads, and inserted inner steel tubes on the seismic behavior of the column members 7.

## II. EXPERIMENTAL PROGRAM

Three pairs of concrete-filled steel tubular columns (CFST) specimens, In each pair one column filled with plain concrete and another column wood infilled CFST specimens, are taken for the investigation. Specimens are circular in shape CFST specimen is taken for the examination. The different cross-sectional region of wood is utilized for the examination.

The details of the specimens appear in Table 1. The constituent materials were weighed in weighing balance with the greatest limit of 300 kg. concrete mixer was utilized for blending concrete. At first, the coarse aggregate was included in the mixer. Along these lines, fine aggregate and cement were included. At that point, the required amount of water was added gradually into the mixer to frame consistent mixture. The diagrammatic representation of specimens as shown in Fig 1.

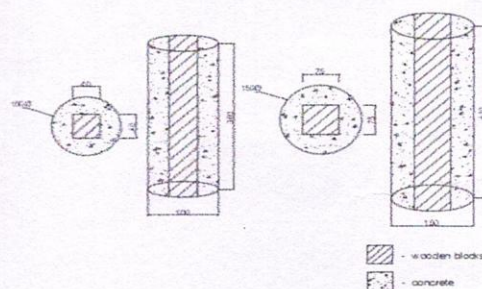


Fig. 1: Geometrical view of the specimen

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# Numerical Analysis of Cold Formed Steel Compression Members Based on Buckling Profile Under Eccentric Loading

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**Abstract:** This paper notably investigated the strength (ultimate load) of the member by taking the buckling profile that commemorates the application of the load. This study mainly contravenes with the previous studies that are majorly dependent on the empirical formulas that fails to provide similar results that outrage in experimental results. Considering the pinned ends that compensate a perfect parabolic curve, which helps in assessing the load details, carried out potential studies. The principle which envisages the investigation is that load acting on the pre-stressing can be decided based on the profile of the tendon. The numerical study further proceeded by the simulation technique and determined the distortional buckling characteristics of the compression member. The use of harmonic sine(or)cosine waves make significant escalated factor for the application of mathematical model in engineering sciences but the results are dejected when compared to parametric analysis.

**Index Terms:** Distortional buckling, Harmonic wave, Parabolic profile, Pinned ends, Ultimate load.

## I. INTRODUCTION

The beam column with slenderness ratio( $l/r$ ) greater than 22 is called slender column. High strength slender beam column is explicitly used in industrial parks installation due to owing to strength and stiffness properties. The numerical investigation of cold formed steel by using finite element analysis subjected to major axis bending agreed strength with combined shear and moment capacities of the specimen[1].The non linear inelastic analysis is used to determine the equilibrium state under eccentric loading .The post buckling characteristics can be entertained by redistributing the in-plane stresses within the buckled column. The modified direct strength method which is developed by the (AS/NZS) Australian and Newzeland code is seems to be more conservative for finding the ultimate load compared to American codes [2].

The top most attention and care should be taken to residual stresses which is developed during manufacturing of cold formed steel they can show a lot of influence on the post buckling strength of the member [3]. Highest load that is acting on the member is given by secant formula incase of negative eccentricities between shear centre and close to centroid and incase of positive eccentricity the torsional-flexural load plays a anchor role [4].The ultimate load of the column can be found by axial load-strain analysis procedure. Distortional mode developed in a member is included in NBR(Brazilian

association 2001), using finite strip method the inelastic analysis is carried out to determine the elastic buckling stresses for various half wave lengths [5]. Beam-column theory is the conservative procedure to carry out the investigation on initial imperfections, second order effects, local buckling due to residual stresses, variation of yield strength at corners [6]. The buckling type depends on the edge and intermediate stiffeners provided in the member which also takes consideration of non-linear analysis, geometric non-linearity [7]. In inelastic local and distortional buckling the strain capacity was decoded through finite element model extension to existing four point bending test that separates local and distortional buckling [8]. Post buckling strength of the stiffened compression plate elements makes them capable of resisting the stresses above buckling stresses and strains above that of yielding strains [9]. A finite element model of member subjected to bi- axial bending and torsion is engaged to study the large deflection and rotation analysis [10].The entire numerical analysis is based on the mathematical principles that expedite the application of mathematical principle in engineering sciences. First step in the numerical analysis is the application of the trail load that produce maximum bending moment and curvature from parameter study. The second step is to inculcate the parabola that is expected to come out of the given loading condition. Third step is to develop algebraic equation that needs to satisfy the given loading conditions.Since this is beam-column member to find the distortional buckling characteristics.A cold formed steel member mainly fails by the local buckling due to local imperfection and by distortional buckling at the cross section level. Numerical analysis is engaged for the outcome of the results related to the buckling profile of the member for different support conditions. The present investigation includes use of pinned supports for the generation of curve as shown in Fig. 1.

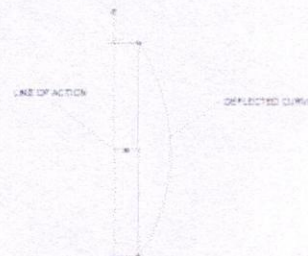


Fig. 1: Deflected Curve for Columns Having Pinned Ends

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# Spatial Distribution Analysis on Groundwater Quality of Sarada River Basin, Visakhapatnam, A.P. India

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**Abstract:** An attempt has been made to study the spatial distribution of pH, E.C, Chlorides and TDS of groundwater in the different sub-basins of Sarada River Basin, Visakhapatnam, A.P. The pH value of groundwater varies from 6.4 to 8.8 with an average of 7.6. The pH range is not within the limits prescribed by WHO or ISI either in the highest desirable level or maximum permissible level. E.C values ranges from 210 to 8000 micromhos/cm with an average of 4105 micromhos/cm. The chloride values of the study area ranges from 14 to 2486mg/l with an average of 1250mg/l. The TDS values of the study area ranges from 136 to 5200 mg/l with an average of 2668mg/l, exceeds the maximum permissible limit of ISI and ICMR. A small portion of the upper Sarada River and some southern part of lower Sarada River Basin which is close to the sea, characterized with sudden change in the values of pH, Electrical Conductivity, Chlorides and TDS which indicate some sort of pollution. The agricultural and industrial townships in the study area shows the minimum pH, high chloride and E.C. values. The study area also reveals that the pollution of groundwater is due to saline water intrusion and over use of fertilizers and pesticides in lower Sarada River Basin

**Index Terms:** pH, E.C, chlorides, TDS and groundwater pollution

The SRB lies between Latitudes  $17^{\circ} 25'$  and  $18^{\circ} 17'$  N and Longitudes  $82^{\circ} 13'$  and  $83^{\circ} 05'$  E. The SRB network starts from Eastern Ghats and contains mainly three rivers namely Bodderu River, Tacheru and Pedderu Rivers, Vedulla gedda and Mamidi vaka gedda.

The Sarada River basin consists of gneissic complex of khondalite group of rocks (65%), granite gneiss (20%), charnockites (10%) and quartzites (5%) of Archean age. The gneissic rocks cover a major portion of the basin with quartzites and charnockites as small linear patches at some places. Laterite duricrust occur in the northern part and gravely laterites occur in the northern and eastern part of the basin as small patches. The top soil group of the basin area are loamy soils, clayey soils, red lateritic soils and marine soils near the coast. The average rainfall of the basin area is about 1000mm. Physiographical, the sarada stream Basin have been separated keen on six sub-basins for the present study of hydro-chemistry namely 1.Upper Sarada 2.Bodderu River 3.Tacheru and Pedderu 4.Vedurla gedda 5.Mamidivaka gedda.. Are given in table-1.

## I. INTRODUCTION

A very large section of the population in urban and rural regions of India uses raw water from groundwater resources for human consumption. In groundwater resources, it is recognized to the value of groundwater is now since imperative since its amount. Through the pressing want intended used for rapid growth of fresh irrigate materials, enough notice is hardly ever known to quality issues and guard supplies, in spite of of the fact that in the long period these can be a grave restraint on sustainable growth.

## II. RESEARCH SIGNIFICANCE

Since the quality of public health depends to a large extent on the quality of drinking water, those are to be monitored systematically.

## III. DESCRIPTION OF WORK

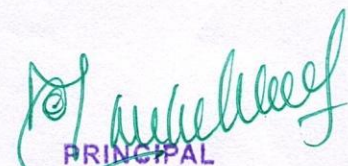
Sarada River Basin is (SRB) is situated in Visakhapatnam district of A.P, which spread over 2590sq.km with in the real study region is 1140 sq.km. The stream birth place at Madugula Konda and passes through Narasipoatnam plains and Visakhapatnam coast, which are parts of Eastern Ghats

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# Behavior of Circular CFST Columns with Central Wood Piece Under Biaxial Loading

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**Abstract:** Composite tubular columns have been used widely in the world as they have many outstanding structural properties such as highly compressive strength, large ductility and more energy absorption capacity. Study has been done to delve the behavior of Concrete Filled Steel Tubular (CFST) columns with central wood piece under biaxial loading through experimental results. Parameters such as Bearing Capacity and Deflection are discussed and compared for the specimens with and without central wood piece under biaxial loading. Based on the fundamental Structural Analysis and composite structures, the concept is mainly aimed at the initial behavior and service behavior of composite column. Here, biaxial loading is established by providing the eccentricity in the loading and analyzed the composite section.

**Index Terms:** Biaxial Loading, CFST, Composite tubular columns, Eccentric loading, Timber infill, Wood Piece.

## I. INTRODUCTION

Concrete Filled Steel Tubular (CFST) Columns is a type of hybrid system in which Concrete and Steel act as a Composite member. Composite action between the steel tube and concrete is primarily expected in the transverse direction for a tubed column. Concrete inside the steel tube increases stiffness to the steel tube and prevents it from local buckling. In this type of system, no reinforcement and formwork required as the outer core i.e., Steel tube provides reinforcement properties and acts as formwork, thereby reducing the time and cost of the member. Load capacity of this hybrid member is increased as the concrete is confined inside the steel tube. As steel has high ductility and high strength, CFST Columns acquire favorable ductility and high energy absorption capacities. In this type of CFST Column, Wood is used as the inner core which reduces the volume of concrete inside the CFST column and to prevent the inward failure of concrete.

Over the past few years, experimental studies have been conducted on the structural behaviour and structural performance of the CFST Columns. The structural behaviour of circular concrete columns with timber infill under axial compressions showed that timber infill contributes noticeable ductility for these complex structures and solid timber infill counters the inward failure of concrete. The accuracy of various lateral confining pressure models for sandwiched concrete in circular DCFST columns was examined by

comparing Analytical solutions experimentally. A Numerical Analysis algorithm was developed using Visual Basic and presented the mechanical behavior of short concrete filled steel tubular columns through Analytical studies. The slender composite section aids composite actions than Stocky sections whereas that ends of the columns are buckled and middle portion of the column is bulged for the larger diameter tubular columns under the compression. Confinement mechanism and local buckling can be demonstrated based on Shanley Theory.

The Thin walled CFST Columns under partial concentric compressive loading behaves as a ductile member for L/D ratio from 4.5 to 6 and a simplified model can predict the bearing capacity of the CFST Columns loaded partially to acceptable extent. Experimental values are larger than the superposed estimated formula and the inner tube in concrete filled double skin tubular column has no influence on the confinement effect of concrete. Timber and CFRP enhances the capacity-to-weight ratio of the composted member such that the strength of the composite member is approximately the summation of the individual strengths of the two materials.

## II. RESEARCH SIGNIFICANCE

As seen above, circular concrete filled steel tubular columns with central wood piece under biaxial loading have never been investigated in literature. On this basis, the presented work addresses the behavior of composite column under biaxial loading and to study the CFST columns intensively so that behavior can be determined approximately. The main aim was to study how the initial and service behavior was affected by bond strength between the wood piece, concrete core and the steel tube and the effect of eccentricity on the load carrying capacity and deflection.

## III. EXPERIMENTAL PROGRAM

This experiment fixates on the behavior of the composite columns due to eccentric loading. Testing procedure for this experiment is conducted on Universal Testing Machine. The ends of the column were restrained and the load was applied. LVDT and displacement meters were fixed to determine the axial displacement according to the load which is applied eccentrically. The Strain gauges were placed at various points such as I, II, III and IV i.e., top, bottom and at the middle of the column.

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# Smart Career Guidance and Recommendation System

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**Abstract** - Recommender system is a computer program build with the help of experts where the details of the students and their aptitudes help finding a right course for his future. This project proposes feasible predictions for student's field selection based on their marks and choice of interest. Choosing a right field in CSE/IT stream is very important for his/her future. If the decision went wrong it will be a mismatch between student aptitude, capability and personal interest. This project also reveals the research process for preparation of such a recommender system. Smart Career Guidance Recommendation System is developed for recommending skilling courses and certification courses in the CSE/IT domain. A substantial amount of literature focuses on predicting student performance in solving problems or completing courses. Many Machine learning techniques, such as decision trees artificial neural networks, matrix factorization, collaborative filters and probabilistic graphical models, have been applied to develop student performance prediction algorithms. In this paper, we identify and apply the suitable algorithms for Student specific skill oriented course recommendation system in the CSE/IT domain. We present the dataset built using the questionnaire and skill tests to extract the information regarding their interests, abilities.

**keywords** - Machine Learning, Course Recommendation System, Skill Prediction

## I. INTRODUCTION

Competition in today's society is heavily multiplying day by day. Especially it is too hard in present day's to face technical world. So as to compete and reach the goal of students, they need to be plan and organized from initial and final stages of their education. So it's important to perpetually assess their performance, establish their interests and assess however shut area unit they're to their goal and asses whether or not they are within the right path that directs towards their targeted. This helps them in improving themselves, motivating themselves to a better career path if their capabilities are not up to the mark to reach their goal and pre evaluate themselves before going to the career peek point.

Not only that recruiters while recruiting people into their companies evaluate candidates on different parameters and draw a final conclusion to select an employee or not and if selected, finds a relevant stream and career area to student. There are many types of roles like Database administrator, Business Process Analyst, Developer, Testing Manager, Networks Manager, Data scientist and so on. All these roles require some pre-requisite knowledge in them to be placed in them. So, recruiters analyze candidates performance in skills, talents and interests and place the candidate in the right job role suited for them. These kind of prediction systems make their recruitment tasks very easy because as the inputs are given, recommendation is done based on inputs.

Already these type of profession recommendation systems and course recommendation, prediction systems are widely used in various private personal analysing portals like Co-Cubes, AMCAT. They only consider features like technical abilities and psychometry of candidates into consideration. These portals analyze the students technically up to date and suggest the students and industries job roles suited on their performance. But here various factors including abilities of students in sports, academics and their hobbies, interests, competitions, skills and knowledge are also taken into consideration. As the input parameters and final classes of output are more in number typical programming and casual algorithms cannot give the fruitful and possible outcome classification and prediction. So advanced machine learning algorithms like SVM, Random Forest decision tree, One Hot encoding, XG boost are used.

## II. LITERATURE REVIEW

Many machine learning techniques, such as decision trees, artificial neural networks, matrix factorization, collaborative filters and probabilistic graphical models, have been applied to develop prediction algorithms. Most of this work ignores the continuous effect that students enhance their knowledge over time and follow the prediction as a one-time task. To take the temporal/sequential effect into account, a three-mode tensor factorization (on student/problem/time) technique was developed for predicting student performance in solving problems in IT Sector. There are mainly two issues while developing this sort of model one is weather the student is willing to build his career based on his interests and compassions and weather the student has proper identification of improving his Skills by pursuing certification courses based on the interests of the students. So a Questioner developed in this model must classify the reflections of the student outcomes.

In order to build a model that predicts the student interests and compassions towards a course is like a torchbearer because there is no model to predict and analyze the student compassion and make him aware with a course to build rightly and choose wisely. So in order to understand the prior knowledge of the individual it's good to consider the performance into account which makes a difference in learning. Student retention is an important issue in education. While intervention programs can improve retention rates, such programs need prior knowledge of student's performance. That is where performance prediction becomes important.

# Face Recognition based Attendance System using Machine Learning

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**Abstract** - Attendance is an important part of daily classroom ascertainment for the teacher for his or her smooth running of class. At the beginning and ending of the class, usually teacher check the attendance, but the manual attendance system may leads to appear that a teacher may miss someone or some students may answer multiple times. Now a days, Machine Learning has been highly explored for computer vision applications. So, we use the concept of machine learning in Face – recognition for automatic attendance systems. In this project, we perform the face recognition and face detection algorithms, to provide the computer systems the ability of finding and recognizing human faces fast and precisely in images or videos so that the systems can used in giving attendance.

**keywords** - Machine Learning, face recognition, assessment, face detection algorithm, LBPH,HAAR

## I. INTRODUCTION

Generally, in the classroom the attendance was taken by the teachers manually at the beginning and ending of the class. The problem with this approach is that it requires some time to take and also the manual process will have chances to make mistakes in most of the cases. To overcome that problem, RFID (Radio Frequency Identification) was introduced in the past years. But those are also having the fail proof of attendance system. So, we are introducing the concept of Face Recognition Based Attendance system, the main objective the proposed system is to allot attendance to the students using face recognition-based algorithms to achieve fail proof attendance system.

Face detection is used for many applications for the identification of human faces in digital images or video. It is defined as specific case of object-class detection; where it is used to find the locations and sizes of all objects in an image that belong to a given class. The technology is can be able to predict frontal or near-frontal faces in a photo, regardless of orientation, lighting conditions or skin color.

Face Recognition is a form of biometric software that maps an individual's facial features mathematically and stores the data as a faceprint. The software consists of Deep Learning algorithms to compare a live capture or digital image to the stored face print in order to verify an individual's identity.

### Face Recognition using Python

Faces are made of thousands of fine lines and features that must be matched. The face recognition using Python is used to break the task of identifying the face into thousands of smaller, bite-sized tasks, each of which is easy to face Recognition Python is the latest technology in Machine Learning techniques. OpenCV utilizes Machine Learning algorithms to search for faces within a picture.

### Facial Recognition using Python Libraries

An easy way to detect faces using Python is by using the OpenCV package which is written in C/C++, OpenCV now provides bindings for Python. It uses machine learning algorithms to search for faces within a picture. Faces are very complicated, made of thousands of small patterns and features that must be matched. The face recognition algorithms break the task of identifying the face into thousands of smaller, bite-sized tasks, each of which is easy to solve, known as classifiers.

A face may have 5000 or more classifiers, all of which must match for a face to be detected. Since there are at least 5,000 or more tests per block, you might have millions of calculations to do, which makes it a difficult process. To solve this, OpenCV uses cascades. The OpenCV cascade segments the problem of detecting faces into multiple stages. It performs a detailed test for each block. The algorithm can be performed on around 30 to 50 of these stages or cascades, and it will only detect a face if all stages pass. The cascades are a bunch of XML files that contain OpenCV data used to detect objects.

## II. LITERATURE REVIEW

Traditionally attendance was taken manually which is very time consuming and often leads to human error. Additionally, there are many uncertainties towards the sources of the attendance records which in fact, most of the attendance records are not retrieved from the actual situation. The old method that uses paper sheets for taking student's attendance can no longer be used. Based on the research, there are many solutions that are available to solve this issue. According to research journal "Attendance System Using NFC Technology with Embedded Camera on Mobile Device" (Bhise, Khichi, Korde, Lokare, 2015). The attendance system is improved by using Near Field. Communication (NFC) technology and mobile application. According to the research paper, each student is given a NFC tag that has a unique ID during their enrolment into the college. Attendance of

# An Effective Utilization of Bastion Host Services in Cloud Environment

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**Abstract:** Now a days the cloud computing offers huge benefits, security issues are major concerns that setback from enjoying the full range of advantages it offers. Bastion Host is specifically designed for network security that is placed on the network perimeter which provides protection in the form of patches, authentication, encryption, and eliminates unnecessary software and services and is a well-known concept. This paper discusses Bastion Host services, types and bastion host in a cloud environment AWS. The Priority Queue method for effective utilization of services is proposed and the results are promising in terms of improving throughput and resource utilization.

**Index Terms:** AWS, Bastion Host, DMZ, VPC

## I. INTRODUCTION

Bastion Hosts are designed for secure information flow between the public network and a private network. Bastion hosts sit on the network perimeter. It can play multiple roles such as router, DNS, FTP, SMTP, News, and/or Web servers. The responsibility of the network administrator is to identify \*the services needed on Bastion host to resist the possible attacks. The Hardening of Bastion hosts allow them to resist attacks from external sources thus protecting the internal network. Hardening involves securing the machine, configuring the required services, installing the necessary patches, controlling the services and protocols, locking the user accounts via modifying the Access Control Lists (ACLs), disabling all unnecessary TCP and UDP ports and running the security audit to establish a baseline. The task of the administrator is to do thorough testing of ACLs and unblocking or blocking the networking application without losing the required features. The usage of limited services reduces the resource utilization and throughput. In the existing systems the overhead of the network administrator is to identify the required services, check their healthiness, installations of required services and uninstallations of rest of the services. The various ways of identifying the required services and their installation, controlling and grouping the services without compromising the resource utilization and throughput are to be explored. Here the focus is on proposing the effective utilization of services using priority queue for the services which are needed. This method helps to reduce the overhead of the administrators, fastens the services and helps to increase the resource utilization and throughput.

### Necessity of Bastion Hosts on AWS

Bastion host responsible for allowing access from an external network (Internet for instance) to a private network.

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As it's placed in a demilitarized zone, it should reduce the chances of infiltration. For instance, when there are Linux instances launched in a subnet of Amazon VPC, bastion host can be used in this environment to lessen the risk of letting in the SSH connections from an external network.

Basically, bastion hosts instances are placed in the public subnet that are invoked using either RDP or SSH. It acts as a jump box or jump server, after the establishment of the remote connection to the bastion host, and then permits to use SSH or RDP to log in to other instances (of the private subnets) in Virtual Private Cloud. Fundamentally Bastion host acts as a bridge between the private and public networks via the internet once configuration is done well with the help of Network ACLs and the security groups. Outside the corporate firewall or the DMZ are the areas where the bastion host is generally hosted. It has the high probability of being accessed by the untrusted computers or internet. However, in some circumstances, it can play a different role such as Email Server, Web server, FTP Server, Proxy Server, DNS Server, Honey pots etc.[1]

## II. CHOOSING THE BASTION HOST OFFERED SERVICES

All types of services that a site required to access the Internet or offer to the Internet, services that are not secured providing directly via packet filtering, are provided by Bastion host.

The services which are not meant to access the Internet, should not be installed on a bastion host. For example, if the booting services are provided to the internal hosts, then it leads to compromising the bastion host and corresponding services will be available to the public network.

Services that are provided by the Bastion Host can be classified into four types:

### A. Secured Services:

Packet filtering can be used for secured services and if a pure-proxy firewall is used, then the most conventional way of doing so is to use only the bastion host or shouldn't be provided by any means.

### B. Insecure services as normally provided but be able to secure

Bastion host can be availed to host such kind of services.

### C. Insecure services as normally provided but will not be possible to secure

If, in case, these types of services are certainly needed, only then such services should be provided that too on a victim host (as already discussed) and also should be disabled.



# A Detailed Scrutiny and Reasoning on VLSI Binary Adder Circuits and Architectures

K Mariya Priyadarshini, R. S. Ernest Ravindran, P. Ratna Bhaskar

**Abstract:** In this document a survey on recent developments in the design of binary adders is done. Adders are the core cells of any arithmetic unit which define the speed of any processor. The motivation of this paper is to focus on different kinds of architectures of higher order binary adders that provide high speed, less power to increase the level of integration on any integrated circuits (IC). Though there are many algorithms proposed for improving the speed of an adder the challenges still remain in designing fast and accurate adders. At the schematic level we scrutiny six different adders for high speed and low power applications.

**Key words:** carry propagation delay, fast adder principles, carry selection, carry skip, prefix adders.

## I. INTRODUCTION

In communications and portable multimedia applications emerge, there is always a need for more prominent designs with low voltage, very thin size and high frequency of operation. Adders are the leaf cells in any DSP systems. Hence design of fast adders has become crucial as it affects the execution time of a digital system in variables of voltage and latency.

Every binary adder takes full adder as a basic cell which adds three single bits and its expressions of sum and carry are

$$\text{SUM} = A \text{ XOR } B \text{ XOR } C \text{ and} \\ \text{COUT} = A \cdot B + A \cdot C + B \cdot C$$

The basic multi bit binary adder is the Ripple Carry Adder (RCA). RCA utilizes full adders for multi bit addition. The carry out after each full adder addition is sent to next stage. If for an n-bit RCA  $C_{out}$  need to be evaluated it has to wait until full adder addition for n-1 stages is performed. Accordingly, the last sum and carry bits will be legitimate after a significant deferral [1]. To overcome the problem of carry propagation adders like carry look ahead adder, carry increment adder, carry select adder, carry look ahead adders and parallel prefix adders are presented in this paper [2]. A carry-look ahead adder (CLA) generates the sum bit irrespective of carry input it receives from previous stages. Carry is generated and propagated using look-ahead logic. The following figure 1.1 shows a basic 4-bit CLA [3]. From the figure we can see a look-ahead structure logic is used for generating carry. Due to this more number of MOS transistors are required to implement the circuit which increases area of the chip [3, 4]. Carry Look-ahead Adder (CLA) is a kind of optimized adder when compared with conventional RCA.

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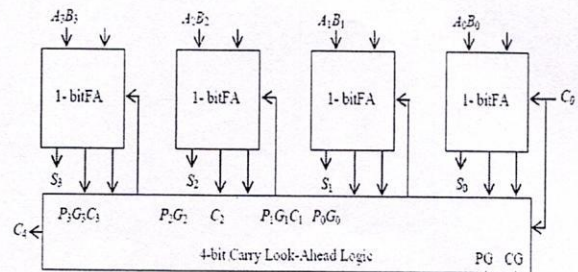


Fig 1.1 Block diagram of Carry Look Ahead Adder

Among the fast adders Carry Skip Adder (CSKA) is one option with reduced carry propagation delay. CSKA doesn't need any separate logic for generating and carry bits which reduces critical path length, but increases area and power dissipation same as RCA. Energy efficient product is very much low when compared to RCA and CLA [6, 7]. Layout for CSKA can be easily implemented with less wire lengths and regular structures. The slow compilation time of this adder structure to generate and propagate carry bits, limits its use in high frequency applications. However CSKA adder's performance degrades for higher order bits and in few combinations of bits, computational complexity equals RCA [8].

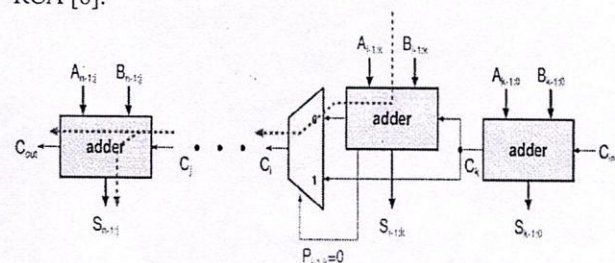


Fig 1.2 General architecture of Carry Skip Adder(CSKA)

$P_{i-1:k}=0$  (not all propagate signals from bit  $i-1$  to bit  $k$  are 1), the result of the carry is generated within this block.

$P_{i-1:k}=1$ , the carry of the previous block is propagated.

Carry Increment Adder (CIA) is one more efficient adder. By using clock phase techniques CIA increases the speed of carry propagation and sum generation. It also has smaller chip area compared with RCA, CLA and CSKA adder topologies but if the bit width is increased speed will be decreased and chip area. [9].

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LINEAR SOFT COMBINATION FOR COOPERATIVE SPECTRUM SENSING IN COGNITIVE RADIO NETWORKS OVER NAKAGAMI-M FADING CHANNELS

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Abstract-

In this paper we propose soft combining methods for cooperative spectrum sensing over fading channels in cognitive radio networks. Cognitive radio technology has been proposed to improve spectrum efficiency by having the cognitive radios act as secondary users to opportunistically access under-utilized frequency bands. Spectrum sensing, as a key enabling functionality in cognitive radio networks, needs to reliably detect signals from licensed primary radios to avoid harmful interference. However, due to the effects of channel fading/shadowing, individual cognitive radios may not be able to reliably detect the existence of a primary radio. So, we proposed Linear combination rule which is used to minimize the probability of missed detection subjected to an upper limit on the probability of false alarm based on Neyman-Pearson criterion. The detection performance of the proposed combination rule is verified in three typical fading scenarios: the Rayleigh fading, the Rician fading and the Nakagami fading. The Simulation results shows that the detection probability curves of soft combining schemes under independently and identically distributed (i.i.d.), Variables of Rayleigh, Rician and Nakagami fading channels.

Index Terms- soft combining methods, cognitive radio, Neyman-pearson criterion, cooperative spectrum sensing.

I. INTRODUCTION

Cognitive Radio (CR) is an adaptive, intelligent radio and network technology that can automatically detect available channels in a wireless spectrum and change transmission parameters enabling more communications to run concurrently and also improve radio operating behaviour. In which a transceiver can intelligently detect which communication channels are in use and which are not, and instantly move into vacant channels while avoiding occupied ones. This optimizes the use of available radio-frequency (RF) spectrum while minimizing interference to other users.

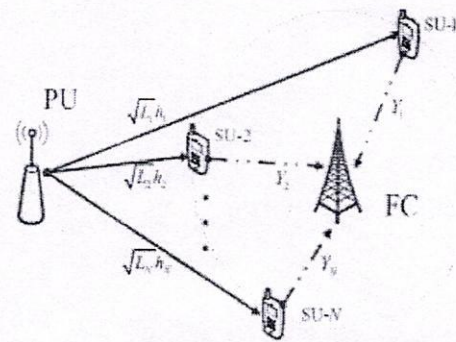


Figure 1: Cooperative sensing model with one PU, N SUs and one FC.

There are two main types of cognitive radio, full cognitive radio and spectrum-sensing cognitive radio. Full cognitive radio takes into account all parameters that a wireless node or network can be aware of. Spectrum-sensing cognitive radio is used to detect channels in the radio frequency spectrum.

Spectrum sensing is a critical technique in cognitive radio (CR) network for secondary user (SU) to identify the spectrum holes and to avoid harmful interference to primary user (PU). For example, by the European Telecommunications Standards Institute recommendation, the listen before- talk m/z

However, the sensing performance of an individual ED may deteriorate due to noise uncertainty or hidden node problem. To enhance the accuracy of spectrum sensing, cooperative sensing (CS) is proposed by exploiting the spatial diversity among the SUs. As shown in Fig.1, N SUs independently observe the band of interest, and forward the local test statistics {yi} to a fusion center (FC)

According to the Neyman-Pearson criterion, the optimal fusion rule is the log -likelihood ratio (LLR) test

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# Design and Implementation of Indoor Environment Monitoring and Control System

Koteswara Rao Ponnuru<sup>1</sup>, Sekhara Babu Velpula<sup>2</sup>, Raveendra Pilli<sup>3</sup>, Ravi Bhukya<sup>4</sup>  
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Enikepadu, Vijayawada

**Abstract :** After more than 20 years of development, Internet of things has a lot of applications in the actual scene, which greatly facilitates people's work and life. As people paying more and more attention to environmental quality, the application of Internet of Things in indoor environment monitoring and control has become an important branch. In this paper we present a set of lightweight intelligent solutions for the management of rooms after studying the key technologies of IoT. The system uses sensors to obtain environmental information, through the process of arduino, such as temperature sensing and gas leakage detection. The controllers will make adaptive response, such as turn on the air conditioner, water sprinkle. The experiments demonstrates the system can be a good solution to the backwardness of current room management, especially house rooms, college rooms, and provides a new application for IoT.

## I. INTRODUCTION

The current advances in the fields of technology and economy are having a significant impact over the Environment, and have led to serious concerns regarding pollution and climate change. Internet of Things (IoT) is a concept and a paradigm that considers pervasive presence in the environment of a variety of things/objects that through wireless and wired connections and unique addressing schemes are able to interact with each other and cooperate with other things/objects to create new applications, services and reach common goals. Environmental monitoring applications of the IoT normally exploit sensors to aid in environmental protection by monitoring parameters like temperature, gas detection and atmospheric conditions.

This paper designs a prototype of wireless environmental monitoring system to upload information from array of sensors to the database. This application allows us to observe or measuring the environmental conditions from remote location from anywhere in real time. This system consist of main three modules namely sensor nodes, the wireless communication and the web server. The sensor nodes in remote location collect the information from surrounding environmental conditions and send data wirelessly using Node MCU to the server.. Our concentration is to allowing simple data connections with little programming required and moreover easy of use.

Environment monitoring and device control allows new level of comfort in homes and it can also manage the energy consumption efficiently which in turns promotes the

saving. In the twenty first century, there is revolution of the sensor networks which have also come up with various applications like surveillance, traffic control, environmental and wildlife monitoring, agricultural application, home automation and industrial process control.

The Internet of things (IoT) is the network of physical devices, vehicles, home appliances and other items embedded with electronics, software, sensors, actuators, and connectivity which enables these objects to connect and exchange data.<sup>[1][2][3]</sup> Each thing is uniquely identifiable through its embedded computing system but is able to inter-operate within the existing Internet infrastructure.

The IoT allows objects to be sensed or controlled remotely across existing network infrastructure,<sup>[7]</sup> creating opportunities for more direct integration of the physical world into computer-based systems, and resulting in improved efficiency, accuracy and economic benefit in addition to reduced human intervention.<sup>[8][9][10][11]</sup> When IoT is augmented with sensors and actuators, the technology becomes an instance of the more general class of cyber-physical systems, which also encompasses technologies such as smart grids, virtual power plants, smart homes, intelligent transportation and smart cities.

## II. BLOCK DIAGRAM

The Block diagram consists of a Microcontroller, a LCD display, sensors, Node MCU and power supply. In this system mainly we have microcontroller, power supply, LCD. The Micro controller is the heart of this project. The total controlling action will be done through this micro controller.

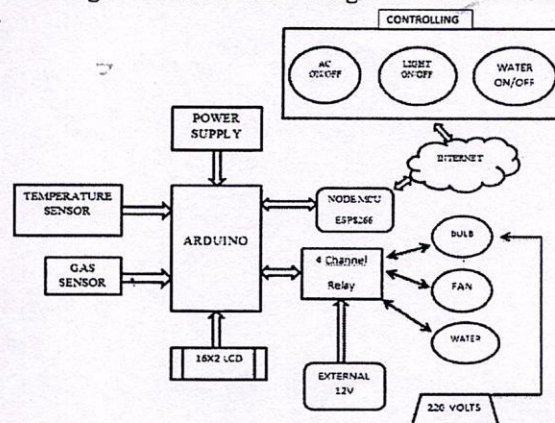


Figure 2.1: Block Diagram

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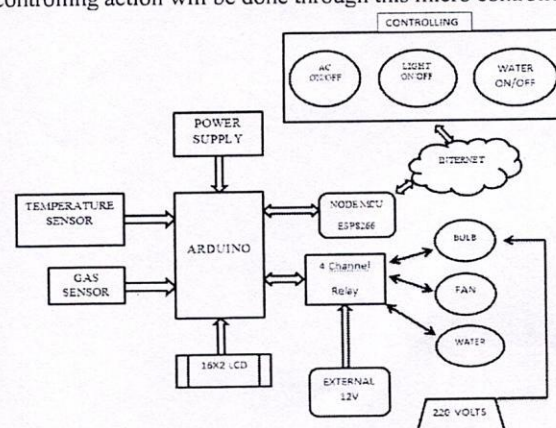


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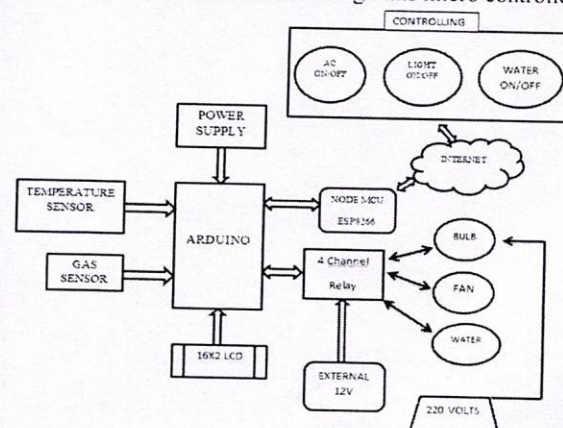


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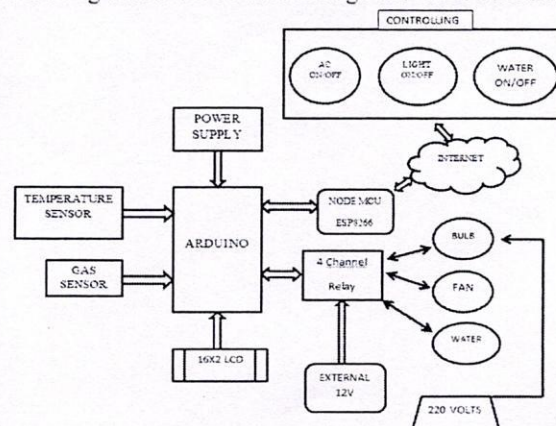


Figure 2.1: Block Diagram

# Face Recognition based Attendance System using Machine Learning

Amritha<sup>1</sup>, Sudhakar

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**Abstract** - Attendance is an important part of daily classroom ascertainment for the teacher for his or her smooth running of class. At the beginning and ending of the class, usually teacher check the attendance, but the manual attendance system may leads to appear that a teacher may miss someone or some students may answer multiple times. Now a days, Machine Learning has been highly explored for computer vision applications. So, we use the concept of machine learning in Face – recognition for automatic attendance systems. In this project, we perform the face recognition and face detection algorithms, to provide the computer systems the ability of finding and recognizing human faces fast and precisely in images or videos so that the systems can used in giving attendance.

**keywords** - Machine Learning, face recognition, assessment, face detection algorithm, LBPH, HAAR

## I. INTRODUCTION

Generally, in the classroom the attendance was taken by the teachers manually at the beginning and ending of the class. The problem with this approach is that it requires some time to take and also the manual process will have chances to make mistakes in most of the cases. To overcome that problem, RFID (Radio Frequency Identification) was introduced in the past years. But those are also having the fail proof of attendance system. So, we are introducing the concept of Face Recognition Based Attendance system, the main objective the proposed system is to allot attendance to the students using face recognition-based algorithms to achieve fail proof attendance system.

Face detection is used for many applications for the identification of human faces in digital images or video. It is defined as specific case of object-class detection; where it is used to find the locations and sizes of all objects in an image that belong to a given class. The technology is can be able to predict frontal or near-frontal faces in a photo, regardless of orientation, lighting conditions or skin color.

Face Recognition is a form of biometric software that maps an individual's facial features mathematically and stores the data as a faceprint. The software consists of Deep Learning algorithms to compare a live capture or digital image to the stored face print in order to verify an individual's identity.

### Face Recognition using Python

Faces are made of thousands of fine lines and features that must be matched. The face recognition using Python is used to break the task of identifying the face into thousands of smaller, bite-sized tasks, each of which is easy to face Recognition Python is the latest technology in Machine Learning techniques. OpenCV utilizes Machine Learning algorithms to search for faces within a picture.

### Facial Recognition using Python Libraries

An easy way to detect faces using Python is by using the OpenCV package which is written in C/C++, OpenCV now provides bindings for Python. It uses machine learning algorithms to search for faces within a picture. Faces are very complicated, made of thousands of small patterns and features that must be matched. The face recognition algorithms break the task of identifying the face into thousands of smaller, bite-sized tasks, each of which is easy to solve, known as classifiers.

A face may have 5000 or more classifiers, all of which must match for a face to be detected. Since there are at least 5,000 or more tests per block, you might have millions of calculations to do, which makes it a difficult process. To solve this, OpenCV uses cascades. The OpenCV cascade segments the problem of detecting faces into multiple stages. It performs a detailed test for each block. The algorithm can be performed on around 30 to 50 of these stages or cascades, and it will only detect a face if all stages pass. The cascades are a bunch of XML files that contain OpenCV data used to detect objects.

## II. LITERATURE REVIEW

Traditionally attendance was taken manually which is very time consuming and often leads to human error. Additionally, there are many uncertainties towards the sources of the attendance records which in fact, most of the attendance records are not retrieved from the actual situation. The old method that uses paper sheets for taking student's attendance can no longer be used. Based on the research, there are many solutions that are available to solve this issue. According to research journal "Attendance System Using NFC Technology with Embedded Camera on Mobile Device" (Bhise, Khichi, Korde, Lokare, 2015). The attendance system is improved by using Near Field. Communication (NFC) technology and mobile application. According to the research paper, each student is given a NFC tag that has a unique ID during their enrolment into the college. Attendance of

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# E-Gadgets in the Era of Globalisation & International Economic Integration

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**Abstract**— Gadgets have made life pleasurable ranging from a washing machine, chimney, electric hub, the churner, the television set, A.C., Room heater, Fans, dryers, hair straighteners, dish washers, sewing machine, air purifiers are all also gadgets. Yet from linking remote villages via increasingly ubiquitous mobile-phone messaging to improved water safety and cooking tools, technological innovations are changing the lives of women and their families for the better, around the world. The world has become so advanced that we have computers and laptops in almost every household today. Internet facility is also a great invention. Mobiles help us to talk to anyone, anywhere at any time. Man has come a long way from the invention of the wheel. There are serious disadvantages of such a fast pace of progress, like global warming and pollution but scientists are working on that too. All electronic gadgets have improved our life a lot. So in the coming centuries we can imagine how our life might be. In this backdrop the present study has made an attempt to identify the role, uses, enhancements and issues concerned with e-gadgets. The e-gadgets actually have increased human productivity in terms of work and made the world a better place to live in. Though gadgets bring joy to the family there are few challenging issues which are to be considered. In order to make the e-revolution a successful one, certain steps should be considered by the Government of India. There are many innovative gadgets ranging from home to organizations are being developed through the initiatives by several companies.

**Keywords:** Gadget, Electronic Gadgets, Communication Gadgets, E-Gadgets, Technical Gadgets

## I. INTRODUCTION

Gadgets have made life pleasurable ranging from a washing machine, chimney, an electric hub, the churner, the television set, A.C., a Room heater, Fans, dryers, hair straighteners dish washers, sewing machine, air purifiers are all also gadgets. Yet from linking remote villages via increasingly ubiquitous mobile-phone messaging to improved water safety and cooking tools, technological innovations are changing the lives of women and their families for the better, around the world. Gadgets make things compact for instance the example of a Swiss Army knife. It can be used as a spoon, knife, twister, bottle opener, fork etc. In a single gadget a user can get the function of more than one product. Gadgets have invaded each and every part of our life and have proved themselves to be useful.

In most cases, it is not only the social-media widgets or super-wired gadgets that are making a difference. Much of the social change being driven by technology involves local innovation, local investment, and local custom. Technology that can be sustained at the country or regional level and through public-private partnerships without massive

international aid is the kind that often brings the most lasting change. Often, this kind of transformation entails looking past the established solutions of the developed world and adopting intelligent, careful and showing good judgment in new technological shortcuts of all sectors.

## II. PURPOSE OF THE STUDY

There are hundreds of inventions which have revolutionized human life. Electronic gadgets are prominent among these inventions. They play a vital role in our lives. The electronic gadgets which we use daily consist of lights, televisions, computers, fans, A/Cs, refrigerators, telephones, cell phones, etc. Life would have been very difficult without these inventions. These inventions have made it possible for us to do many things undreamt of at the beginning of the last century. The world has become so advanced that we have computers and laptops in almost every household today. Internet facility is also a great invention. Mobiles help us to talk to anyone, anywhere at any time. Man has come a long way from the invention of the wheel. There are serious disadvantages of such a fast pace of progress, like global warming and pollution but scientists are working on that too. All electronic gadgets have improved our life a lot. So in the coming centuries we can imagine how our life might be. Without the use of modern gadgets it is not possible to accomplish our daily tasks and we are also not able to do our work with efficiency. It is hard to imagine our life without laptop, smart phones, cell phones, notebooks, microwaves and so on. In this backdrop the present study has made an attempt to identify the role, uses, enhancements and issues concerned with e-gadgets.

## III. OBJECTIVES OF THE STUDY

- To identify the concept of gadgets, electronic gadgets and e-gadgets.
- To analyze the role of e-gadgets in the changing scenario.
- To identify how e-gadgets significant in every walk of life.
- To consider the major issues and challenges in using the e-gadgets.

## IV. CONCEPT OF GADGETS

A Gadget is a small tool such as a machine that has a particular function, but is often thought of as a novelty. Gadgets are sometimes referred to as gizmos. Gizmos in particular are a bit different than gadgets. Gadgets in particular are small tools powered by electronic principles (a circuit board). Man has become so intelligent that he has invented aero planes and spacecraft to fly in, trains, cars, ships and boats for every other mode of travel from one place to another, and mobiles, telephones and the Internet for



## E-Gadgets in the Era of Globalisation & International Economic Integration

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**Abstract**— Gadgets have made life pleasurable ranging from a washing machine, chimney, electric hub, the churner, the television set, A.C., Room heater, Fans, dryers, hair straighteners, dish washers, sewing machine, air purifiers are all also gadgets. Yet from linking remote villages via increasingly ubiquitous mobile-phone messaging to improved water safety and cooking tools, technological innovations are changing the lives of women and their families for the better, around the world. The world has become so advanced that we have computers and laptops in almost every household today. Internet facility is also a great invention. Mobiles help us to talk to anyone, anywhere at any time. Man has come a long way from the invention of the wheel. There are serious disadvantages of such a fast pace of progress, like global warming and pollution but scientists are working on that too. All electronic gadgets have improved our life a lot. So in the coming centuries we can imagine how our life might be. In this backdrop the present study has made an attempt to identify the role, uses, enhancements and issues concerned with e-gadgets. The e-gadgets actually have increased human productivity in terms of work and made the world a better place to live in. Though gadgets bring joy to the family there are few challenging issues which are to be considered. In order to make the e-revolution a successful one, certain steps should be considered by the Government of India. There are many innovative gadgets ranging from home to organizations are being developed through the initiatives by several companies.

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## Perceptions and Problems of Home Loan takers: An Empirical Study of Vijayawada City

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### Abstract

India's housing requirement on an average increasing at a rate of 2.5-3 mn homes per annum. There is a dearth of more than 18.78 million homes at the commencement of 2012 projected by GOI, of which 95% were in the EWS (Economically Weaker Sections) and LIG (Low Income Group) segments. In addition to that, the country's total urban housing scarcity is predicted to be about 30 million by 2022. To fulfill the gap, the GOI launched the Pradhan Mantri Awas Yojana (Urban) beneath the Urban Housing Mission. Own House is a reverie of most of the people living in a villages as well as slum in urban areas and middle class people living in houses on rental basis. For these aspirants of houses, housing loan is golden chance to bring their dreams into reality. The Housing sector witnessed a real boom in the past decade due to the entry of Commercial banks in providing home loan facility. The customers of Home loan from Banks were facing several problems and there is a need to address them. Hence the present paper sheds light on Perceptions and Problems of Home Loan takers of banks in Vijayawada in line with PMAY scheme with GRT and Chi-square.

**Keywords:** Commercial Banks, Home Loan, PMAY, Problems, Urban.

### INTRODUCTION:

Home is one of the dream that everyone one wants to own & fulfill. Home is a dream of every person that illustrates the extent of efforts; relinquish luxuries and above all gathering funds little by little to pay for one's dream. The demand of home loans has increased dramatically. For fulfill this purpose many banks are providing home loans whether commercial banks or home finance institutions to the people who want to have a home. Now-a-days the accessibility of these home loans easier and many to fulfill their dream through Home loans. The low rate of interest rates will attract and meet the demand of many home buyers. A home represents the principal asset that classically people encompass and this is why home loans have such a gigantic impact in the loan market nowadays. When a person purchases a home, he or she will be investing a massive amount of cash. Many people can't come up with the whole money to pay out the house, while some others can't even afford to

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**SIMULTANEOUS ESTIMATION OF LAMIVUDINE AND TENOFOVIR ALAFENAMIDE FUMARATE IN BULK DRUG PRODUCT BY RP-HPLC METHOD**

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**ABSTRACT**

New analytical method was developed for the estimation of Lamivudine and Tenofovir alafenamide fumarate in drug product by liquid chromatography. The chromatographic separation was achieved on C18 column (Eclipse XDB-Phenyl 250\*4.6mm) at ambient temperature. The separation achieved employing a mobile phase consists of 0.1%v/v Trifluoro acetic acid in water: Methanol (300:700). The flow rate was 1.0ml/ minute and ultra violet detector at 260nm. The average retention time for Lamivudine and Tenofovir alafenamide fumarate found to be 2.412 min and 4.669 min. The proposed method was validated for selectivity, precision, linearity and accuracy. All validation parameters were within the acceptable range. The assay methods were found to be linear from 300.0 – 900.00µg/ml for Lamivudine and 6.3 – 18.8µg/ml of Tenofovir alafenamide fumarate.

**KEYWORDS:** Lamivudine, Tenofovir alafenamide fumarate, Isocratic, HPLC, Eclipse XDB-Phenyl, Trifluoro acetic acid, Acetonitrile, Methanol and validation.

**1. INTRODUCTION**

**LAMIVUDINE**

Lamivudine<sup>[1-2]</sup> commonly called 3TC, is an antiretroviral medication used to prevent and treat HIV/AIDS. It is also used to treat chronic hepatitis B when other options are not possible. It is effective against both HIV-1 and HIV-2. It is typically used in combination with other antiretrovirals such as zidovudine and abacavir. Lamivudine may be included as part of post-exposure prevention in those who have been potentially exposed to HIV. Lamivudine is taken by mouth as a liquid or tablet. Lamivudine is chemically designated as 4-Amino-1-[(2R,5S)-2-(hydroxymethyl)-1,3-oxathiolan-5-yl]-1,2-dihydropyrimidin-2-one. Its molecular formula is C<sub>8</sub>H<sub>11</sub>N<sub>3</sub>O<sub>3</sub>S and its molecular weight is 229.26 g/mol.

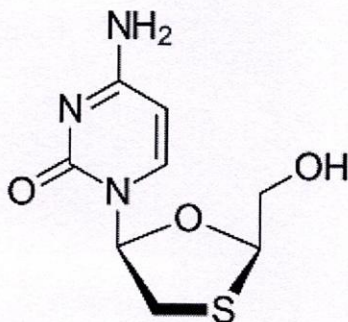


Fig. 1: Chemical structure: Lamivudine.

**Tenofovir alafenamide fumarate**

**Tenofovir alafenamide** (INN/USAN; trade name **Vemlidy**) is a nucleotide reverse transcriptase inhibitor and a prodrug of tenofovir. It was developed by Gilead Sciences for use in the treatment of HIV infection and chronic hepatitis B, and is applied in the form of tenofovir alafenamide fumarate (TAF). Closely related to the commonly used reverse-transcriptase inhibitor tenofovir disoproxil fumarate (TDF), TAF has greater antiviral activity and better distribution into lymphoid tissues than that agent.

**Tenofovir alafenamide fumarate** is chemically designated as Isopropyl (E)-but-2-enedioic acid; propan-2-yl (2S)-2-[[[(2R)-1-(6-aminopurin-9-yl)propan-2-yl]oxymethyl-phenoxyphosphoryl]amino]propanoate. Its molecular formula is C<sub>46</sub>H<sub>62</sub>N<sub>12</sub>O<sub>14</sub>P<sub>2</sub>, and its molecular weight is 1069.02 g/mol/g/mol.

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MIXED CONVECTIVE FLOW OF A NEWTONIAN FLUID WITH PERMEABLE WALLS  
BY CONSIDERING THE INFLUENCE OF ACCELERATION DUE TO GRAVITY

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ABSTRACT

In this paper, the situation of Mixed Convective Flow of A Non-Newtonian Fluid with permeable walls by considering the influence of acceleration due to gravity has been examined in detail. It is noticed that, as Prandtl number increases the temperature also increases. Not much of significant change is observed when the radiation parameter (R) is slightly decreased. However, a drastic change is seen when the Prandtl number changes considerably along with the radiation parameter (R). Further, it is noticed that, as the radiation parameter (R) increases the temperature in the fluid also increases. However, not much of significant change is noticed for a small change in the Prandtl number. But, there is a significant change in the profiles for larger values of Prandtl number (Pr). It is seen that, as we move far away from the lower boundary then the temperature is found to be decreasing. Further, it is observed that, as the radiation parameter (R) increases the temperature of the fluid decreases.

**Key words:** Newtonian fluid, Reynolds Number, Prandtl Number, Radiation Parameter.

INTRODUCTION

During the last several years fluid mechanics had made significant process in several areas of engineering, science and technology. An attempt has been made in this paper to explain the possibility of supporting thermal transfer in several areas of engineering, science and technology. Generally engineering systems are more complicated and experimentally confusing. It is characterized by complex systems where the fluid stream currents have a sudden change with reference to the geometry of the systems, which is not uncommon, but needs to be examined in detail.

For the last many years, extraction of geothermal energy from the deep part of the earth, oil extraction, heat removal from the nuclear debris, flow of liquids through ion exchange beds, drug permeation through human skin and glands are few such wide applications. In view of several applications in physics, chemistry and chemical technology, the problem has gained more importance, where the transfer of liquid from one container to another container is involved, the rate at which such transfer takes place at the thin film adhering to the surface of the containers needs to be taken into account. Generally in the chemical processing industry the walls of the reactor are subjected to the corrosion due to the reaction with in the vessels. Such a phenomena causes loss of production and then consuming more reaction time for the next cycle of chemical processing.

The porous medium can be considered as an ordered flow in a disordered geometry. The porous medium may be either an aggregate of large number of particles such as sand or a solid containing more capillaries such as a porous rock. When the fluid percolates through a porous material, because of the complexity of microscopic flow in the pores, the actual part of an individual fluid particle cannot be analytically analysed. However, the process can be defined in terms of equilibrium forces.

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# Effect of Bio-Enzyme in the Treatment of Fresh Water Bodies

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**Abstract:** "Bio Enzymes" are organic compounds produced by fermentation of fresh vegetable/fruit waste in presence of water and brown sugar/jaggery. It is claimed as a multi-use solution for domestic and agricultural applications. The objective is to clean water bodies with Bio enzymes. By using selective micro-organisms such as yeast, the fermentation process forms mineral salts, organic acids, alcohol, natural chains of proteins and enzymes. This study is carried out on fresh water bodies (mostly ponds) in and around bhimavaram as part of "Mana Ooru Mana Neeru" initiative by SRKR Engineering College. The pH value of the bio-enzyme was found to be 3.5 and upon treating pond water with it, there was substantial change in DO, BOD and COD values of the water. The water bodies were cleaner, lost its foul smell and BOD, COD levels reached permissible levels after the treatment.

**Index Terms:** bio-enzyme, BOD, COD, DO, pH.

## I. INTRODUCTION

Due to the increase of migration to urban in small towns in India, the matter of sewage disposal and industrial waste has become more and more essential. The fresh water bodies (ponds) in urban areas are getting polluted and the authorities lack cleaning mechanism to keep the environment clean. Ruinous impacts on human health and on the atmosphere might result if pollution of receiving garbage into waters is sustained. Therefore, to preserve water quality for future generations, a good means that of finding this drawback should be thought of. Water treatment technologies are up, and presently it's potential to treat these fresh water bodies and get the water back to highly usable state. Though treatment of waste water and its legislation is well instituted in several developed countries, correct sanitation with economical treatment has not been practiced in several places in India.

Domestic water treatment has been suggested as a plausible solution for this problem but largely failed because it depends too much on people being responsible at an individual capacity which requires lot of awareness programs from groups, government bodies etc and could be a long-term holistic solution to the problem. So instead, the treatment of water bodies could be an efficient interim solution which can be implemented by social groups or government health/sanitary bodies. The proposed bio-enzyme solution has yielded good results as part of our work with fresh water bodies in and around bhimavaram (West Godavari District) in Andhra Pradesh.

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## II. MATERIALS AND METHODS

The primary need for the experiment is the bio-enzyme itself which takes about 90 days to prepare. The physical cleaning of the water body (pond in our case) along with processes like de-silting, solid waste removal, enzyme treatment, tree plantation and bund heightening are the major methods deployed as part of the experimentation.

### A. Bio-Enzyme preparation

**CONTAINER:** Plastic air-tight container.

**INGREDIENTS:** Vegetable dregs, fruit waste, Water and sugar (brown sugar, molasses sugar or Jaggery)

### COMPOSITION:

| Ratio                 | Kilograms | grams | Kilograms |
|-----------------------|-----------|-------|-----------|
| Sugar/jaggery         | 1         | 300   | 10        |
| Vegetable/fruit waste | 3         | 900   | 30        |
| Water                 | 10        | 3000  | 100       |

### INSTRUCTION:

1. Prepare Plastic air-tight container. Don't use glass or metal containers that don't permit expansion caused by gas evolved throughout the fermentation method of enzyme.
2. Dilute sugar in water, followed by adding your domestic waste. Use solely fruit waste and vegetable dregs. Avoid oily medium food, fish or meat residues (make those your garden compost materials). To create fresh smelling enzyme (catalyst), add orange/lemon peel or pandan leave etc.
3. Leave some air area for fermentation and confirm the plastic container is air tight.
4. Throughout the first month, gases are going to be discharged throughout fermentation method. Leave go of the pressure build up in the container to avoid rupturing.
5. Push the floating dregs downward each once in a while.
6. Place at cool, dry and airy space. Avoid direct daylight. Let it ferment for a minimum of three months before use. Filter and it's able to use.
7. When three months, extract out the water and leave solely the sediment. The sediment may be dried to become fertilizer or might leave it for next fermentation.
8. The perfect color of eco enzyme (catalyst) is dark brown. If the color addresses black add same quantity of brown sugar to re-ferment it.
9. It should have white, black or brown layer on high of the eco enzyme (catalyst), ignore it. If you encounter worms within the container, leave it for some time can close the cover tightly.

# **SIMULTANEOUS DETERMINATION OF L- METHYL FOLATE AND ESCITALOPRAM IN BULK AND PHARMACEUTICAL FORMULATION BY STABILITY INDICATING RP-HPLC METHOD**

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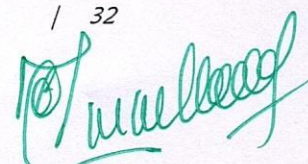
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**Abstract:** Stability indicating Reverse phase -HPLC Method been described for the simultaneous estimation of L-Methyl folate and Escitalopram in combined tablet formulation form. Chromatographic separation was carried out by using reversed phase HPLC and the method was achieved on a ODS column with UV detection. The mobile phase was optimized with Acetonitrile; 0.01% H<sub>3</sub>PO<sub>4</sub> in water 35:65 (%V/V) Flow rate of 1.0ml/min and the wavelength was selected at 212nm. The drug was stressed by acidic, alkaline, oxidative, thermal and photolytic conditions and the degradation samples were analyzed by the proposed method. Degradation studies showed that all the two drugs were degraded under oxidative, acidic, alkaline and thermal conditions, Minor degradation observed under photolytic and hydrolysis condition. Analytical Method validation parameters such as specificity, linearity, accuracy, precision, Ruggedness and Robustness were determined and System suitability of all the parameters was passed. Hence this method was stability indicating method, It can be used for the routine and Stability analysis of L-Methyl folate and Escitalopram in pharmaceutical dosage forms.

**Keywords:** L-Methyl Folate and Escitalopram, RP-HPLC.

## **Introduction:**

**Levomefolic Acid(L-Methyl Folate):** Levomefolic acid (fig- 1) was primary biologically active form of folic acid used at the cellular level for DNA reproduction. A-vitamin (B<sub>9</sub>) essential to human health and function. One of its most notable functions is its role in creating key neurotransmitters or brain chemicals that regulate human mood, cognitive ability and arousal.



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# A CRITICAL STUDY ON THE ROLE OF CHEMISTRY OVER THE SOCIETY AND HUMAN RACE

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## Abstract

Chemistry is one of the most important subject which deals with the basic structure of almost every material on The Earth. Everything on Earth is made up of different chemicals and their blends. Starting from the very basic food intakes to the food utilization by human body everything is just the chemical reaction. From energy we require to work till the energy we release in atmosphere is the transformations of different chain chemical reactions. It encourages in everyday choices that influence our lives for example blending the family synthetic compounds, for example, tea grounds and sugar. It additionally depicts different substance components preset in the earth, their responses, and impacts on nature. It represents condition fragments, their interrelationships, and significances. In our day by day lives, we wear garments that are made of textures, for example, nylon which is found out in science. It likewise supports the business division through extraction of profitable metallic, for example, copper, zinc, and magnesium and furthermore helps in understanding the substance responses of such metals. We use cleansers that are made through a procedure called saponification in science, these cleansers help in completing day by day exercises, for example, clothing. Our paper deals with the importance of chemistry over the social and human race.

*Keywords: Synthetic Compounds, Cleansers, Copper, Zinc, and Magnesium*

## 1. Introduction

In 20<sup>th</sup> century we witnessed many development. The major development were in three domains Nuclear Science, the Electronic Science and the Chemical Science. Out of all the development of chemistry started in most beginning in 1930 itself. Chemistry has a notoriety for being a confounded and exhausting science, however generally, that