International Conference on Engineering & Technology
(ICET-18)

Singapore
03rd September, 2018

IARF Conference
www.iarfconference.com
Publisher: IARF Explore

© Copyright 2019, IARF-International Conference, Singapore

No part of this book can be reproduced in any form or by any means without prior written permission of the publisher.

This edition can be exported from Indian only by publisher

IARF-Explore
Editorial:

We cordially invite you to attend the International Conference on Engineering & Technology (ICET-18), which will be held in Singapore on September 03rd, 2018. The main objective of ICET-18 is to provide a platform for researchers, engineers, academicians as well as industrial professionals from all over the world to present their research results and development activities in Electrical, Electronics, Mechanical, Civil and Computer Science Engineering. This conference provides opportunities for the delegates to exchange new ideas and experience face to face, to establish business or research relations and to find global partners for future collaboration.

These proceedings collect the up-to-date, comprehensive and worldwide state-of-art knowledge on Engineering & Technology. All accepted papers were subjected to strict peer-reviewing by 2-4 expert referees. The papers have been selected for these proceedings because of their quality and the relevance to the conference. We hope these proceedings will not only provide the readers a broad overview of the latest research results on Engineering & Technology but also provide the readers a valuable summary and reference in these fields.

The conference is supported by many universities and research institutes. Many professors played an important role in the successful holding of the conference, so we would like to take this opportunity to express our sincere gratitude and highest respects to them. They have worked very hard in reviewing papers and making valuable suggestions for the authors to improve their work. We also would like to express our gratitude to the external reviewers, for providing extra help in the review process, and to the authors for contributing their research result to the conference.

Since July 2018, the Organizing Committees have received more than 30 manuscript papers, and the papers cover all the aspects in Electrical, Electronics, Mechanical, Civil and Computer Science Engineering. Finally, after review, about 10 papers were included to the proceedings of ICET-2018.

We would like to extend our appreciation to all participants in the conference for their great contribution to the success of International Conference 2018. We would like to thank the keynote and individual speakers and all participating authors for their hard work and time. We also sincerely appreciate the work by the technical program committee and all reviewers, whose contributions make this conference possible. We would like to extend our thanks to all the referees for their constructive comments on all papers; especially, we would like to thank to organizing committee for their hard work.
Acknowledgement

IARF is hosting the International Conference on Engineering & Technology this year in month of September. International Conference on Engineering & Technology will provide a forum for students, professional engineers, academician, and scientist engaged in research and development to convene and present their latest scholarly work and application in the industry. The primary goal of the conference is to promote research and developmental activities in Electronics, Electrical, Mechanical, Civil, Computer Science and Information Technology and to promote scientific information interchange between researchers, developers, engineers, students, and practitioners working in and around the world. The aim of the Conference is to provide a platform to the researchers and practitioners from both academia as well as industry to meet the share cutting-edge development in the field.

I express my hearty gratitude to all my Colleagues, Staffs, Professors, Reviewers and Members of organizing committee for their hearty and dedicated support to make this conference successful. I am also thankful to all our delegates for their pain staking effort to travel such a long distance to attain this conference.

Dr. Simpson Rodrigs
President
IARF Conference (IARF)
# CONTENTS

<table>
<thead>
<tr>
<th>S.NO</th>
<th>TITLES AND AUTHORS</th>
<th>PAGE NO</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>Color Image Denoising Methods Based on Modified Mean-Median (MMM) Method</td>
<td>1-6</td>
</tr>
<tr>
<td></td>
<td>▶ Gourav Dhakad</td>
<td></td>
</tr>
<tr>
<td></td>
<td>▶ Hitesh Gupta</td>
<td></td>
</tr>
<tr>
<td></td>
<td>▶ Vijay Trivedi</td>
<td></td>
</tr>
<tr>
<td>2.</td>
<td>Chat Based Conversational Agent for Management</td>
<td>7-10</td>
</tr>
<tr>
<td></td>
<td>▶ Akshat Singh</td>
<td></td>
</tr>
<tr>
<td>3.</td>
<td>Active and Reactive Power Control of Three Phase Grid Connected System with</td>
<td>11-17</td>
</tr>
<tr>
<td></td>
<td>Proportional-Resonant Controller by using SVPWM Technique</td>
<td></td>
</tr>
<tr>
<td></td>
<td>▶ Peddinti Raja</td>
<td></td>
</tr>
<tr>
<td>4.</td>
<td>Travel Free</td>
<td>18-19</td>
</tr>
<tr>
<td></td>
<td>▶ R. Meera Ranjani</td>
<td></td>
</tr>
<tr>
<td></td>
<td>▶ Kumari Shalini</td>
<td></td>
</tr>
<tr>
<td>5.</td>
<td>GBS GST Billing Software</td>
<td>20-21</td>
</tr>
<tr>
<td></td>
<td>▶ Bidisha Panja</td>
<td></td>
</tr>
<tr>
<td></td>
<td>▶ Saptarshi Banerjee</td>
<td></td>
</tr>
<tr>
<td></td>
<td>▶ S.Sivamohan</td>
<td></td>
</tr>
<tr>
<td></td>
<td>▶ Veeramani Ramasamy</td>
<td></td>
</tr>
<tr>
<td></td>
<td>▶ Ambica Gupta</td>
<td></td>
</tr>
<tr>
<td></td>
<td>▶ Aakriti Rai</td>
<td></td>
</tr>
<tr>
<td>7.</td>
<td>Combustion and Propulsion Characteristics of Composite Solid Propellants under</td>
<td>25-31</td>
</tr>
<tr>
<td></td>
<td>Elevated Conditions</td>
<td></td>
</tr>
<tr>
<td></td>
<td>▶ Pallavi Gajjar</td>
<td></td>
</tr>
<tr>
<td></td>
<td>▶ Vinayak Malhotra</td>
<td></td>
</tr>
<tr>
<td>8.</td>
<td>Progressive Enhancement of Driving License</td>
<td>32-33</td>
</tr>
<tr>
<td></td>
<td>▶ Sowmâtri B S</td>
<td></td>
</tr>
<tr>
<td></td>
<td>▶ Hemanth Harikumar</td>
<td></td>
</tr>
<tr>
<td></td>
<td>▶ P.Prittopaul</td>
<td></td>
</tr>
<tr>
<td></td>
<td>▶ R.Vijayalakshmi</td>
<td></td>
</tr>
<tr>
<td>10.</td>
<td>A SURVEY on Segment Based Evaluation of Cofactor Used in Human Gait Recognition</td>
<td>38-42</td>
</tr>
<tr>
<td></td>
<td>▶ Dr. P.S.Smitha</td>
<td></td>
</tr>
<tr>
<td></td>
<td>▶ Sruthi Nath C</td>
<td></td>
</tr>
</tbody>
</table>
Color Image Denoising Methods Based on Modified Mean-Median (MMM) Method

Asst. Prof. Department Of CSE, Lnct Bhopal

Abstract: Image enhancement techniques are best solution for improving the visual appearance of images to a human viewer. It also preserves the structure features of the image. Enhancement of the noisy image data without losing any significant information is very challenging. In this paper we have introduced the modified mean median based method for removing impulse noise effectively while preserving details of the image. The proposed filter would be better than many of the existing filters such as the median filter and its variant and other fuzzy filters. The advantages of the these method are that it reduces Impulse noise in a gray scale image as well as color image (low level impulse noise). It preserves edge sharpness, It does not introduce blurring artifacts or new colors artifacts in comparison to other state of the art methods.

Index Terms—Image Denoising, Gaussian Noise, MSE, PSNR

I. INTRODUCTION

An image is worth a thousand words. In the modern age, images are the most common and convenient means of conveying or transmitting information. Visual information in the form of digital images allows humans to perceive and understand the world surrounding them in a better manner. Hence, processing of images by computer has been drawing a very significant attention of the researchers over the last few decades. The process of receiving and analyzing visual information by digital computer is called digital image processing. Mathematically, an image is a two-dimensional function, f (x,y) , where x and y are spatial (plane) coordinates and the amplitude of f at any coordinate (x,y) is called the intensity or gray level of the image at that point. When x, y and the amplitude values are all finite discrete quantities then image is known as a digital image [1]. A digital image is composed of a finite number of elements, each of which has a particular location and value. These elements are referred to as picture elements, image elements, pels or pixels. Pixel is the term most widely used to denote the element of a digital image. [1, 2, 3] A rectangular array of pixels is known as bitmap.

Digital image processing is the use of computer algorithms to perform image processing on digital images. Digital Images can be of different types such as binary, gray-scale and color images [4].

1.Binary images: Binary images use only a single bit to represent each pixel. They are the simplest type of images and can take only two discrete values, black and white. Black is represented with the value ‘0’ while white with ‘1’. This inability to represent intermediate shades of gray limits their usefulness in dealing with photographic images. It finds applications in computer vision areas where the general shape or outline information of the image is needed.

2. Gray-scale images: They are known as monochrome or one-color images. A black and white image is made up of pixels each of which holds a single number corresponding to the gray level of the image at a particular location. These gray levels span the full range from black to white in a series of very fine steps. For an 8-bit image there will be 256 gray levels where ‘0’ represents black and ‘255’ denotes white.

3. Color Images: A color image is made up of pixels each of which holds three numbers corresponding to the red, green, and blue levels of the image at a particular location. Red, green, and blue (RGB) are the primary colors for mixing light. Any color can be created by mixing the correct amounts of red, green, and blue light. Assuming 256 levels for each primary, each color pixel can be stored in three bytes (24 bits) of memory. This corresponds to roughly 16.7 million different possible colors. For images of the same size, a gray scale image will use three times less memory than a color image. In this study, we have used several standard gray scale images for our experimental and simulation results. For image processing, we need to convert
the natural images into digital images by the process of
digitization. A digitized image can be stored in a computer
memory or on some form of storage media such as hard disk
or CD-ROM. This digitization procedure can be done by
scanner, or by video camera connected to frame grabber
board in computer. Once the image has been digitized, it can
be operated upon by various image processing operations.
Digital image processing operations can be broadly divided
into following classes:

Digital image processing classes

Examples of operations within each class are as follows:
1) Image Enhancement: Brightness adjustment, contrast
enhancement, image averaging, convolution, frequency
domain filtering, and edge enhancement.
2) Image restoration: Photometric correction, inverse
filtering, and noise removal
3) Image analysis: Segmentation feature extraction, object
classification
4) Image compression: Lossless and lossy compression
5) Image synthesis: Topographic imaging, 3-D
reconstruction

The fields that use digital image processing techniques can
be divided into criminology, microscopy, photography,
remote sensing, medical imaging, forensics, transportation
and military applications.

Out of the five classes of digital image processing, cited
above, this thesis deals with image restoration. To be
precise, the paper devotes on a part of the image restoration
i.e. impulse noise removal from images, stated in the
Problem Definition. Further, this paper also discusses how
image noise removal can be utilized for high quality image
enhancement.

II. IMPULSE NOISE

The digital image acquisition process converts an optical
image into a continuous electrical signal that is, then,
sampled [4]. At every step in the process there are
fluctuations caused by natural phenomena that adds a
random value to the exact brightness value for a given pixel.
This process introduces noise in an image. There are
many types of noises that contaminate images. One of such
noise is Impulse Noise. Impulse noise is generally
introduced into images while transmitting and acquiring
them over an unsecure communication channel. Impulse
noise affects images at the time of acquisition due to noisy
sensors or at the time of transmission due to channel errors
or in storage media due to faulty hardware. Sharp and
sudden disturbances in the image signal introduce impulse
noise. Its appearance is randomly scattered white or black
(or both) pixels over the image.

(a) Original image (b) Image corrupted with impulse noise

Let \( Y(i , j) \) : Gray level of an original image
\( X(i , j) \): Gray level of noisy image \( X \) at a pixel location \((i , j)\)
\([N_{\text{min}}, N_{\text{max}}]\): Dynamic range of \( Y \)

Impulsive noise may be defined as:

\[
X(i,j) = \begin{cases} 
Y(i,j) & \text{with } 1 - p \\
R(i,j) & \text{with } p 
\end{cases}
\]

\( R(i , j) \) is the substitute for the original gray scale value at
the pixel location \((i , j)\)

Impulse noise has the property of either leaving a pixel
unmodified with probability \( 1 - p \)
or replacing it altogether with probability \( p \). This is shown
in Eq (1).

Two common types of impulse noise are:

Salt & Pepper Noise (SPN)

For images corrupted by salt-and-pepper noise, the noisy
pixels can take only the maximum and the minimum values
in the dynamic range i.e.

When \( R(i , j) = \{ N_{\text{min}}, N_{\text{max}} \} \)
Salt & Pepper Noise dynamic range

Random Valued Impulsive Noise (RVIN)
For images corrupted by Random-valued noise, the noisy pixels can take any random value in the dynamic range i.e. $R(i,j)$ can vary between $\{N_{\min}, N_{\max}\}$
In this study our focus is to remove Salt & Pepper noise (Fixed valued impulse noise).

III. IMPULSE NOISE DETECTOR & IMPULSE NOISE DENSITY PREDICTION

Step 1: Select window of size $T \times T$ pixel. Assume that the pixel being processed is $X_{ij}$.
Step 2: If $X_{ij} = 0$ or $X_{ij} = 255$ then $X_{ij}$ is corrupted pixel then set value of $H_{ij}$ to 1. Where $H_{ij}$ is index matrix 2D at the coordinate $(i,j)$.
Step 3: If $0 < X_{ij} < 255$ then it is may be uncorrupted pixel and to check whether it is corrupted or not, first transform the window from 2D to 1D vector and then sort the element of this vector in ascending order and If the $X_{ij}$ between first and fifth index value then $X_{ij}$ is uncorrupted pixel then set value of $H_{ij}$ to 0 .otherwise it is corrupted pixel and set value of $H_{ij}$ to 1.

Step3: if $X_{ij}$ is an uncorrupted pixel and its value is left unchanged. Otherwise follow the next step:

Step3.1 find the window $T \times T$ around the corrupted pixel $X_{ij}$ such that it have some element (except 0 and 255) on it.
Step 3.2 eliminate all 0 and 255 from the window and find the median of the remaining pixels. Suppose median is denoted by $M_d$
Step 3.3.Obtained the Filter value by calculating the linearity value between the average of noise free values without $M_d$ element, with the median value of noise-free pixels. And it can obtain by following formula:

$$M_f = \frac{1}{n} \sum_{i=1}^{n} W_f$$
$$M_d = M_f - M_d$$
$$Pf(i,j) = M_f + \frac{(Mean(W_f) - M_d)}{2}$$

Step 3.4.Replace the value of $X_{ij}$ to the value $Pf(i,j)$.
IV. QUALITY MEASUREMENT METRICS

The quality of the enhanced image is measured by calculation of certain quality measurement metrics [10-12]. These metrics give the comparison ratio between the original image and the modified image. The quality may be assessed on the basis of these values. The metrics used in this paper are as follows: peak signal-to-noise ratio (PSNR), Execution Time (Tr).

Peak signal to noise ratio (PSNR)
The PSNR depicts the measure of modification in the original image. This metric is used for discriminating between the original and enhanced image. The easy computation is the advantage of this measure. It is formulated as:

\[ PSNR = 10 \log \left( \frac{(L-1)^2}{MSE} \right) \]

Where MSE is MEAN SQUARE ERROR defined in next section.

The method should not significantly amplify the noise level and thus a high value of PSNR is required. A low value of PSNR shows that the constructed image is of poor quality.

Mean Square Error

One obvious way of measuring the similarity is to compute an error signal by subtracting the test signal from the reference, and then computing the average energy of the error signal. The mean-squared-error (MSE) is the simplest, and the most widely used, full-reference image quality measurement. This metric is frequently used in signal processing and is defined as follows:

\[ MSE = \sqrt{\frac{1}{MN} \sum_{i=1}^{M} \sum_{j=1}^{N} (\mu_{ij} - m_{ij})^2} \]

Where \( \mu_{ij} \) is the Denoised image and \( m_{ij} \) is the original image. A large value for MSE means that the image is of poor quality.

Processing Time

Processing Time \( T(r) \) defines the time required to complete the execution of proposed method that is required by fuzzification and defuzzification process and measured in ms.

Average of percentage error

To measure percentage of error in the noise prediction can be calculated by using following formula.

\[ AE_p = \frac{1}{n} \sum_{i=1}^{n} AE_p(i) \]

Denoted:

\( \hat{p} \) is impulse noise prediction

\( p \) is the actual value of impulse noise (%)

\( AE_p \) is Absolute error of \( p \) and \( \overline{AE_p} \) is average of absolute error of \( p \), \( n \) is total data sample.

V. EXPERIMENTAL RESULT

In this section, we demonstrate the performance of the proposed method in comparison with some existing contrast enhancement methods.

TABLE I. ABSOLUTE MEAN BRIGHTNESS ERROR (AMBE)

<table>
<thead>
<tr>
<th>NOISE</th>
<th>SMF</th>
<th>SAMF</th>
<th>ASMF</th>
<th>QAMF</th>
<th>LMMF</th>
</tr>
</thead>
<tbody>
<tr>
<td>50%</td>
<td>23.243</td>
<td>31.282</td>
<td>31.584</td>
<td>32.368</td>
<td>39.999</td>
</tr>
<tr>
<td>70%</td>
<td>17.876</td>
<td>26.541</td>
<td>28.572</td>
<td>29.546</td>
<td>38.137</td>
</tr>
<tr>
<td>80%</td>
<td>12.647</td>
<td>26.975</td>
<td>26.981</td>
<td>27.739</td>
<td>36.856</td>
</tr>
<tr>
<td>90%</td>
<td>8.194</td>
<td>24.796</td>
<td>24.797</td>
<td>25.21</td>
<td>35.346</td>
</tr>
<tr>
<td>95%</td>
<td>6.492</td>
<td>23.137</td>
<td>23.137</td>
<td>23.492</td>
<td>33.984</td>
</tr>
</tbody>
</table>

Based on results of Table I, we observe that proposed has least values in all three images as compare to other methods. Further if we look at last row of Table I, which shows average results of AMBE then we find that proposed method has least average AMBE values among other methods.
VI. CONCLUSION & FUTURE WORK

In this paper we have introduced the modified mean median based method for removing impulse noise effectively while preserving details of the image. The proposed filter would be better than many of the existing filters such as the median filter and its variant and other fuzzy filters. The advantages of the these method are that it reduces Impulse noise in a gray scale image as well as color image (low level impulse noise),It preserves edge sharpness , It does not introduce blurring artifacts or new colors artifacts in comparison to other state of the art methods.

REFERENCES


Chat Based Conversational Agent for Management

[1][2] Student, Department of Information Technology, SRM University
[3] Faculty, Department of Information Technology, SRM University

Abstract: With automation making a revolutionary impact in various industries by improving the efficiency compared to the conventional ways and messaging apps like Messenger and WhatsApp being more popular among people that social media itself, it's become crucial for businesses to improve their strategies in terms of the services they provide and to be where their potential customers are. Consider a business where their customer services are provided only via sales persons. He/she can handle maximum of one customer at a time and to scale efficiency even by 1% needs recruitment of new employees, which can be very expensive. Even after hiring new employees, it's still a difficult task to provide the customer with the information they are looking for rapidly. Solving this problem is a new technology – A chat based conversational agent aka chatbot. Chatbots can handle multiple customers at the same time, provided quick responses, be interactive and keep the customers engaged all while an economical option to setup. The objective is to create a chatbot using pattern matching technique that will aim to increase the efficiency of a hotel management system. With the help this chatbot, customers can view menu, get information about nearby touristic places, check weather etc, all by just chatting with the bot. This chatbot aims to be user-friendly by eliminating conventional ways that would otherwise require making calls, shifting between web pages and sometimes even having to visit the agency to get the work done.

Keywords: Automation, Technology, business, conversational agent, pattern matching technique, social media, messenger apps, user-friendly

I. INTRODUCTION

The world of business saw a revolutionary change in the customer service and experience and are being used in new ways everyday thanks to the introduction of a technology called the chatbot. Alan Turning and Joseph Weizenbaum in 1950 ideated the concept of chatbot when the wanted to develop a test to see if a person can distinguish a computer from a human: The Turing Test. In 1966 a computer program called ELIZA was hard coded by Weizenbaum which consisted of about 200 lines of code that instructed it to behave in terms of language, like a psychotherapist. The result of the experiment lead to a surprising result, an overwhelming large majority of the people believed that ELIZA was a real person. Over the years many other chatbots have been developed such as voice operated chatbot. Though chatbots have existed for the past years without having virality, some of the reasons that has given it a status of global trend are mobile messenger domain, app fatigue and the dramatic reduction in its development. App fatigue is a term that is used to refer to the users, both individual and businesses who are exhausted of installing, updating, learning how to use these app and manage the memory issues of using a mobile phone that come hand in hand. Businesses who invest a lot on app development and maintaining have only realised that very few people use them. Millions of apps have been released up to date according to TechCrunch data. If you compare this figure with the average number of app in a consumer’s mobile which is 30, of which only 5 is used on regular basis, the data seems to speak for itself. Adding to the cons is the fact that most users have a strong unwillingness to try out new apps owing to the memory issue and those who do are most likely to abandon the app after the first use. These are the factors that lead to the boom of chatbots in recent times.

II. RELATED WORKS

In most cases chatbots are built to serve a specific purpose. Their ability to serve a specific purpose with multitasking capabilities has led to their application in various domains. Some of the works done in previous projects serve as an example of application of chatbots. In one such project, the application of chatbot as a course recommender in MOOC (Massive Open Online Courses) was emphasised. The goal of the chatbot was to encourage students to apply the self-taught technique in their education path and assist any learner in picking the right MOOCs for them based on their personal and professional interest [1]. Another project specified the application of chatbot in the field on medicine. The paper of the project elaborated the objective which was to create a better connection between the healthcare seekers and their providers by providing a quick and relevant reply to the users of the bot [2]. In one of the project the bot was trained to understand and interact with human beings by programming the machine to give take its own decision on...
the reply [7]. In one of the study undertaken, the factors that affect the integrity and human likeness of a chat bot to identify improvement factors was identified [8]. Interactivity and user-friendly features of chatbots has me emphasised in previous works undertaken. The effectively showcase the reason behind the trend. Several works have been ideated and implemented regarding the field of chatbots.

III. PROPOSED WORK

DESIGN: Since most of the room bookings and table reservations are done through websites and apps, the hotel industry has established its appearance in social media. The webpage of a hotel group is a direct representation of the company’s brand. Including a chatbot can increase the stickiness factor of a page to great extends. The Objective of Mr. Bot is to increase the efficiency of the hotel management in terms of its interactions with its customers and expand its uses. The bot acts as a hospitality manager for the customers by helping them view menu, inform if they are allergic to any food items, respond promptly and relevantly to customer enquiries and suggestions. Further it can provide suggestions on places to visit based on their location. The chat bot consists of modules, where each module takes care of a particular functionality. The bot aims to be very engaging and asks the customer a list of questions to understand customer needs and expectations before displaying relevant information. The bot will be user-friendly to interact with and understand and aim to converse like a normal human being. The chatbot’s aim is to give extended support be diverse in its uses as per customer needs. Since a chatbot is available 24/7 it makes it evident option for customer services. The bot strives for clarity and eloquence in terms of how it serves its users.

IV. CONSTRUCTION

The bot will be constructed with the help of node.js, a powerful java script based language. The fundamental characters of the chatbot on implemented using this code. Each block of code is written to execute a specific function. The bot works on the basis of a pattern matching technique known as RegEx. RegEx is defined using a sequence of characters that act as the key to identify a specific search pattern. It has some strict rules of expression which are used to define the search patterns. The code looks something like this, ‘\b(?<greetings>Hey|Hello|Hi)\b’, this code is used to identify greeting patterns. Each regex expression is given an intent which has a specific appropriate response that will be invoked if the user’s input matches the corresponding regex expression. The functions are separated into different modules and each module has a specific function.

DEPLOYMENT:
The bot will be deployed in Facebook’s platform for the convenience of the user. Facebook being a huge platform where millions of potential customers exist, it has become the go to platform for marketing and deploying chatbots. Deploying on Facebook ensures that the business’s website gets a lot of reach and expand its customer base.

V. ANALYSIS AND RESULT

The bot has been deployed, run and tested successfully. It is capable of responding in a human-like tone. Each module has been tested for errors. The intent-handled nature of chatbot makes it a value adding for the marketers as they are able to clearly understand what the customers want using keywords and are able to respond and redirect suitable responses. The no. of views of the business’s website has increased due to the chatbot and hence it has been identified as the marketing tool on its own apart from customer services all while being a very economical option. It has increased the stickiness factor of the marketing campaign held in the online Facebook platform. The bot has successfully imitated a human -tone and it is very interactive.
VI. CONCLUSIONS AND FUTURE ENHANCEMENT

In the coming years chatbot is be used extensively and their uses and benefits and extensively studied and worked on. Future enhancements include implementing voice recognition to expand its user base to the visually challenged. Other enhancements include using machine learning to facilitate natural processing language and help the bot get more personalised the more you use it and build a multi-lingual bot that can understand more than one language.

REFERENCES

[1] Carmen Holotescu, University of “Ioan Slavici” of Timisoara, MOOCBuddy, a chatbot for personalised learning in MOOCs


[7] Bayu Setiaji, Ferry Wahyu Wibowo, Department of Informatics Engineering STMIK AMIKOM Yogyakarta, Indonesia e-mail: bayusetiaji@amikom.ac.id, Available at http://uksim.info/isms2016/CD/data/0665a072.pdf

Active and Reactive Power Control of Three Phase Grid Connected System with Proportional-Resonant Controller by using SVPWM Technique

[1] Peddinti Raja
Student (M.E), SRKR Engineering College, Bhimavaram-534204

Abstract: This paper presents detailed analysis of operation and design of Proportional resonant (PR) controller by using SVPWM technique. On the basis of LCL filter, double-loop current control scheme with the proportional-resonant method is simulated. The proposed control method can reduce the steady-state error of the current, and eliminate the impact of the grid frequency offset on the net current, and the system oscillation caused by the resonance frequency can be decreased, too. Therefore, the stability and robustness of the grid-connected system are improved. Under Unbalanced conditions Active and Reactive power are controlled and regulated by current loop on stationary reference frame by using PR controller along SVPWM, and results are used to provide a comparison between the different control strategies. The analysis is performed on a traditional three-phase voltage source inverter, used as a simple and comprehensive reference frame. Among the conclusions are the feasibility and great potential of PR particularly for power systems with a reduced number of switching states. In addition, the possibility to address different or additional control objectives easily in a single cost function enables a simple, flexible, and improved performance controller for power-conversion. The operation and performance parameters are compared for two models under unbalanced conditions. The study was done by simulating the system on Mat lab for 3KW grid connected system. Finally, both simulation and experimental results are presented in conclusion.

Keywords — Converters, LCL Filters, resonant controller; VSC converters; SVPWM technique

I. INTRODUCTION

In recent years the utilization of renewable energy sources for electrical power generation was increased rapidly. For example, renewable energies like wind, hydro, solar, PV cell. Because this are eco-friendly in nature, And this are used in various applications in recent years. The numbers of these systems connected to the grid are increasing. So it is important to regulate the grid Active and Reactive powers and voltages under unbalanced conditions along with in the system frequency range and harmonics are limited under desired range of Grid operation. It increases the grid stability of operation. When all this power sources are integrated to grid system then they produce a power quality (PQ) issues. According to IEEE9829 and IEEE1547 we have to control the power quality in desired range. These standards are achieved by means of robust control schemes. In recent years there are so many techniques are available to control power quality. In those mostly used method is Proportional integral (PI), because of its simplicity of operation and easy of control. However, it has some drawbacks PI controller cannot achieve those are instability to track sinusoidal reference single phase signals and reject the disturbances within the system. At fundamental frequency PI controller produce an infinite gain;

This paper deals with the problems of system under Dynamic power change conditions. For, this a modified proportional resonant controller (PR) by using SVPWM is applied to control the grid side converter. The design method of controller and filter along with mathematical equations are presented, and a comparison of system voltages under unbalanced condition is done with proportional resonant controller. The simulation results are presented given for both the cases along desired output voltage wave forms in both the cases.

II. SYSTEM MODEL

The three phase voltage source converter Connected to grid transformer through controller and low pass filter is shown in fig1.
This method is mainly concerned on grid side converter control. For system simulation we assume input any renewable energy source (PV, Wind, solar energies) as a fixed input voltage source. Here grid side impedance is represented as \( L_g \) is connected in series with LCL filter.

Therefore for any change in grid impedance \( L_g \) will cause the change of filter resonant frequency

\[
W_{res} = \sqrt{\frac{L_i + L_g}{L_iL_gC_f}}
\]

(1)

Where \( L_i \) = inverter side impedance; \( L_g \) = grid side impedance; \( C_f \) = Filter capacitance

From equation (1) \( L_g = \frac{L_i - W_{res}L_iL_gC_f}{W_{res}L_iC_f} \)

(2)

The closed loop block diagram of above system can be represented as shown in below fig.2

\[
G_{PR}(s) = K_p + \frac{2K_1s}{s^2 + W_0^2}
\]

(4)

\[
G_{PWM} = \frac{1}{1 + 1.5T_sS}
\]

(5)

\[
G_D(S) = \frac{(S^2 + R_DZ_{LC}^2S + Z_{LC}^2)}{LS(S^2 + R_DC_FW_{RES} + W_{RES})}
\]

Where \( T_s \) is Sampling Period, \( R_D \) is filter damping resistance; \( Z_{LC}^2 = [L_G + C_F]^{-1} : L_{GT} = L_G \)

### III. BASIC SYSTEM COMPONENTS DESIGN

#### 1. LCL FILTER

In this section we discuss about design and analysis of low pass filter for grid connected inverter. In case of high voltage applications the dynamic response of the L filter is poor. So here we considered LCL filter. It is utilized to limit the harmonics and that gives the improved output voltages and currents. The LCL filters as shown in fig3.

\[
I_g = \frac{1}{1 + \frac{1}{SC_f}}V_i - \frac{1}{1 + \frac{1}{SC_f}}V_g
\]

(7)
Active and Reactive Power Control of Three Phase Grid Connected System with Proportional-Resonant Controller by using SVPWM Technique

\[ I_g \left( SL_{fg} + R_{fg} + \frac{1}{SC_f} \right) = 0 \]  
(8)

The transfer function is given as

\[ H(S) = \frac{I_g}{V_i} \]  
(9)

The closed loop transfer function of LCL filter is obtained by utilizing above equation is

\[ H(S) = \frac{1}{S^3 L_f L_g C_f + S(L_f + L_g)} \]  
(10)

If impedance of the inductance becomes equal to zero then there is a resonance frequency occurs that is given as

\[ f = \frac{1}{2\pi \sqrt{L_f L_g C_f}} \]  
(11)

To avoid resonance Effect and to improve the stability of the voltage and currents control a damping resistance is introduced

\[ R_d = \frac{1}{6W_{Res}} \prod \cdot C \]  
(12)

Now, the transfer function of system with Rd is given as

\[ H(S) = \frac{S C_f R_d + 1}{S^3 L_f L_g C_f + S^2 C_f R_d (L_g + L_f) + S (L_f + L_g)} \]  
(13)

LCL filter response with out and with Rd are as shown in fig4, fig5.

\[ \sum_{h=3,5,7} K_h \frac{S}{S^2 + (hW_0)^2} \]  
(16)
The Bode plots of resonant controller for different values of 
Gain $K_i$ and $W_0$ are shown in fig.7, fig.8, fig.9

**Fig.8 Open loop Bode plot of PR controller**

**Fig.9 Closed loop Bode plot of PR controller**

**Fig.10 For various $K_i$ values PR controller Response**

In practical application, the infinite gain associated with the ideal case might lead to instability problems. Alternatively; non ideal PR controller is applied to improve the performance of the controlled system: When $G(s)$ is quasi proportional-resonant controller

$$G(S) = K_p + \frac{2W_c K_i S}{S^2 + 2W_c S + W_h^2}$$  \hspace{1cm} (17)

In, $W_c$ is the cutoff frequency which is introduced to add more flexibility for selecting the bandwidth of the controller and to reduce the sensitivity towards the variation of background grid frequency. Above Fig.4 shows the comparison between the frequency responses of an ideal and non-ideal PR controller. At the fundamental frequency, a high gain is achieved to eliminate the steady state error whereas approximately no gains appear at other frequencies.

Quasi proportional-resonant controller not only can maintain high gain at the fundamental frequency, but also reduce the impact of grid frequency offset on the net current. According to the compensation principle, $u_{grid}$ feed-forward control is increased which can completely eliminate the effects of the frequency offset.

**SVPWM Technique**

There are different types of PWM techniques available those are Sine PWM, Hysteresis, and Space vector PWM. In this we are using SVPWM technique.

**Basic Operation**

In this it treats the sinusoidal voltage as a constant amplitude vector rotating at constant frequency. This PWM technique approximates the reference voltage $V_{ref}$ by a combination of the eight switching patterns ($V_0$ to $V_7$). Coordinate Transformation (abc reference frame to the stationary d-q frame), A three-phase voltage vector is transformed into a vector in the stationary d-q coordinate frame which represents the spatial vector sum of the three-phase voltage. The vectors ($V_1$ to $V_6$) divide

**Fig.11 Basic switching vectors and sectors**

The plane into six sectors (each sector: 60. degrees $V_{ref}$ is generated by two adjacent non-zero vectors and two zero vectors). The eight inverter voltage switching outputs are as shown below
Active and Reactive Power Control of Three Phase Grid Connected System with Proportional-Resonant Controller by using SVPWM Technique

\[ V_0 = \begin{bmatrix} 0 \ 0 \ 0 \end{bmatrix} \quad V_4 = \begin{bmatrix} 1 \ 0 \ 0 \end{bmatrix} \]

\[ V_2 = \begin{bmatrix} 1 \ 1 \ 0 \end{bmatrix} \quad V_3 = \begin{bmatrix} 0 \ 1 \ 0 \end{bmatrix} \]

\[ V_4 = \begin{bmatrix} 0 \ 1 \ 1 \end{bmatrix} \quad V_5 = \begin{bmatrix} 0 \ 0 \ 1 \end{bmatrix} \]

\[ V_6 = \begin{bmatrix} 1 \ 0 \ 1 \end{bmatrix} \quad V_7 = \begin{bmatrix} 1 \ 1 \ 1 \end{bmatrix} \]

\textbf{Fig.12 switching of eight inverter voltage vectors (V0-V7)}

The modulation signals of SVPWM are as shown in fig.11

\textbf{Fig.13 Power vs.SVPWM modulation}

\textbf{SYSTEM PARAMETERS}

<table>
<thead>
<tr>
<th>S.no</th>
<th>Quantity</th>
<th>Value</th>
<th>Units</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Rated power</td>
<td>3000</td>
<td>Watts</td>
</tr>
<tr>
<td>2</td>
<td>Grid line to line voltage(V_{rms})</td>
<td>220</td>
<td>Volts</td>
</tr>
<tr>
<td>3</td>
<td>Dc Link voltage</td>
<td>400</td>
<td>volts</td>
</tr>
<tr>
<td>4</td>
<td>Frequency</td>
<td>60</td>
<td>Hz</td>
</tr>
<tr>
<td>5</td>
<td>L_i</td>
<td>1.4</td>
<td>mH</td>
</tr>
<tr>
<td>6</td>
<td>C_i</td>
<td>4.4</td>
<td>µF</td>
</tr>
<tr>
<td>7</td>
<td>L_g</td>
<td>709</td>
<td>µH</td>
</tr>
<tr>
<td>8</td>
<td>R_D</td>
<td>4.45</td>
<td>Ω</td>
</tr>
<tr>
<td>9</td>
<td>Switching Frequency</td>
<td>7.8</td>
<td>KHz</td>
</tr>
<tr>
<td>10</td>
<td>K_p,K_i</td>
<td>10,500</td>
<td>-</td>
</tr>
</tbody>
</table>

\textbf{Table.1 System Parameters}

\textbf{IV. SIMULATIONS AND EXPERIMENTAL RESULTS}

We verified the proportional resonant controller by using SVPWM technique Simulations are done by using Mat lab/Simulink. The grid currents for various active powers are shown in figure.12, fig.13

1. \textbf{ACTIVE POWER VARIATIONS}

\textbf{Fig.14 Active power vs. Currents}

\textbf{Fig.15 active power vs. single phase Currents}

Fig.14 shows the grid voltages and currents wave forms for different values of active powers respectively.
Active and Reactive Power Control of Three Phase Grid Connected System with Proportional-Resonant Controller by using SVPWM Technique

2. REACTIVE POWER VARIATIONS

![Fig.16 Voltage vs. currents for dynamic Active powers](image1)

![Fig.17 $I_{\alpha}$ vs. Time](image2)

![Fig.18 $I_{\beta}$ vs. Time](image3)

![Fig.19 Reactive power vs. Currents](image4)

![Fig.20 Reactive power vs. Voltage, Current](image5)

We can observe that under all dynamic conditions the voltages and currents are in phase with variation of active power in the system. Along with this we can also controlled the current harmonics. In the case of reactive power variation we can observe that current leads phase voltages and harmonics are regulated. Finally it is clear that the proposed controller provides smooth grid operation under various power variations.

V. CONCLUSION

In this paper we studied the Active and reactive power control by using PR controller with SVPWM technique, the design of LCL and PR controller is detailed. The controller operation for dynamic active and reactive power are simulated and analyzed. The desired grid currents and voltages are achieved. The smooth and fast response operation of the system was obtained. The proposed method
also reduces the current harmonics in the system under various load conditions.

REFERENCES


Travel Free

SRM University Ramapuram Chennai, Tamil Nadu

Abstract: With increased number of passengers in railway stations, the number of theft and other crimes have increased in the past couple of years. As the passengers increase, the luggages they use automatically is more, with respect to the size and number. The comfort of walking without any luggages can happen with services that will be provided to the passenger through this particular Web App, “Travel Free” is a App that aims at travellers travelling by train, who find it difficult to carry luggages, walk in the crowd with luggages and senior citizens. The App provides railway porters who would help in picking up the luggages from the traveller’s residence or from the station entrance and place it in the traveller’s reserved seat. The details of the reservation should be given by the passenger during the time of booking. All this would be under the supervision of a responsible railway employee. Incase of any problems faced during or after the pick up, complaint can be given through the app portal and it would be taken care of. The required technologies are Wireless Internet Connection, GPS(Global Positioning System), and a good Smartphone

Keywords— Wireless Internet Connection(Wi-Fi), GPS(Global Positioning System), Integrated Development Environment (IDE),

I. INTRODUCTION

The Web App is an easy source for people to use and it is feasible to different operating system users too. Our project aims at creating a user-friendly app that helps people travelling by train to book their luggage pick up from their houses. The app provides the user to book platform porters through a provider who is well authorized by the Railway Department. Once the booking is done, your luggage would be placed in your specific compartment and birth. Traveller’s details should be given during the time of booking.

II. RELATED WORKS

Airports have these types of baggage handling system (BHS). Their basic idea is "CHECK IN". They provide these services after the luggage has been bought to the airport by the passenger. A baggage handling system (BHS) is a type of system used to transport checked luggage from ticket counters to areas where the bags can be loaded onto airplanes. A BHS also transports checked baggage coming from airplanes to baggage claims or to an area where the bag can be loaded onto another airplane.

III. TECHNOLOGIES INVOLVED

- Web Applications
- GPS (Global Positioning System)
- Wi-Fi (Wireless Internet Connection)

3.1. Web Application

A web application or web app is a client–server computer program in which the client (including the user interface and client-side logic) runs in a web browser. Common web applications include webmail, online retail sales, online auctions, wikis, instant messaging services and many other functions.

Mobile web applications:

Further information: Multiple phone web-based application framework

There are several ways of targeting mobile devices when making a web application:

- Responsive web design can be used to make a web application - whether a conventional web site or a single-page application viewable on small screens and work well with touchscreens.
- Progressive Web Apps are a hybrid of regular web pages (or websites) and a mobile application.
- Native apps or "mobile apps" run directly on a mobile device, just as a conventional software application runs directly on a desktop computer, without a web browser (and potentially without the need for Internet connectivity); these are typically written in Java (for Android devices) or Objective C or Swift (for iOS devices). Recently, frameworks like React Native, Flutter and Xamarin allow the development of native apps for all platforms using languages other than each standard native language.

Hybrid apps embed a mobile web site inside a native app, possibly using a hybrid framework like Apache Cordova and Ionic or Appcelerator Titanium. This allows
development using web technologies (and possibly directly copying code from an existing mobile web site) while also retaining certain advantages of native apps (e.g. direct access to device hardware, offline operation, app store visibility).

### 3.2 GPS - Global Positioning System

GPS is a space-based radionavigation system owned by the United States government and operated by the United States Air Force. It is a global navigation satellite system that provides geolocation and time information to a GPS receiver anywhere on or near the Earth where there is an unobstructed line of sight to four or more GPS satellites. The GPS system does not require the user to transmit any data, it operates independently. It is originally known as Navstar GPS. Its origin United States. It was first launched in February 1978; 39 years ago. It total consists of 33 satellites and in total 31 satellites in orbit. Two types of GPS are Military and civilian. It has a Global coverage. Accuracy is upto 5 meter. Features of GPS are:

- Designed for the Desired Use
- Locates Satellites Rapidly
- Adequate Screen Size and Resolution
- Adequate Screen Size and Resolution
- Accesses Live Traffic Info
- Upgradable to New Maps
- Compatible with Preferred Mobile Phone
- Offers Special Features of Value

### 3.3 Wi-Fi (Wireless Internet Connection)

Wi-Fi or WiFi is a technology for wireless local area networking with devices based on the IEEE 802.11 standards. Wi-Fi is a trademark of the Wi-Fi Alliance. It was introduced in September 1998, 19 years ago. Devices that can use Wi-Fi technology include personal computers, video-game consoles, phones and tablets, digital cameras, smart TVs, digital audio players and modern printers. Wi-Fi compatible devices can connect to the Internet via a WLAN and a wireless access point. Such an access point (or hotspot) has a range of about 20 meters (66 feet) indoors and a greater range outdoors. Hotspot coverage can be as small as a single room with walls that block radio waves, or as large as many square kilometres achieved by using multiple overlapping access points.

### IV. RESULTS AND DISCUSSION

#### CONCLUSION

“Travel Safe” is a useful app that can reduce the chaos in Railway Stations. This would mean a better and safer journey that would take place. With smartphone users growing hugely, this would be an efficient app that could be easily accessed and utilised to make travelling a safer journey.

#### FUTURE WORK

As of now, airports don't provide the facilities of collecting the luggage from passenger's residence. This can be implied with the airports too. Volvo buses can also have this implemented in their system.

#### REFERENCES

Wikipedia
GBS GST Billing Software

[1] (Author), [2] (co Author), [3] (Assistant Professor)
[1][2][3] dept. name: Information Technology SRM UNIVERSITY INDIA

Abstract; This brief paper describes the uses and concepts of GST as well as a comprehensive description about the necessity of GBS (GST billing system). In here we will also emphasis on making the user – software interaction as easy as possible with incorporating new features to propagate smooth government to customer communication.

A. Selecting a Template (Heading 2)
First, confirm that you have the correct template for your paper size. This template has been tailored for output on the A4 paper size. If you are using US letter-sized paper, please close this file and download the file “MSW_USltr_format”.

B. Maintaining the Integrity of the Specifications
The template is used to format your paper and style the text. All margins, column widths, line spaces, and text fonts are prescribed; please do not alter them. You may note peculiarities. For example, the head margin in this template measures proportionately more than is customary. This measurement and others are deliberate, using specifications that anticipate your paper as one part of the entire proceedings, and not as an independent document. Please do not revise any of the current designations.

I. INTRODUCTION

The Hundred and Twenty Second amendment act introduced a national Goods and Services Taxes in India from 1 July 2017. The GST described in economic terms is a comprehensive indirect tax levy on goods and services in national level. The single GST replaced several former taxes and levies which included central excise duty services taxes and additional custom duty. It proved to be much more easier and comprehensive than those previous. Transaction made within a single state are levied with CGST by the central governmental SGST and by the state government. many ancient business owners who were used to the complex system were struggling to adjust with their present system to the digitalization. Thus to make their accounting an easier ordeal we proposed to make customized version of GST billing system. so that the auto computation might help them to restart their business as early as possible.

II. CALCULATION INCLUDED FOR GST CALCULATION

\[ \text{GST} = \text{output tax} - \text{input tax} \]
\[ \text{GST} = \text{tax percentage} \times \text{amount} + \text{amount} \]

The set off to adjust icst sgst and cgst is
III. EXISTANCE OF PROPOSED SYSTEM

The existing system for GST accounting are:
1. MARG ERP
2. Tally
3. SAP
4. ZOHO

IV. ADVANTAGES

1. GBS will primarily focus on the effective and accurate calculation of taxation without any hassle.
2. In this software, auto updation after every month to the E-governance site will be Inculcated.
3. The software will also have a matching system to refer the invoices of both the manufacturing company and stockist.

V. DISADVANTAGES

1. Many medium and small enterprises were unable to comprehend the protocols related to this taxation system.
2. For calculating and manually updating in the e-governance site proved to be a tedious task as well. Over a market research from various sectors of the society, it was observed there are only a few people who are well acquainted with this concept.
3. Retrieving the tax rate for the products can be wrong if done manually.

VI. FUTURE ENHANCEMENT

The software is mainly concerned to the rural and semi urban entrepreneurs. After the proper establishment the software will go for mainstream competition thus less complexity and more efficiency in terms of space and time.

VII. CONCLUSION

The software is small effort from youth of INDIA to carry on and make economical market of India flexible and also to prevent transaction blockage.

REFERENCES

[1] www.gstindia.com
[2] www.youtube.com
[3] www.cbes.gov.in
Graphical Password Strategy

Veeramani Ramasamy, Ambica Gupta, Aakriti Rai

M.E., Assistant Professor of Department of Information Technology, SRM University, Ramapuram, Chennai

Third Year Students Department of Information Technology, SRM University, Ramapuram, Chennai

Abstract: This paper is based on graphical password to protect user data or unauthorized access of information. The pattern are some set of graphical images which randomly changes its position every time you try to login. The user has to provide his details for registration and then has to draw a pattern as a password. The user has to select an application while registration itself and can have multiple accounts for every single application. The pattern is a 4x4 Grid consisting of multiple graphical images, the user has to drag or draw at least over 4 images for the application to consider his pattern lock. The Application auto generates a Unique Id for every User who wants to register. After the user has successfully registered he is redirected to the Login page where he has to provide his Id and Pattern Password from which the selected application by the user during the registration opens up.

Keywords: Graphical password, Graphical images, 4x4 Grid pattern.

I. INTRODUCTION

Password have been widely used to authenticate users to remote servers in web and other applications. Text passwords have been used for a long time. Graphical passwords, introduced by Blonder in 1996, are an alternative to text passwords. In a graphical password, a user interacts with one or more images to create or enter a password. Graphical passwords are intended to capitalize on the promise of better memorability and improved security against guessing attacks. Graphical passwords are particularly suitable for keyboard less devices such as Android and iPhones where on in putting a text password is cumbersome. For example, Windows 8 recently released by Microsoft supports graphical password logon. With increasingly popularity of Smart phones and slate computers, we expect to see a wider deployment of graphical passwords in Web applications. The project allows user to input a pattern password and only user knows how the pattern looks like as a whole. On matching the pattern, system unlock the security and opens up the specified application. Every time user logs on to the system the pattern password randomly changes its position. Now, if user chooses the correct pattern to make the original pattern, the system authenticates and allows to access the application. Else the user is not granted access.

II. MODULES AND THEIR DESCRIPTION

This application comprises of four Modules:

1. Registration: User first need to register into the system simply by filling up the details such as Name, Email id and Phone number.

2. Pattern Lock: After filling up the details, user can now set a pattern of his/her choice for security purpose.

3. Login: After successful registration, user can now login into the system by matching up the pattern.

4. Application Access: If the security pattern is matched, system grants the access to use the specified application.

III EXSTING SYSTEM AND PROPOSED SYSTEM

Problem with current scenario

Some two persons proposed a graphical authentication scheme based on the Hash Visualization technique. In their system, the user is asked to select a certain number of images from a set of random pictures generated by a program. Later, the user will be required to identify the pre-selected images in order to be authenticated. The results showed that 90% of all participants succeeded in the authentication using this technique, while only 70% succeeded using text-based passwords and PINS. The average log-in time, however, is longer than the traditional approach. A weakness of this system is that the server needs to store the seeds of the portfolio images of each user in plain text. Also, the process of selecting a set of pictures from the picture database can be tedious.

Other two persons developed a graphical password technique that deals with the shoulder-surfing problem. In the first scheme, the system will display a number of pass-objects (pre-selected by user) among many other objects. To be authenticated, a user needs to recognize pass-objects and click inside the convex hull formed by all the pass-objects. In order to make the password hard to guess, both suggested
using 1000 objects, which makes the display very crowded and the objects almost indistinguishable, but using fewer objects may lead to a smaller password space, since the resulting convex hull can be large. In their second algorithm, a user moves a frame (and the objects within it) until the pass object on the frame lines up with the other two pass-objects. The authors also suggest repeating the process a few more times to minimize the likelihood of logging in by randomly clicking or rotating. The main drawback of these algorithms is that the log in process can be slow.

**Proposed System:**
Graphical password application allows the user to set a pattern password for using other applications. The patterns are some set of graphical images which randomly change its position every time you try to login. The user has to provide his/her details for registration and then has to draw a pattern as a password by drawing it twice. The user has to select an application while registration itself and can have multiple accounts for every single application. The pattern is a 4x4 grid consisting of graphical images, the user has to drag or draw at least over 4 images for the application to consider his/her pattern lock. The Application autogenerates a Unique Id for every User who wants to register. After the user has successfully register he is redirected to the Login page where he/she has to provide his/her Id and Pattern Password and the application selected by the user during the registration opens up.

**IV. SYSTEM ARCHITECTURE**

**V. DATA FLOW DIAGRAMS**
A data flow diagram is a graphical tool used to describe an analyzed movement of data through a system. These are the central tool the bases from which the other components are developed. The transformation of data input to output through processed, may be described logically and independently of physical components associated with the system. These are known as the Logical data flow diagrams. A full description of a system actually consists of a set of data flow diagrams.

**VI. CONCLUSION AND FUTURE WORK**
The main aim of developing this application is to secure every smart phone device from external threads which we never know when they accessed our smartphone read or share our private data, messages, images, etc. as the doesn’t have any locking facility from snooping.
This application secure all your personal files, data, etc. once the device is locked using this security application.

REFERENCES

[1] en.wikipedia.org


Combustion and Propulsion Characteristics of Composite Solid Propellants under Elevated Conditions

Department of Aerospace Engineering, SRM University, Chennai, India

Abstract:- Research efforts in Composite solid propellants are mostly carried out at standard operating static conditions and hence majority of the studies have taken place by considering lower values of supersonic area ratio and chamber pressure. The work addresses evaluation of the combustion and propulsion characteristics under elevated conditions. Composite solid propellant [AP/HTPB/Al] is selected and systematic parametric studies are carried out using NASA-CEA. The simulations were carried out for elevated chamber pressure, supersonic area ratio conditions along with varying fuel concentration and O/F ratio. The performance was analyzed in terms of change in specific impulse and characteristic velocity. The study comprises of investigating the optimized composition criterion under varying conditions. The simulation predictions were duly verified and validated with the benchmark experimental and theoretical works. The results were compared with the preceding static testing of the composite propellant under normal conditions. Results show that high values of controlling parameters and high energy materials do affect the composite propellant performance. Based on the results, an effort is made to reason out the trends obtained under elevated operating conditions for the necessary effects. Additionally, useful information regarding the inclinations of energetic materials under elevated conditions is explicated.

Keywords:- Solid composite propellants, Al/HTPB/AP, Specific Impulse, Characteristic velocity, Supersonic area ratio, Chamber Pressure, Oxidizer to Fuel ratio.

I. INTRODUCTION

Rockets have revolutionized the space technology and human endeavor in space. The magnitude of the space operations relies heavily on the chemical rockets and thus draws immense emphasis on propellants and testing. Typically, the solid propellants are tested under standard prefixed conditions primarily carried out with a scaled model. The utility of propellants depends heavily on the state of testing standards. These propellants are widely tested with large scale or lab scale static motors under controlled conditions with chamber pressure varying from 10 to 70 bars and supersonic area ratio in the range of 10 to 100. The necessity of physical insight in to the phenomenon is detailed using set of design and performance parameters. The chamber pressure and supersonic area ratio are important design and control parameters to yield physical insight about the performance. The controlling parameters are known to have significant influence on the propellants under diverse conditions. The performance is analyzed in terms of change in specific impulse and related independent parameters. The work is driven by the prevailing issues in composite solid propellants as experimental research is only being carried out by considering relatively lower values of controlling parameters like the nozzle area ratio, chamber pressure and oxidizer to fuel ratio rather than analyzing the controlling parameters under elevated conditions. The solid propellants are treated under standard conditions with a scaled model under statically controlled conditions to avoid uncontrollable combustion. Trends of composite solid propellants at elevated conditions of nozzle area ratio, chamber pressure and oxidizer to fuel ratio are not experimentally validated. Practically, the rockets using propellants operate under varying conditions and thus it is mandatory to understand the nature of characteristic parametric changes under varying conditions.

The processes inside the combustion chamber of solid propellant rockets can be explained for an ideal situation by different relationships. The key parameters include physical, chemical and mechanical properties of propellant, combustion gas conditions, and rocket operating conditions. Three important factors namely, the specific impulse (I_{sp}), characteristic velocity (C*) and thrust coefficient (C_F) are of paramount importance in rocket propulsion. Theoretically, the nozzle expansion ratio or supersonic area ratio (A_n/A* or \epsilon) can be expressed in terms of specific heat ratio of combustion gases (\gamma) and pressure ratio (P_e/P_c) as:
\[
\varepsilon = \sqrt{\frac{\gamma - 1}{2} \left[ 1 - \left( \frac{P_e}{P_c} \right)^{\frac{(\gamma + 1)}{\gamma}} \right]} \frac{1}{\gamma - 1}
\]

(1)

Where,
\( P_e \) = Exit Pressure
\( P_c \) = Chamber Pressure
\( \gamma \) = Specific heat of combustion gases

Equation (1) dictates that the supersonic area ratio \( \frac{A_e}{A^*} \) is a strong function of specific heat ratio of combustion gases \( \gamma \) and pressure ratio \( \frac{P_e}{P_c} \) i.e. change in chamber pressure will lead to change in the supersonic area ratio.

The adjoining rocket performance parameters includes specific impulse \( (I_{sp}) \), characteristic velocity \( (C^*) \) and thrust coefficient \( (C_F) \). The theoretical framework for abovementioned performance parameters can be refereed as:

\[
CF = \frac{F}{P_c At}
\]

(2)

\[
C_F = \frac{F}{P_c At}
\]

Where, 
\( F \) = Thrust produced by rocket
\( A_t \) = Area of nozzle at throat
\( P_a \) = Ambient pressure

Thrust coefficient \( C_F \) is a figure of merit of the nozzle and signifies nozzle effectiveness. Equations 2-3 states that the meanwhile, \( C_F \) is a function of specific heat of combustion gases \( \gamma \), supersonic area ratio \( \frac{A_e}{A^*} \), pressure ratio \( \frac{P_e}{P_c} \), it is independent of the chamber temperature \( T_c \) and the mean molecular weight of the exhaust products. Except for \( \gamma \), thrust is completely free from the choice of propellant and depends only on the operating pressure. The optimum value of thrust coefficient is obtained if the rocket is operating in a vacuum and \( P_a = 0 \), whereas, for high value of \( \gamma \), low value of \( \gamma \) and high value of nozzle expansion ratio \( \frac{A_e}{A^*} \) are preferred. The dependence of \( C_F \) on \( \frac{A_e}{A^*} \) vanishes, if pressure thrust is 0, however, the trend remains unaltered. The characteristic velocity \( C^* \) depends mainly on the conditions in the combustion chamber. It depends on \( T_c \), \( M \) and \( \gamma \), with \( P_c \) influencing it indirectly through \( T_c \).

\[
C^* = \sqrt{\frac{\gamma T_c}{M}} \frac{1}{\gamma - 1}
\]

(5)

Where,
\( T_c \) = Chamber temperature
\( M \) = Molecular mass of the combustion gases
\( m \) = Net mass flow rate of the gases through the nozzle

Equation 5 states that, \( C^* \) is independent of the downstream conditions beyond that of the nozzle. A higher value of \( C^* \) is always desirable through a high chamber temperature and a low mean molecular weight of exhaust products.

From Equation (4) we can say that \( C^* \) is a function which converts mass-flow \( \dot{m} \) into chamber pressure \( P_c \) i.e. \( C^* \) is not a nozzle parameter and is a transfer function of \( \dot{m} \) and \( P_c \). \( C^* \) is sensitive to the combustion process and is a true measure of propellant performance thus, essential for merit of the chamber. The specific impulse \( (I_{sp}) \) is detailed as:

\[
I_{sp} = \frac{C_F C^*}{g}
\]

(6)

\[
I_{sp} = \frac{CF C^*}{g} \frac{1}{\gamma - 1}
\]

(7)

\( I_{sp} \) is a product of the pressure generating capacity in the rocket \( C^* \) and velocity generating property \( C_F \) which is a chamber parameter. Like \( C^* \), it needs a higher chamber temperature and a low mean molecular weight of exhaust products. \( I_{sp} \) value depends on the nozzle expansion ratio \( \frac{A_e}{A^*} \). Low value of \( \gamma \) is desirable for a high value of \( I_{sp} \) and when \( \gamma = 1 \), it becomes infinite. It is important to note that the mean performance parameters are a strong function of controlling parameters viz, chamber pressure and area expansion ratio. Thus, to fundamentally understand the operations under elevated conditions, it is necessary to adjust the understanding of inter-relation between the operating parameters.

Appreciable work had been done in the past and reviews can be found in [1-17] which provide an excellent assessment of the advancement till the end of the century and in recently. Present work emphases on the importance of operating condition, testing the controlling parameters and their role in relation to the performance. A base composite propellant [AP/HTPB/Al] is selected and extensive testing is being carried out to fundamentally understand the role of operating chamber pressure, supersonic area ratio and varying fuel concentration on the performance. The cases of standard testing and testing under elevated conditions of pressure and supersonic area ratio are undertaken to evaluate the performance change. In addition to establishing relationship between the controlling parameters, determining their roles and effects on the rocket
performance parameters and quantitatively as well as qualitatively verifying the trends of specific impulse and characteristic velocity w.r.t. controlling parameters, the work also emphasizes on incorporating the use of energetic materials like Iron in the base propellant composition of to get an enhanced propellant performance. A comparison of the trend obtained by adding Iron to the base composition at standard conditions is made with that at elevated conditions. A quantitative analysis is done of the variation in trends obtained. The evaluation of combustion and propulsion features of propellants under varying conditions is an aspect yet to be comprehensively explored. Present work attempts to investigate the combustion and propulsion features of the composite propellant under elevated condition. The specific objectives of the work are:

a) To understand the importance of operating conditions, testing the controlling parameters and their role in relation to the performance.

b) To study behavior/trends and role of energetic materials in base propellants for increasing performance at elevated conditions

II. SIMULATIONS AND SOLUTION METHODOLOGY

The work involves utilization of specialized chemical propulsion software NASA CEA (Chemical Equilibrium with Applications). The software tool calculates chemical equilibrium compositions and properties of complex mixtures from any set of reactants and determines thermodynamic and transport properties for the product mixture. Applications include assigned thermodynamic states, theoretical rocket performance, Chapman-Jouguet detonations, and shock-tube parameters for incident and reflected shocks. The composition of the oxidizers and fuels are varied stepwise and the theoretical rocket performance parameters like Specific Impulse, Characteristic Velocity are noted down and parametric analysis is done based on the software predictions. The present study is carried out by comparing results by varying the controlling parameters like chamber pressure, supersonic area ratio and oxidizer to fuel ratio (O/F) from lower to elevated conditions. The species present in the composite solid propellant composition are chosen either directly by choosing the solid propellant option or if new options are to be investigated then the atoms of the fuel to be chosen are selected from the periodic table.

III. RESULTS

The operating conditions are varied w.r.t. the base propellant composition of Ammonium Perchlorate as the oxidizer (70%), HTPB (Hydroxyl Terminated Polybutadiene) (15%) as the binder and Aluminum (15%). Addition of energetic material in the base composition in the form of Iron is also made at standard and elevated conditions. Prior to the main results, the software predictions were validated with existing experimental and theoretical data (please see Table 1). Analyzing the data, one can clearly note that the software predictions match reasonably well with the preceding experimental and theoretical work. Hence, it is likely to give good physical insight into understanding the effect of the controlling parameters in composite solid propellants. The first part of the study is devoted to evaluating the optimum composite propellant composition. This is done to compare this result with increment/ decrement in performance parameters associated with elevated operating conditions. First, the base composition AP/HTPB/Al [70/15/15] is validated for extensive utilization. Figure 1 shows the variation of performance parameter specific impulse with aluminium concentration.

<table>
<thead>
<tr>
<th>Composition</th>
<th>Exp./ Theo. (sec)</th>
<th>Simltn. (sec)</th>
</tr>
</thead>
<tbody>
<tr>
<td>AP (80%)/Al (20%)</td>
<td>246</td>
<td>242.59</td>
</tr>
<tr>
<td>K.S. Williams, PhD</td>
<td></td>
<td></td>
</tr>
<tr>
<td>University, 2012.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>AP/HTPB/Al [70/10/20]</td>
<td>258</td>
<td>247.08</td>
</tr>
<tr>
<td>AP/HTPB/Al [70/15/15]</td>
<td>265</td>
<td>260</td>
</tr>
<tr>
<td>AP/HTPB/Al [64/14/18]</td>
<td>265</td>
<td>263.37</td>
</tr>
<tr>
<td>Venkatachalam et. al., 2002.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>AP/HTPB/Al [(50-10)/(35-75)/15].</td>
<td>(238-175)</td>
<td>(230-170)</td>
</tr>
<tr>
<td>Nevada Aerospace science</td>
<td>266</td>
<td>264.02</td>
</tr>
<tr>
<td>associate(nassarocketry.com).</td>
<td></td>
<td></td>
</tr>
<tr>
<td>AP/HTPB/Al [68/14/18] at (Pc=6.89MPa)</td>
<td>267</td>
<td>263.97</td>
</tr>
<tr>
<td><a href="http://www.lr.tudelft.nl">www.lr.tudelft.nl</a></td>
<td></td>
<td></td>
</tr>
<tr>
<td>AP/PBAN/Al [70/12/16] at (Pc=6.89MPa)</td>
<td>267</td>
<td>263.97</td>
</tr>
<tr>
<td><a href="http://www.lr.tudelft.nl">www.lr.tudelft.nl</a></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

It is important to note that, aluminium is used in crystalline form. Looking at the plot one can note that the ‘Al’ gives the maximum ‘Isp’ at 15%(weight). The optimum composition is determined by increasing the mass fraction of Al in steps of 1%, ranging from no Al to 45% of ‘Al’ by total mass. The results are shown in Figure 1. A non-monotonic trend is seen that peaks around 15% of ‘Al’ by mass. The corresponding ‘Isp’ is around 265s. The high “Isp” values seen are largely explained on basis of the flame temperature of ‘Al’ which is around 3700 K, which is
Combustion and Propulsion Characteristics of Composite Solid Propellants under Elevated Conditions

...significantly higher than the adiabatic flame temperature for hydrocarbon fuels.

Figure 1: Variation of specific impulse with Aluminium concentration.

The non-monotonic trend seen is also a result of the variation of the adiabatic flame temperature with the fuel concentration. Lower and higher concentration of fuels lead to lower flame temperatures and hence have lower \(I_{sp}\). The results are cross-checked with secondary parameter viz., characteristic velocity \(C^*\) (Figure 2).

The \(C^*\) variation indicates trend like the \(I_{sp}\) that on increasing the ‘Al’ concentration from 0 to 15% the characteristic velocity increases till 15% and then decreases drastically. The above-mentioned result certifies usage of 15% Aluminium in the base composition. One of the important attributes of ‘Al’ is generation of high temperatures generated (4100 K) as increase in pressure results increasing effective velocity and hence increased thrust. Aluminium agglomerates in the liquid state help to dampen combustion instabilities.

Figure 2: Variation of characteristic velocity with Aluminium concentration.

Figure 3 shows that the base composition taken into consideration was Al/HTPB/AP in the ratio 15/15/70 with a minimal supersonic area ratio 10 and chamber pressure 25 bar for which the corresponding \(I_{sp}\) was noted to be 262.3 s.

Figure 4 signifies the value of the characteristic velocity \(C^*\) which was noted to be 1575.4 m/s w.r.t. the same base composition of Al/HTPB/AP and at the same base conditions as above. Firstly, the dependence of \(I_{sp}\) with varying supersonic area ratio for different values of constant chamber pressure was taken into consideration.
Figure 5 shows the trend of increment in $I_{sp}$ with varying supersonic area ratio from 10 to 400 for different values of constant chamber pressure which are 10 bar, 100 bar and 300 bar respectively. The base composition of Al/HTPB/AP in the ratio 15/15/70 was considered. It is to be noted that for respective values of constant chamber pressure, the variation in $I_{sp}$ is less than 1% corresponding to each supersonic area ratio value. Also, the increment of $I_{sp}$ w.r.t. varying supersonic area ratio followed the same trend for low, intermediate and high chamber pressure values of 10bar, 100bar and 300bar respectively. The approximate increment in $I_{sp}$ from nozzle area ratio 10 to 50 is 15%, from 50 to 100 is 4%, from 100 to 150 is 2%, from 150 to 200 is 1%, from 200 to 250 is 0.8%, from 250 to 300 is 0.6%, from 300 to 350 is 0.4% and from 350 to 400 is 0.4%. It can be noted that the rate of increment decreases monotonically as the area ratio increases. The increment in $I_{sp}$ w.r.t the supersonic area ratio can be reasoned out since $I_{sp}$ is a function of the thrust coefficient $C_F$ which is a direct function of the supersonic area ratio. Figure 6 verifies the result seen in figure 5 with the variation of $I_{sp}$ with varying chamber pressure from 10 bar to 300 bar for three different values of supersonic area ratio.

The values considered are 10, 100 and 300 to signify low, intermediate and high supersonic area ratio respectively. It can be noted that the increment in $I_{sp}$ values from supersonic area ratio 10 to 100 is approximately 18-19% and from supersonic area ratio 100 to 300 is approximately 4% i.e. the increment in $I_{sp}$ is substantial initially when supersonic area ratio is small but as the supersonic area ratio gets larger, the increment in $I_{sp}$ is not substantial. Hence for subsequent very high supersonic area ratio values, the $I_{sp}$ values get relatively invariant and redundant with the supersonic area ratio.

Figure 7 shows the variation of $I_{sp}$ with varying fuel concentration (%) for the base composition of Al/HTPB/AP at chamber pressure 25 bar. For a lower supersonic area ratio of 10, the max $I_{sp}$ of 262.3s was noted at 30% fuel concentration i.e. the optimum O/F ratio for lower supersonic area ratio appeared to be 2.33. But for higher supersonic area ratio of 375, the maximum $I_{sp}$ of 328.9s is noted at 20% fuel concentration i.e. the optimum O/F ratio for higher supersonic area ratio appeared to be 4.

The % increase in $I_{sp}$ was found to be 27% at fuel concentration 30% for both area ratio values of 10 and 375. From this, it is inferred that O/F ratio is a function of supersonic area ratio.
The results in Figure 8 were cross-checked with secondary parameter characteristic velocity ‘Cstar’ but the ‘Cstar’ variation indicated that it’s not a function of supersonic area ratio as the maximum ‘Cstar’ value was obtained at fuel concentration of 30% and was noted to be 1575.4 m/s irrespective of the supersonic area ratio. Irrespective of the area ratio values, ‘Cstar’ follows the same trend with the same values for variation with fuel concentration (%). This behaviour can be justified as C* is not a nozzle parameter and hence is not dependent of the supersonic area ratio. It is a function of and figure of merit of the chamber pressure according to equation 6.

Figure 9 shows the variation of Isp at sea level and vacuum with variation in fuel concentration for the base composition Al/HTPB/AP at supersonic area ratio 375 and for constant chamber pressure values of 25 bar and 100 bar respectively. It can be noted that the Isp values in vacuum are always higher than the corresponding Isp values at sea level for each increment in fuel concentration. This is because in vacuum Pas=0 so C_F would be maximum and hence Isp since its directly proportional to C_F according to equation 6. The maximum variation between Isp at vacuum and at sea level was noted to be approximately 4% at 60% fuel concentration when chamber pressure is taken as 25 bar and approximately 4% at 50% fuel concentration when chamber pressure is taken to be 100 bar. The plot again signifies that the trend followed by Isp at various chamber pressures is the same and that out of chamber pressure and area ratio, the dominant controlling parameter of Isp is the area ratio as increasing chamber pressure from 25 bar to 100 bar doesn’t show a significant increase in the Isp value. Figure 10 gives the relationship between Isp and Al concentration in the Al/HTPB/AP mixture at chamber pressure 25 bar.

At O/F ratio 2.33 and area ratio 10, the maximum Isp of 262s was obtained at approximately 16% ‘Al’ concentration which validates the optimum concentration of Al at low supersonic area ratio to be 15%.

In contrast, at O/F ratio 2.33 and at elevated supersonic area ratio of 375, the maximum Isp of 338s was obtained at 21% Al concentration. Also, at O/F ratio 4 and supersonic area ratio 375, the maximum Isp of 332s was obtained at 13% ‘Al’ concentration. It is thus show that optimum ‘Al’ concentration for obtaining maximum Isp is a function of supersonic area ratio. Figure 11 shows the variation of Isp with Iron concentration in the base composition of Al/HTPB/AP which taken in the ratio of 15/15/70. It can be
noted from the plot that addition of Fe to the fuel acts as a catalyst. The trend increases until 11% iron concentration and decreases thereafter is identical for both values of supersonic area ratio (375 and 10) at chamber pressures 100 bar and 25 bar respectively. For both cases the maximum ‘Isp’ is obtained at 11% iron concentration. Fe gives approximately 4.65% rise in Isp to the base composition of Al/HTPB/AP at supersonic area ratio 10 and chamber pressure 25 bar. For elevated conditions of supersonic area ratio 375 and chamber pressure 100 bar, Fe approximately gives a rise of 4.28% to the base composition of Al/HTPB/AP.

**IV. SUMMARY**

Out of supersonic area ratio and chamber pressure, supersonic area ratio is the more dominant controlling parameter because changing it showed substantial changes in Isp till a particular limit under elevated conditions but changing chamber pressure didn’t show substantial changes in the Isp even under elevated conditions. Also when operating under elevated condition of supersonic area ratio 375, it was noted that the optimum fuel concentration shifted from 30% (which was the case for lower values of supersonic area ratio) to 20%. But characteristic velocity remained unchanged or was indifferent to the changes made in supersonic area ratio which signified that characteristic velocity was not a function of the supersonic area ratio. It was also noted that under elevated conditions of high supersonic area ratio and high chamber pressure, the trend followed by Isp at sea level and in vacuum was the same with approximately only 4% variation in the values. The reason behind the use of Aluminum at 15% concentration in the base composition under lower values of supersonic area ratio & chamber pressure was established. It was also noted that the optimum Al concentration for obtaining maximum Isp is a function of the supersonic area ratio. 11% Iron is required to be added to cause increment of 4% in Specific Impulse at O/F greater than 1 at lower values of controlling parameters. The same was also verified by adding Iron under elevated conditions of supersonic area ratio and chamber pressure.

**REFERENCES**

Progressive Enhancement of Driving License

[Sowmitri B S, Hemanth Harikumar]
[UG Scholar, UG Scholar]
SRM University, Ramapuram Campus, Ramapuram, Chennai, Tamil Nadu

Abstract: Digitalization has profoundly enhanced the technology curve. As the world is progressing towards digital era it’s no longer necessary to carry a wallet. Digital transactions and money-transfer apps make it much easier to survive without carrying cash or card. Project ‘ID’ is one such idea where the driving license in the wallets could be substituted with a digital form of license which abolishes the need for wallet. The project envisions the digital driver’s license as a mobile application that does more than simply provide a digital ID for verifying driver’s privileges. It provides a variety of services and functions which would widely benefit the nation. The project helps identify the vehicles whose documents expire. It facilitates individuals to showcase their electronic identity even without an internet connection. It sets up reminders for expiry of certificates such as PUC. The project would be a progressive web app with an aim to enhance the driving license and keep track of vehicle and the driver. The project helps to resolve major problems of our country such as pollution and corruption.

Keywords: Digitalization, Electronic Identity, PUC- Pollution under control, Progressive web app.

I. INTRODUCTION

Technology has taken a tectonic shift in our everyday lives. Smartphones have become the new wallets, say, the digital wallets which replaces the need for wallets. Individual’s driver license is one of the key documents that people keep in their purse or wallet. The driver license is not only the identifying document that allows people to drive a vehicle, but has also become a key document for other types of authentication such as at banks, retail outlets, air travel, etc. The idea arose from Digital India campaign and concerns such as vehicular pollution. According to article 115 Emission of smoke, vapour, etc. from motor vehicles: (7) After the expiry of a period of one year from the date on which the motor vehicle was first registered, every such vehicle shall carry a valid ‘Pollution under control’ certificate issued by an agency authorised for this purpose by the State Government. The validity of the certificate shall be for six months and the certificate shall always be carried in the vehicle and produced on demand by the officers referred to in sub-rule (1) of rule 116. Documents such as PUC could be managed efficiently with this project. The project works on a technology called ‘progressive web app’. Wherein the driving license will be progressively enhanced to a digital driving license. The core idea behind using this technology is to take advantage of the service workers which helps us to retain information even without internet connection. The application provides the following services and functionality

- Driver’s License / ID
- Driving record
- Vehicle Record and Registrations
- Services
  1) Reminders
  2) Complaint box

II. RELATED WORKS

Several states in US have begun the process of exploring an electronic license. MorphoTrust is a company that makes most drivers licenses. The Iowa license, developed by Morpho Trust uses a 3D-like photo or digital watermark for validation. A quick screen swipe flips the license to its back, revealing a bar code and the class of the license.

In India DigiLocker is an existing online locker facility available for Android OS, the app lets you upload and save all your government-issued documents including PAN card, Aadhar Card, college certificates, property documents and more online. The driving license and vehicle registration papers can be uploaded and presented to officers when required. With this integration, users will no longer need to carry around their original documents all the time. The traffic police and other law enforcement agencies will have the required apps for spot verification of the documents.
**III. METHOD**

The project will be a progressive web app. Progressive web apps are just web applications designed to be mobile friendly. It’ll start out just like any other web app, browser will invite the user to install the app to their home screens. PWA’s can also benefit with push notifications, like any other native apps. To begin the process of obtaining a digital driver’s license the user must first access the website. Upload the required documents such as driving license, vehicle documents, pollution certificate and insurance certificate. The users will be authenticated using aadhar card which will be linked with the driving license. With this done, the website could be pinned to the home screen. Which makes it look and feel like an app.

The application includes:

1) Service workers  
2) Web manifest  
3) Application shell.

**IV. RESULTS AND DISCUSSION**

Progressive web app technology is best suited for the project. As per requirements it fulfils the following objectives to qualify as a progressive web app. Progressive – Work for every user on all browsers. Responsive – Operate seamlessly across all form factors. Connectivity independent – Work offline or on low quality network connections. App-like – App-style interactions and navigation. Fresh – Always up-to-date. Secure – Served only via HTTPS. Discoverable – Are identifiable as “applications,” allowing search engine discovery.

Re-engageable – Make user re-engagement easy through features like push notifications. Installable – Allow users to easily “keep” apps they find most useful on their home screen. Linkable – Easily share via URL with no app store installations required.

**VI. FUTURE WORK**

The future enhancement would be to include biometric – a thumbprint or facial image to securely lock the app. The application should also include the capability to remotely deactivate or remove the digital license if the device is lost or stolen. The project aims to develop a government portal for bringing the defaulters in front of justice.

**REFERENCES**

[2] https://www.google.co.in/search?q=digital+Id&rlz=1C1CHZH_enIN687IN687&oq=digital+Id+&aqs=chrome.69i57j69i60l3j0l2.27025j0j7&sourceid=chrome&ie=UTF-8  


[1] Assistant Professor, [2] PG Scholar, Velammal Engineering College, India

Abstract: Wireless sensor networks (WSNs) provide emergency navigation services, given their easy deployment and the ability of intelligent sensing and communication. They help people in escaping from a hazardous region safely and quickly when an emergency occurs. However, guiding more and more people to the same exit causes congestion which does not help in timely evacuation. Many times, trapped people move back and forth during navigation, known as oscillation. Frequent oscillations lead to the people remaining in danger for a longer period of time and decreases their chances of survival. The evacuation systems must provide shortest and safest navigation paths with reduced congestion. In this paper, we give a survey of various emergency navigation schemes. The existing systems are evaluated in terms of parameters such as scalability, congestion avoidance, evacuation time, survival rate, communication cost, reaction to emergency dynamics and navigation efficiency with guaranteed safety.

Keywords: Congestion, Emergency, Navigation, Wireless Sensor Network (WSN).

I. INTRODUCTION

WSNs raise many exciting opportunities to minimize the impacts caused by emergencies [1]-[4]. In a mobile sensor network, the sensors are able to relocate and self-organize into a network. One interesting application of WSN is that they are used as indoor guiding service for emergency evacuation whose goal is to assist moving objects in escaping a hazardous region safely and quickly when an emergency occurs. WSNs are an attractive option for indoor environments today, due to the recognition of the importance of energy conservation [5] and emergency/rescue operations [3], [10]. The sensor nodes are deployed in an area of interest in advance. The users are equipped with communicating devices like 802.15.4 compatible PDAs that communicate with sensors in the network [7], [8]. When an emergency occurs in this area, the service can determine the emergency location from the data collected by sensor nodes. It then plans safer paths that detour around the hazardous regions and arranges proper paths that can evacuate all people in short time. According to guiding directions of sensor nodes, a person can follow the planned paths to escape to safe area.

In centralized load-balancing guiding system, an analytical model is used to estimate the total evacuation time [9]. The base station uses this model to construct a guiding tree whose evacuation time is the shortest. It relies on wired infrastructure or multi-hop wireless sensor network for gathering sensing data. The central server thus has the comprehensive knowledge of all sensor nodes. Optimal navigation paths are then constructed by the central server and sent via the sensor network to inform and guide the moving objects. However, an emergency (e.g., fire, earthquake) may damage the central server or the sensor network. Each sensor node exchanges sensing data with neighboring nodes and determines its guiding direction based on collected data [7]-[10]. The concept of potential is used to attract or repulse the moving objects. A danger area has a repulsive potential to push away moving objects, and a safe area has an attractive potential to pull them towards it. Based on potential of various locations, navigation paths with guiding directions are constructed for objects to move away from the danger area. The concept of potential is also utilized in [11], which additionally considers scenarios with multiple emergency events and multiple exits in their proposed protocol.

The navigation of human beings seeks for a safe-critical path, other than packet loss or energy efficiency which is the first priority as in packet routing. Here the safety of a path not only means to be far away from a hazardous area, but also refers to mild congestion, less detours as well as fast reaction to emergency. Secondly, human navigation consumes much more time than traditional packet routing process, due to the limited movement speed of people. While during one packet delivery process the network is often considered static, human navigation in contrast deals with emergency dynamics almost all along the guiding process.
II. LITERATURE SURVEY

The algorithm proposed in this paper achieves both mild congestion and small stretch, where all operations are in-situ carried out by cyber-physical interactions among people and sensor nodes. It does not require location information, nor the reliance on any particular communication model. It is also distributed and scalable to the size of the network with limited storage on each node. It develops a potential map which indicates the hazard level of an exit, and develops a hazard level map which tells the location of hazardous areas so that users are guided to different paths and heavy congestion is avoided. People near the hazardous area achieve a mild congestion at the cost of a slight detour, while people distant from the danger avoid unnecessary detours. It has faster reacting speed to emergency dynamics and highest navigation path planning efficiency.[12]

Ziliang Wang; Zhenjiang Li; Mo Li; Yunhao Liu; Zheng Yang, “Sensor Network Navigation Without Locations”. The navigation system presented in this paper embeds a road map in the sensor network without location information so as to provide users navigating routes with guaranteed safety. The road map is rebuilt in the event of changes in dangerous areas. Users issue only local queries to obtain navigation route. It incurs the least overhead as only local communication is needed to update the road backbone when dangerous areas change.[13]

Guang Tan; Stephen A. Jarvis; Anne Marie Kermarrec, “Connectivity-guaranteed And Obstacle-adaptive Deployment Schemes For Mobile Sensor Networks”. The navigation scheme stated in this paper maximizes sensing coverage, achieves connectivity for a network with arbitrary sensor communication/sensing ranges or node densities. Floor-based scheme is used that divides the field into floors. It does not need any knowledge of the field layout, which can be irregular and have obstacles of arbitrary shape. A high network coverage and a small moving distance is obtained.[14]

Lin wang; Yuan He; Wenyuan Liu; Nan Jing; Jiliang Wang; Yunhao Liu, “On Oscillation-free Emergency Navigation Via Wireless Sensor Networks”. The system uses the concept of moving speed to evaluate the congestion degree to accurately estimate the evacuating time. Oscillation is defined as a situation where the trapped users will move back and forth passively in local area due to crowd congestion or emergency dynamics. It reduces the direction oscillations due to the network communication delay and adapt to the variation of hazardous region. A metric called ENO(Expected Number of Oscillations) is used to measure the success rate of navigation. It greatly reduces the stay time of users in dangerous regions, enhancing the overall safety of the guided users. [15]

Yunhao Liu; Yuan He; Mo Li; Jiliang Wang; Kebin Liu; Luferng Mo; Wei Dong; Zheng Yang; Min Xi; Jizhong Zhao; Xiang – Yang Li, “Does Wireless Sensor Network Scale? A Measurement Study On Greenorbs” . GreenOrbs is a monitoring system deployed in forest area that performs all-year-round ecological surveillance in the forest, collecting various sensory data, such as temperature, humidity, illumination, and content of carbon dioxide. The collected information can be utilized to support various forestry applications. The main aim of this system is to check whether wireless sensor networks scales. Network yield, percentage of successfully acknowledged packets are measured. The system does not suffer from ‘hot area’ problem. It is the first method to conduct a long term and large-scale measurement study on an operating sensor network in the wild. [16]

Buragohain; D. Agrawal; S. Suri, “Distributed Navigation Algorithms For Sensor Networks”. The system constructs a skeleton graph which is nothing but a reduced graph with fewer nodes from the full communication graph. It makes use of skeleton graph to find approximate safe paths with much lower communication cost. Shortest path is found which is of optimal quality and safe. The system also calculates minimum exposure path.[10]

Dilusha Weeraddana; Ashanie Gunathillake and Samiru Gayan, “Sensor Network Based Emergency Response And Navigation Support Architecture”. The paper proposes a system that integrates the WSN based knowledge with the soft knowledge acquired from various data sources for the emergency navigation support. The main functionalities of the system include gathering data from WSN deployed in multi-story building, processing it with information from knowledge base, share the decisions made with first responders and people in the building. Meets the navigation requirements of both the firefighters and victims and evacuates people much faster avoiding congestion.[17]

Shen Li , Andong Zhan, Xiaobing Wu, Panlong Yang and Guihai Chen, “Efficient Emergency Rescue Navigation With Wireless Sensor Networks”. The Emergency Rescue Navigation strategy takes both pedestrian congestion and rescue force flexibility into account to save trapped people. The system uses a directed graph to model the entire environment. The movements of people are taken as network flows on graph. By calculating maximum cut on graph, the system gives commands to firemen to avoid hazardous areas so that trapped people are saved and congestion is avoided. It minimizes evacuation time by sending firemen to clean obstacles and keep those regions safe. [18]
A Survey on Emergency Navigation using Wireless sensor Networks

Gaddafi Abdul-Salaam, Abdal Hanan Abdullah and Mohammad Hossein anisi, “Energy-efficient Data Reporting For Navigation In Position-free Hybrid Wireless Sensor Networks”. Hybrid Wireless Sensor Networks consists of both static and mobile sensor nodes that work together for sensing and collecting data. Total power consumption is minimized because each node adjusts its radio frequency transmission power needed to reach neighbour nodes without using maximum radio frequency power. It reports event packets in an energy-efficient manner. It significantly reduces the energy consumption and maximize the HWSN lifetime. The elimination of packet redundancy is feasible. [19]

Chi-Han Lin ; Po-Yu Chen; Wen-Tsuen Chen, “ An Adaptive Guiding Protocol For Crowd Evacuation Based On Wireless Sensor Networks”. This protocol takes into account many factors like location of hazardous regions, distance to exits, congestion degree of each location and guides moving objects with load balancing among multiple navigation paths to multiple exits and avoids congestion to reduce the evacuation time. It achieves the highest survival rate. [20]

III. CONCLUSION

This survey paper presents an overview of various emergency navigation techniques implemented using wireless sensor networks. One of the main challenges in emergency navigation systems is that quantifying the safety of a path is not possible all the time. After the emergency alert has triggered, the user will not be able to find the shortest path to exit efficiently, because of unknown place. The congestion caused by rushing trapped users to the nearest exit is also a major problem. The ultimate objective of any emergency navigation must be to guide people to the nearest exit for the sake of timeliness which causes extreme congestions at the exit and significantly prolong the emergency navigation time while leaving other exits of low usage. An alternative path must be shown while ignoring a roundabout way temporarily replacing part of a route. In this paper, we have surveyed various emergency navigation schemes taking into account scalability, congestion avoidance, evacuation time, survival rate, communication cost, reaction to emergency dynamics and navigation efficiency with guaranteed safety.

REFERENCES


A SURVEY on Segment Based Evaluation of Co-factor Used in Human Gait Recognition


Abstract;- Gait recognition is an effective biometric feature to identify persons from a distance by the way people walk or run. While gait has several attractive properties as a biometric, the greatest disadvantage in gait recognition is to identify an individual with cofactors and in different emotional and environmental conditions. Different views and angles of the camera also constitute in degradation of the gait identification. Thus different measures and methods have been proposed for enhancing the gait identification in these cases. This paper is study of gait recognition during these conditions and discussing ways for lowering the degradations. This paper presents a literature review of cofactor affected gait recognition and propose a method to identify cofactor affected probes in certain view angles. Recent researches in gait identification techniques are presented in this paper.

I. INTRODUCTION

Many biometric resources, such as fingerprint, palm print, face recognition, iris, have been systematically studied and employed in many systems. In spite of their widespread applications, these resources has certain disadvantages such as performance degradation due to low resolution images, pictures taken at a distance and needfulness of a person to come close to the system for identification. For these reasons, innovative biometric recognition techniques for human identification at a distance emerged and gained immense attention among the researchers in recent years.

Gait Recognition can be based on the human shape analysis, movement analysis or any other richer recognition cue. Gait is a natural contender for recognition of a person at distance, given its unique identification techniques and capabilities. Gait recognition includes visual cue extraction as well as classification. But the major role play here is the representation of the gait features in an efficient manner. Two common categories of gait recognition are appearance-based and model-based approaches. Model-based approaches include evaluation of gait dynamics, such as stride length, cadence, and joint angles. These approaches could not claim high performance partly due to the self-occlusion caused by legs and arms crossing. Appearance-based analysis uses gait features measured from silhouettes by feature extraction methods, such as gait energy image (GEI), Fourier transforms etc. Gait features from silhouettes can be separated into static appearance features and dynamic gait features, which reflect the shape of human body and the way how people move during walking, respectively. The appearance of a person gets changed when it is affected with a cofactor and decreases the efficiency of the technique. There are several approaches to identify the cofactors.

Cofactor affected GEI detection and removal process were exemplified in and got remarkable recognition rate. The whole GEI is first segmented into three parts considering the area of cofactor appearance in it. Cofactor information are detected and eliminated. Finally, the three segments are recombined for final classification.

II. LITERATURE REVIEW OF GAIT IDENTIFICATION TECHNIQUES

All basic gait identification technique currently being used by the researchers and industry will be discussed and evaluated in this section.

A. Silhouette Transformation Based on Walking Speed for Gait Identification

The paper presents a method of gait identification using silhouette-based frequency domain features. When a person...
changes his/her walking speed, dynamic features such as stride and joint angle are changed while static features such as thigh and shin length are not changed. Based on this fact, first, static and dynamic features are identified and separated from gait silhouettes by fitting a human model. Secondly, a factorization based speed transformation model for the dynamic features is created using a training set for various persons on various speeds. Methodologies adopted in the paper are GSV (Gait silhouette Volume) for silhouette extraction normalization by the height registration. The method transforms the dynamic features from a reference speed to another arbitrary speed. Even though person with multiple walking speed can be determined the method evaluates the speed ratio only by a single factor dynamic features. Should include full body model fitting, Gait style classification etc.

B. Gait Recognition across Various Walking Speeds Using Higher Order Shape Configuration Based on a Differential Composition Model

The model proposes a higher order shape configuration for gait shape description which conserves discriminant information in the gait signatures and able to tolerate the varying walking speed. In this paper, Procrustes shape analysis (PSA) is adopted for gait recognition because it has been proved as a special shape description that can tolerate the change of orientation of an object. The method adapts proper noise elimination and holes remedy methods. This method eliminates the degradations caused by CSC (centroid shape configuration) such as unstable shape centroid by HSC & PSA techniques. DCM improves performance of cross speed gait recognition. But Gait shape of an individual can be easily altered by many factors such as change of walking speed and inconsistency in walking patterns.

C. Human ID Gait Challenge Problem, Datasets, Performance and Analysis

The paper presents the means for measuring progress and specifying the properties of automatic gait recognition by the help of a baseline algorithm, set of 12 experiments and very large dataset. The baseline algorithm estimates silhouettes by background subtraction and performs recognition by temporal correlation of silhouettes. The 12 experiments are of great difficulty, which is measured by the baseline algorithm, and examine the effects of covariates on performance. The data set consists of 1,870 sequences from 122 subjects spanning covariates. Baseline algorithm is the reasonable solution for reporting the performance and the scientific basis for advancing and understanding automatic gait recognition. It involves the segmentation process which involves some segmentation errors due to no much threshold change and moving objects in background.

D. Individual Recognition Using Gait Energy Image

GEI based human recognition is the concept in the paper. As a solution for the problem of lack of training templates, they propose an approach for human recognition by combining statistical gait features from real and synthetic templates. And then directly compute the real templates from training silhouette sequences, synthetic templates are generated from training sequences by simulating silhouette distortion. Statistical approach used for learning effective features from real and synthetic templates. This method outperforms the baseline algorithm and good computational efficiency for real world applications. Even though the proposed synthetic feature classifier is insensitive to silhouette distortions, performance is not satisfactory in case of large silhouette distortions.

E. Human Carrying Status in Visual Surveillance

This paper proposes effective methods to solve the carrying status problem in visual surveillance systems. The paper introduces a set of Gabor based human gait appearance model incorporated with GTDA (General Tensor Discriminant Analysis). The very high dimensionality of the feature space makes training phase difficult. Thus they are using GTDA incorporated with object structure information and it also reduces ill-posed problems. The method is highly useful for face recognition, texture classification and image retrieval and not up to the level for gait recognition.

F. General Tensor Discriminant Analysis and Gabor Features for Gait Recognition

Traditional representation methods are not suited to conventional classification methods such as the linear discriminant analysis (LDA) because of the undersample problem. Thus they came up with three different Gabor function based image representations such as GaborD, GaborS and GaborSD also for LDA, two-dimensional LDA (2DLDA). GaborD is the sum of Gabor filter responses over directions, GaborS is the sum of Gabor filter responses over scales, whereas GaborSD is the sum of Gabor filter responses over scales and directions. The method significantly reduces the effects of under sampling on classification and preserve discriminative information. With the introduction of 2DLDA the complexity of the method increased and also performance degraded in silhouette quality.

G. Segment Based Co-factor Detection and Elimination for Effective Gait Recognition

The paper presents a method for detecting co-factor affected segments of GEI and an approach for dynamic reconstruction of cofactored GEI for more accurate recognition. The GEI image is split into three or four
A SURVEY on Segment Based Evaluation of Co-factor Used in Human Gait Recognition

segments and the cofactor affected segment is analyzed. Thus the segment is avoided from the feature extraction and the rest is processed. The greatest advantage in this method is elimination of cofactored information from affected body segments rather than replacing them with earlier images. Even though this method performs good in cofactor affected segment identification, identification of gait image with cofactor information is performed only in a single angle of 90 degree.

H. Integrated Face and Gait Recognition from Multiple Views

A normalisation of input sequence approach is performed which provides greater recognition accuracy than is obtained using the not normalized input sequences. Tracking a person and recognition should ideally incorporate information from multiple views, and work well even when people are far away. Two main problems that make this challenging are varying appearance due to changing pose, and the relatively low resolution of images taken at a distance. First problem is solved with a view-normalization approach and second with a multi-modal recognition strategy. Image based visual hull (IBVH) is computed from a set of monocular views and used to render virtual views for recognition. VH allows rendering a synthetic view of the object from desired viewpoints at a moderate computational cost and provides information about the objects 3D location and shape. The features used in gait recognition algorithm are clearly view dependent and it is generally impractical to collect data for each person across all possible views.

I. Person identification from spatio-temporal 3D gait

This model presents a spatio-temporal 3D gait database and a view independent person recognition method from gait which creates a database with virtual images synthesized and view transformation model methodology. A spatio-temporal 3D gait database is built using multiple cameras that consists of sequential 3D models of multiple walking people. Then from these 3D models, synthesizes virtual images from multiple arbitrary viewpoints and affine moment invariants are derived from virtual images as gait features. In the recognition phase, images of a probe that walks in an arbitrary direction are taken from one camera, and then calculate gait features. Finally the person is recognized and one’s walking direction is estimated. This method can deal with the change of azimuth angle but cannot deal with the change in elevation angle. People can be identified with correct classification using small dimension number of features. There can be dégradation in précise 3D model reconstruction.

J. Silhouette based Gait Recognition Using Procrustes Shape Analysis and Elliptic Fourier Descriptors

This model combines spatio-temporal motion characteristics, statistical and physical parameters (STM-SPP) by analyzing shape of the subject’s silhouette contours using Procrustes shape analysis (PSA) and elliptic Fourier descriptors (EFDs). EFD is introduced here to achieve efficiency against cofactor attached or carrying conditions whereas physical parameters of human body to resolve similar dissimilarity scores between probe and gallery sequences obtained by PSA. The method is suitable for real world applications. The method is also robust to subjects carrying small items and limited across-day gait variations, but not significant change of styles. Efficient against missing or distorted frames to some extent mainly due to segmentation imperfections and insensitive to color and texture of the subjects clothing. The method is not much significant to change of styles for e.g. pants Vs skirts or long coats, massive leg injury, variations of camera viewpoints etc.

III. CONCLUSION

This paper mainly focuses on the study of human gait recognition techniques under various conditions. It is found that even if the accuracy with which we are able to measure certain gait parameters improves, we still do not know if the knowledge of these parameters provides adequate discrimination power to enable large scale deployment of gait recognition technologies. Therefore, it is not possible to consider a single method for all type of images nor all methods can perform well for a particular type of image. Hence, it is good to use hybrid solution consists of multiple methods for human gait recognition technique.

REFERENCES


[5] Feature Selection On GAIT ENERGY IMAGE For Human Identification, Khalid Bashir, Tao Xiang, Shaogang Gong Queen Mary, University of London


