STAFF SELF APPRAISAL REPORT

2023-2024

KSSEM

Field	Data	SCORE
Name	Dr. K Senthil Babu	---
Present Address, Mob.No., e-mail id.	# 1692, 1st floor , Nirman layout 2nd phase, Bangalore -109	
Age and Date of Birth	44, 30-04-1980	
Qualification	PhD	
Designation and Department	Professor	
Teaching Experience (After PG)	18 years	
Other Experience(If any)	2.6 yrs – Industry Experience	
List of Subjects Taught till date (use separate sheet if necessary)	Basic Electrical Engineering Operation Research and Management Digital Signal Processing Control Systems Signals and systems High Performance communication Network Computer Communication Network Network Analysis Analog Communication Digital Communication Digital Switching System Fiber optics and Networks Optical Fiber Communication Optical Networking	
Number of FDPs attended since joining service (Attach Separate List)	• Participated in Five days FDP on **"Sensors and their applications"** organised by the Department of Electronics and Communication Engineering of Vemana Institute of Technology, Bangalore, from 13th to 17th July 2020 • Participated in Two days FDP on "ICT Tools for Course Preparation and Evaluation using Gnomio and Kahoot" organised by the Department of Electronics and Communication	--

	Engineering of Bahubali College of Engineering, Shravanabelagola on 27th and 28th July 2020 • Attended a 3day FDP on "Outcome Based Education" at KSIT on 17th to 19th July 2019 • Participated in **Three days FDP on Outcome based Education –NBA** organised by KSIT Bangalore from 17th to 19th July 2019 • Attended a FDP on " Programming Raspberry Pi and its application I IOT" organized by Department of Telecommunication Engineering, KSIT in association with Inversa Technosoft on 18th to 20th January 2017 at KSIT, Bangalore • Attended a FDP on R&D funding Opportunities and Intellectual property rights organized by IPR/IEI, KSIT from 28th to 30th March 2016	
*Subjects taught in the Assessment Year and percentage pass (Both Theory &Practicals) (10marks for each x Percentage) If Online please indicate.	1.Digital Signal Processing - 85.48% 2. Digital Signal Processing Lab -100% 3. Computer communication Networks- 100% 4. Computer communication Networks Lab100%	38.5/40 ✓
Details of UG Projects Guided (5 marks/ project guided)Provide Titles (HOD to endorse)	1. A Low-Cost Therapeutic Exercise Machine For Mechanized Knee Rehabilitation 2. Implementation of an Automated Portable Hydroponic System for Indoor Environment 3. Design and Fabrication of a prototype for Knee Rehabilitation 4. An IoT based Smart Wearable system for monitoring Asthma Patients	10/10 ✓
Details of PG Projects Guided (5 marks/ project guided) Only for MBA/M.Tech. Provide Titles (HOD to Endorse)	NA	
Percentage of classes held (No. of classes taken/no. of classes allocated x 5) Give details. HOD to Endorse.	All classes are handled as allotted	5/5 ✓

Student Feedback for Offline / Online classes.(Av.Percentage x 5 marks) Give details. HOD to verify.	2022-23 (Even) Digital Signal Processing -99.0% 2023-24(ODD) Computer Networks -98.98%	5/5 ✓

Details of students mentored during current assessment year. (Furnish details)	**11 students (7th Sem)**	--
	1KG20EC021	
	1KG20EC022	
	1KG20EC023	
	1KG20EC024	
	1KG20EC045	
	1KG20EC046	
	1KG20EC047	
	1KG20EC048	
	1KG21EC400	
	1KG21EC401	
	1KG19EC061	
Details of Participation in VTU Bodies (2 Marks) Furnish details and proofs.		/2
Details on Examination related Activity (2marks each) Marks only for external responsibility.)	1. Practical Exams 2. Conduction of Theory exams 3. Paper Setting - 4. Evaluation-	8/8 ✓
List of FDPs attended during the Assessment year (5 marks each) (Attach Certificate copies) Provide Title, dates etc. HODs to verify		/10
Financial Assistance received during		--

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current year for attending FDPs		
Status of Ph.D. [Attach proof for each stage and for every claim] Ph.D. Completed – 10 marks.	Awarded Ph.D from Sri Krishnadevaraya University, Anatapur on 20/6/2020	✓ 10/10
Research Publications: (5 marks each) Provide Full Details. HODs to verify. [Attach copies of Title Page]	• Paper titled "Design and Implementation of Protective Headgear to Reduce Human Casualties" published in International Journal of Advances in Engineering Architecture Science and Technology (September 2023) • Paper titled "Embedded Based Vehicle Theft Detection" published in International Journal Of Current Engineering And Scientific Research (IJCESR) : September 2023 • Calibration of MQ-7 and Detection of Hazardous Carbon Monooxide Concentration in Test Canister • Hazardous gas detection and alarming system (HGDAS) to prevent human casualties • Energy Model for the Configured MSP430F1612 on a TELOSB Mote with the Help of Contik • Porting contiki to customized TELOSB mote	✓ 10/10
Seminars / Workshops / Conferences attended (5 Marks each) Data to be verified by HODs. [Attach Certificate Copies]	1) Need of IPR Literacy for Academia and Research Institutions: by CSIR-NAL, Bengaluru on 27 th July 2023 2). Insight from leaders - Organised by dept of Mech. Engg. KSSEM	✓ 5/10
Financial Assistance received during current year for attending such events.	NIL	--

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Registered as Research Guide (Reasons for not registering)	Applied	/ -
Research Scholars registered with details	No	/5
Details of Patents Applied for (If any) One application 5 marks Provide Details.	1. Application Number : 202141021977 Field of invention : Communication Date of Filing : 16/5/2021 2. APplication No : R20234006193 2022U1063780	5/5 /
Academic Programs organized and supported during current year.(Only FDP/Workshop /Seminar / Conference) . Do not include Webinars.	**List Attached**	5/5 ✓
Details of programs attended for skill development like MOOCs, MOODLES, COURSERA, NPTEL and others (Only programs >= 20 hours need to be considered.	**Coursera-(Getting Started with Python)**	5/5 ✓
Details of Utilization of NPTEL and other Online materials for augmenting own lectures. Provide proof	DSP: https://nptel.ac.in/courses/108/105/108105055/ CN: http://www.mhhe.com/engcs/compsci/forouzan/ CN:https://www.academia.edu/31758087/FIFTH_EDITION_Data_Communications_AND_Networking	5/5 ✓

for using this in the classroom. HOD to Verify.		
Details of Project Proposal submitted during the current year. (At least one) Provide Details	- Design and Fabrication of a prototype for Knee Rehabilitation - Implementation of an Automated Portable Hydroponic System for Indoor Environment - An IoT-Based Smart Wearable System for Monitoring Asthma Patients. - A Low-Cost Therapeutic Exercise Machine For Mechanized Knee Rehabilitation	5/5
Details of Project Funds Received. (including KSCST & VTU financial assistance)	**Rs.5500 + Rs 5000**	5/5
Consultancy Revenue Generated		/5
Details of Participation in cultural events during the current year	**Involved in Disciplinary Committee**	
Additional Responsibilities in the Department/ College Example: Head, Coordinator , Accreditation etc.(2marks for each responsibility)	**NAAC – Main Coordinator** **NBA – Department Main Coordinator** **LAB incharge** **Department Head** **Coordinator in Graduation Day, Alumni Meet and all college Events**	10/10
Details of Live Membership for Professional Bodies (IEEE CSI SEA ISTE …..)(2marks for first	**Member of The Institution of Engineers (IEI)** **(Membership No: M-1584310)**	2/5

membership &3 marks for second membership)		
Contribution to Cultural / Sports Events (Furnish Details) [Marks to be granulated based on the responsibility and participation by the HOI.]	Participated in International sports organized by PES college	5/5 ✓
Contribution towards Branding, Admissions, etc [Marks to be granulated based on the responsibility and participation by the HOI.]	Involved in Branding – Hosur region Involved in Admission of students in the college	10/10 ✓
TOTAL		148.5/ 190

Signature of faculty

Date:

Comments from the HOD:

* Organized Various events in the department for Students & facelties in coordination with all department staff. * Resource person for tech talk and workshop.

Signature of the HOD

Comments of the Principal after the discussion:

- Performance is highly satisfactory.
- Advised to attend FDPs at IISc & other institutions of higher repute to develop network.

Signature of the Principal

CEO   21/8/2024

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K.S. SCHOOL OF ENGINEERING AND MANAGEMENT, BENGALURU - 560109

DEPARTMENT OF ELECTRONICS AND COMMUNICATION ENGINEERING

Conferences/FDP/Workshop/Seminars/Technical Talks/Guest Lectures/Webinars Organised for Faculties/Students

Slno.	Name of Event	Date and Event
1	Guru Purnima Celebration	03/07/2023
2	Hands on Training on Application of IOT using Blynk and Google Firebase Cloud.	8/7/2023 to 9/07/2023
3	Hands on Training on Introduction to Embedded Systems	8/7/2023 to 9/07/2023
4	Need of IPR Literacy for Academy and Research	27/7/2023
5	AI based condition Monitoring and Fault Diagnosis	27/7/2023
6	Seminar on Top 3 Careers to Pursue after Engineering	03/08/2023
7	Organic Farming, Indian Agriculture Connectivity for Marketing for 4th Sem ECE Students	5/8/2023
8	Sports Day for 4th Sem ECE Students	5/8/2023
9	Technical talk on Modulation systems in mobile Communication:1G to 5G	30/8/2023
10	Teachers Day Celebration	05/09/2023
11	On Computational & 'Smart' ECG sensing cum analysis.	03/10/2023
12	Ayudha Pooja Celebration	20/10/2023
13	Small Scale Gas Sensors	3/11/2023
14	Viksit Bharath @2047, voice of youth	11/11/2023
15	Students Ideas to Products	29/11/2023
16	Technical Talk on Career orientation program in Artificial Intelligence	11/1/2024
17	Technical Talk on Road Map For Career Success	12/1/2024
18	Report on Social Connect and Responsibility-Heritage Walk Devarayanadurga Hills, Namada Chilume and Mandaragiri- Tumkur	20/1/2024
19	Wearable Sensors and IoT for Health Care	14/2/2024
20	Sports Day	15/2/2024
21	Women's Day Celebration	11/3/2024
22	Talk by Narendra Modi on Semiconductor Fabrication Facility	13/3/2024
23	Seminar on Opportunities in Embedded Systems	15/4/2024
24	Project Exhibition	3/5/2024
25	Seminar on Kick starting a Successful Journey in Embedded Systems	3/5/2024
26	Resume Building & Strengthening Linkdin Profile	17/05/2024
27	Farewell Day Celebration	21/5/2024
28	Logical Thinking and Problem Solving	30/05/2024

FORM FOR AUTHORIZATION OF A PATENT AGENT/ ANY OTHER PERSON IN A MATTER OR PROCEEDING UNDER THE ACT

I/~~WE~~, **K. SENTHIL BABU,** of the address: **K.S. SCHOOL OF ENGINEERING AND MANAGEMENT, NO. 15, MALLASANDRA, OFF. KANAKAPURA ROAD, BENGALURU-560109, INDIA,** hereby authorise: JOSHITA DAVAR KHEMANI, AMIT JAIN (IN/PA No. 2189); SOMA RANI MISHRA (IN/PA :1159); SONAL MISHRA (IN/PA : 3929); CHANDAN MUKHERJEE (IN/PA : 1273); JAYASREE K (IN/PA : 841); RASHMI GUPTA (IN/PA : 1430); ANTRIKSH MISHRA (IN/PA : 2668); SUJATA DEY (IN/PA : 2666); AASTHA SHARMA (IN/PA : 3456); SWATI GUPTA (IN/PA : 3763); SHUBHOJEET GHOSH (IN/PA : 2490); VARTIKA SRIVASTAVA (IN/PA : 3487); VIKAS GARG (IN/PA : 3061); AYUSH SRIVASTAVA (IN/PA : 3328); SHARMA RAHUL (IN/PA : 1649); YOGESH (IN/PA : 2703); UJJWAL ANAND (IN/PA : 3162); MANISH SANWAL (IN/PA : 2670); ADITYA MITTAL (IN/PA : 4429); VIVEK SHANDILYA (IN/PA : 5177); all Advocates and/or Registered Patent Agents; and Indian citizen, to Act on our behalf in connection with invention having application no. **202241063780** dated **09.11.2022** and/or titled **"KNEE REHABILITATION USING ARDUINO"** and in all matters and proceedings relating to said application before the Controller of Patents or the Government of India or any other authority whether administrative, judicial or quasi-judicial, in connection therewith or incidental thereto and in all matters and proceedings subsequent to the grant of such letters patent including renewals thereof, filing of statements of working thereof, amendments thereof or of the application, specification or any other documents filed in respect thereof, restorations thereof, registrations of any license, mortgage, assignment transfer or other interest in respect thereof or change in our name, address or address for service and in general to do all acts or things (including appointment of a substitute or substitutes) as the said Agent(s) may deem necessary or expedient and request that all notices, requisitions and communications relating to the matters and proceedings related to the aforesaid be sent to such Agent(s) at the below address unless otherwise specified.

L.S. DAVAR & CO., Globsyn Crystals, Tower 1, 2nd Floor, Block EP, Plot No. 11 & 12, Salt Lake, Sector V, Kolkata – 700 091;

and

L.S. DAVAR & CO., F-1/2, Okhla Industrial Area Phase – 1, New Delhi – 110020.

I/We, hereby confirm previous Acts, if any done by the said Agent(s) in respect of said matters and proceedings.

Dated this _18_ day of _December_, 2023

To
The Controller of Patents
The Patent Office,
India

Signature..

Name: **K. SENTHIL BABU**

Designation......_Professor_..........

Government of India

उद्योग संवर्धन और आंतरिक व्यापार विभाग | वैज्ञानिक और औद्योगिक अनुसंधान विभाग
Department for Promotion of Industry | Department of Scientific and Industrial
and Internal Trade | Research

राष्ट्रीय बौद्धिक संपदा महोत्सव
National Intellectual Property Festival

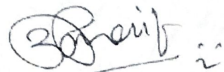नवाचार हेतु विचारों का पोषण
Nurturing Ideas to Innovation

Certificate

This is to certify that, **DR. K. SENTHIL BABU** of **K. S. SCHOOL OF ENGINEERING AND MANAGEMENT** has successfully participated in **National Intellectual Property Awareness Training Program** as part of the **National IP Festival** organised by **O/o CGPDTM** and **CSIR** under **Azadi Ka Amrit Mahotsav.**

1st to 31st July, 2023

**National Intellectual Property Awareness Mission organized by
Intellectual Property Office India and CSIR India.**

Date:August 03, 2023

Prof. (Dr.) Unnat P. Pandit
Controller General of Patents,
Design & Trade Marks and
Registrar of Copyrights & Geographical Indications

Design and Implementation of Protective Headgear to Reduce Human Casualties

K. Senthil Babu[1*], M. Kishore[2], J. Dileep[3]

[1]Professor and HOD, Department of Electronics and Communication Engineering, KSSEM, Bengaluru, Karnataka, India

[2,3]Assistant Professor, Department of Electronics and Communication Engineering, KSSEM, Bengaluru, Karnataka, India

Abstract

Background: A smart helmet is a type of protective headgear used by the rider that makes bike driving safer than before.

Objectives: The main objective of this methodology is to build a safety system that reduces the number of two-wheeler accidents and drunken driving cases.

Methods: A belt tie sensor checks if the person is wearing the helmet or not. If the rider is not wearing a helmet, the bike remains off. The bike will start only when the rider is wearing a helmet.

Statistical Analysis: When the rider crashes and the helmet hits the ground, force sensors detect the motion and tilt of the helmet and report the occurrence of an accident.

Applications: It sends information about the corresponding location using GPS and sends a message to the registered number using GSM. The main advantage is that the proposed helmet can be used on any bike.

Improvements: It is not restricted to one user. Multiple users can use it. A panic button is provided to indicate the intensity of the accident.

Keywords: Accident, Tracking, Belt tie sensor

1. Introduction

A traffic accident is defined as any vehicle accident that occurs on public highway roads. The thought of developing this project comes to mind to do some good things for society. Many deaths are happening as the number of two-wheeler accidents increases day by day. Head protectors (helmets) have been made mandatory in Maharashtra State. Traffic collisions in India have expanded to a greater extent. According to Section 129 of the Motor Vehicles Act, 1988, it is necessary for each and every person riding a bike to wear defencing headgear adhering to the guidelines of the BIS (Bureau of Indian Standards). The WHO association has momentarily referenced the reasons for and the avoidance of traffic accidents that occurred all throughout the planet. They likewise referenced the most elevated death rate that occurred in India, and the study additionally detailed the rate at which 1.5 lakh people pass through the

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Email: senthilbabuk@kssem.edu.in

Ref. No.: KSSEM/GEN/3116/2024-25

Date: 15-05-2024

To,

Dr. K. Senthil Babu,
Prof. and Head of ECE,
KSSEM,
Bengaluru.

Dear Sir,

Subject: Letter of Appreciation

We are pleased to highly appreciate you for your presentation and deliberation as Resource Person in one-day workshop on "CO, PO and Mapping" organized by department of CS & BS, KSSEM on 11th May, 2024.

We would like to convey our sincere thanks and gratitude for sharing your expertise in the workshop.

We would feel honoured to collaborate with you in future.

Yours Sincerely,

15/5/24

PRINCIPAL
Dr. K. RAMA NARASIMHA
Principal/Director
K S School of Engineering and Management
Bengaluru - 560 109

EMBEDDED BASED VEHICLE THEFT DETECTION

Dr. K. Senthil Babu, Dr. Kishore M, Mr. Dileep J
Professor & Head of ECE, Asst. Professor, Asst. Professor
K S School of Engineering and Management, Bengaluru
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Abstract— In recent years vehicle theft has become a major issue. The number of vehicles theft increasing day by day. The safety and security of the vehicle is essential. Alarm also connected to the vehicle to indicate the theft but does not appear feasible, since the wires can be disconnected before the vehicle is the stolen. Vehicle theft cannot be prevented but after the theft vehicle can be traced by using traditional method that includes tracking using GPS. The project aims in building vehicle theft detection and tracking system that helps us to identify the location of the vehicle. Additional procedure is included to cut-off the ignition system, so that the engine cannot be started. The project also includes notification system that sends message, whenever the ignition is turned on

Index Terms— Security, Solenoid valve, Theft Detection, Tracking

I. INTRODUCTION

In the last few decades, India has progressed at such an enormous rate that many companies have strongly established themselves here. These companies bring a huge amount of workforce with them. Arranging transportation to such a huge mass is a cumbersome task involving many intricacies. Generally, this transport is arranged through the local transport vendors on a yearly contract basis, recently happen mishaps such as burglary, rape cases etc. The development of satellite communication technology is easy to identify the vehicle locations. Vehicle tracking systems have brought this technology to the day-to-day life of the common person. Today GPS used in cars, ambulances, fleets and police vehicles are common sights on the roads of developed countries. All the existing technology support tracking the vehicle place and status. The GPS/GSM Based System is one of the most important systems, which integrate both GSM and GPS technologies. It is necessary due to the many of applications of both GSM and GPS systems and the wide usage of them by millions of people throughout the world. This system designed for users in land construction and transport business, provides real-time information such as location, speed and expected arrival time of the user is moving vehicles in a concise and easy-to-read format. This system may also useful for communication process among the two points. Currently GPS vehicle tracking ensures their safety as travelling. This vehicle tracking system found in vehicles as a theft prevention and rescue device. Vehicle owner or Police follow the signal emitted by the tracking system to locate a robbed vehicle in parallel the stolen vehicle engine speed going to decreased and pushed to off. Google maps are used to view vehicle's location. After switch of the engine, motor cannot restart without permission of password. Vehicle tracking usually used in navy operators for navy management functions, routing, send off, on board information and security. The applications include monitoring driving performance of a parent with a teen driver. Vehicle tracking systems accepted in consumer vehicles as a theft prevention and retrieval device. If the theft identified, the system sends the SMS to the vehicle owner. After that vehicle owner sends the SMS to the controller, issue the necessary signals to stop the motor.

A) PROBLEM STATEMENT

Most of our daily activities take place outside our home. Because of this, transportation affects every aspect of our lives especially in doing our daily routines such as going to work, school, mall, bank, gym, etc., and even back to our home. Motorcycle is one of the least expensive and a convenient mode of transportation for all people. Unfortunately, it is easy to steal, and difficult to track the vehicle, even appeal will take long time to sort it out. To avoid these long procedures, this project can be implemented to track the vehicle faster.

B) OBJECTIVE

This is an efficient system for automobiles. In this system uses modern techniques of GPS (Global Positioning System) and GSM (Global System for Mobile Communication) to get perfect output as these two systems are the modern and most developed products in this field. This is a 2 in 1 system, initially it prohibits any unauthorized use of vehicle by locking its ignition system which could not be accessed without owner's consent.

In case of theft, this system would provide effective tracking of vehicle through which owner can track the vehicle easily as it instantly prompts user about theft after very next second of theft Also, after theft it starts providing location, co-ordinates to user immediately after theft and continues to send these co-ordinates after prescribed time intervals through which owner can easily track the vehicle and get it back by getting help from law enforcing agencies. In addition to all these features owner can also track the vehicle through SMS if vehicle is in authorized access. Using this feature owner could monitor the vehicle if it is in use of some friend or family members. Also, parents can keep an eye on their children using this feature of our proposed project.

Kammavari Sangham (R) 1952

K. S. GROUP OF INSTITUTIONS

K. S. SCHOOL OF ENGINEERING AND MANAGEMENT

Approved by AICTE, New Delhi; Affiliated to VTU, Belagavi, Karnataka; Accredited by NAAC

www.kssem.edu.in

DEPARTMENT OF MANAGEMENT STUDIES AND RESEARCH CENTRE

August 10th, 2023

Dear Dr. Senthil Babu,

Warm Greetings from Department of Management Studies and Research Centre!

On behalf of Department of Management Studies staff and students and on my own behalf, I take this opportunity to extend gratitude filled with thanks for delivering a highly appreciated talk on "Electronics and Communication Trends and Scope" as part of our value-added session held on 10/08/2023". We are truly fortunate to have had someone of your expertise and credentials volunteering time from your busy schedule to share valuable insights with our students.

Your words of encouragement and guidance were well received by the students. Your knowledge and words of inspiration was much appreciated.

With kind regards,

Yours Sincerely,

HOD-MBA

DR. SHEKAR H.S

Professor & HOD-MBA,
K.S School of Engineering & management
#15, Mallasandra, Off. Kanakapura Road
Bengaluru - 560 109

PRINCIPAL

11/8/23

DR. K. RAMA NARASIMHA
Dr. K. RAMA NARASIMHA
Principal/Director
K S School of Engineering and Management
Bengaluru - 560 109

Research Article

HAZARDOUS GAS DETECTION AND ALARMING SYSTEM (HGDAS) TO PREVENT HUMAN CASUALTIES

K.Senthil Babu*, and C.Nagaraja

Department of Electronics, S K University, Anantapur, AP, India

ABSTRACT

In recent years the number of causalities that are reported by the noxious gases have increased very rapidly. This has led to major crisis not only on the environment but also on the health of the humans. The core causes of these aftereffects are that the pollution levels are well beyond the safe limits in the environment. In this paper hazardous gas detection and alarming system is proposed which has the ability to detect multiple hazardous gases in the environment under test and also alarm the individuals to take necessary action to avoid exposure to these harmful gases which may put their life under risk. This is suitable in multiple environments such as coal mines, chemical industries, oil and petroleum industries, places where complex welding process is involved and many more. The alarming process used here can be adjusted based on the required threshold PPM which alerts the person in that environment when the gas levels exceed the threshold. This paper also puts forth the different case studies that are carried out in different test environments

INTRODUCTION

Due to the growth of Industries in the country there is an associated economical development involved. In spite of these economical developments this industrial growth has led to the deterioration in the environment which leads to multiple health hazards. The gases expelled by the industries are not only toxic but also hazardous. The environment is not only affected by the industrial exhaust gases but also due to vehicles on road machineries, welding process, burning of waste and many more. These gases lead to air pollution, acid rains, toxicity, flammability etc., The level of hazardous gases are sometime beyond the safe limit which causes inconvenience for the workers in that environment. There are permissible levels of toxic and hazardous gases specified by National Institute for Occupational Safety and Health's (NIOSH). The toxic gas has a lethal concentration (LC50) of 200 Parts Per Million (PPM) in air. According to the compressed gas safety level (CGSL) (ucsd.edu) there are four classes of gases such as

- Class I = < 200 LC50
- Class II = 201–2000 LC50
- Class III >= 2001–5000 LC50
- Class IV >= 5000

defined in parts per million (PPM).

Compressed gases on the otherwise have different levels of hazardousness. Methane is colorless, odorless and a Class IV category gas under CGSL standard is flammable. Carbon monoxide is also colorless and odorless which is of type Class III category. Ammonia is a pungent smell gas and colorless belonging to Class III category. Arsine a colorless and having garlic smell is highly toxic and flammable is of Class I category. Carbon dioxide is simple asphyxiate gas which is Class IV category gas that becomes immediate danger to life at higher concentrations. Hydrogen a Class IV that has a pungent smell is a flammable gas. Likewise there are many other gases that are categorized as hazardous beyond certain concentrations. It becomes necessary for the industries to make sure that the workers are exposed to the environments well within safety limits. There are various methodologies and procedures followed by the industries to detect the gas levels in the working environment (Adefila, K., Yan, Y., Wang, T, 2015) (Chaitas P., Domanski W., Laopoulos Th., Zakrzewski, J., 2004) (Adefila, K.; Yan, Y., 2013). In spite of the safety measure followed by the industries multiple accidents and mishaps are taking place due to lack of alerting procedures to evacuate the workers from work place during

Corresponding author: **K.Senthil Babu**
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Calibration of MQ-7 and Detection of Hazardous Carbon Mono-oxide Concentration in Test Canister

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Dr. C. Nagaraja
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S K University, Anantapur, Andhra Pradesh
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Abstract: The most active research in recent years is estimating the noxious waste which has a very high influence on the human health. There are many gases which have adverse effects on human health. Here carbon monoxide (CO) is considered as one of toxic gas which is considered to cause various health issues based on the concentration the casualty is exposed. In this paper, we ensure the presence of hazardous gases and also provide the procedure to estimate the concentration of the same with the help of the MQ-7 sensor and test setup. The calibration of the sensor is carried out with a canister of known volume and the estimation of the CO in the test environment is also determined.

Keywords: Calibration; MQ-7; Hazardous Gases.

I. INTRODUCTION

Many circumstances [3], test experiments lead to the production of gases and vapours directly or indirectly. These gases and vapours are classified in to different levels of hazardousness and toxicity [10] [11]. Those hazardous and toxic gases when inhaled or exposed to humans have harmful effects. There are gases that become dangerous to health in concentrations as little as 1ppm (parts per million). Workers are at high risks to these gases which causes various health aliments depending on the duration of the gases they are exposed too. Hydrogen sulphide has a bad odour at 0.1ppm but leads to paralysis when exposed to the concentration over 50ppm. This does not strictly suggest that 50ppm is the hazardous limit but even if the concentration is slightly below than the hazardous level may lead to paralysis or death when exposed to longer durations. Various other gases like Ammonia, carbon dioxide, carbon monoxide, Methane have their own characteristics. Ammonia has a threshold limit of 25ppm whereas 500 ppm is immediately dangerous to life. Carbon dioxide produced by combustion, fermentation, brewing methods has a maximum safe level of 5000ppm beyond which may cause severity in health issues. Carbon monoxide (CO) is a class-III toxic gas which is slightly less dense than air and it is a colourless gas with neutral odour and also tasteless. This gas can readily mix with air and can be readily inhaled. There are many cases of carbon monoxide poisoning reported in many countries [5]. The threshold limit is 25ppm and when the concentration is 1200ppm and greater leads to a very high risk for life.

In this paper, we determine the concentration of the carbon monoxide gas in the test environment and also calibrate the sensor to read the amount of CO present in the canister. Calibration is the process of configuring an instrument to provide a result for a sample within an acceptable range [6] [7]. The accuracy of the instrument is maintained or altered according to requirements by calibrating the instrument. The main operation of calibrating [8] [9] the device is to eradicate and minimize the factors that cause imprecise measurements. The procedure for calibrating devices may vary but generally, it involves using the instrument to test samples for various values. These values from the test samples are called as "**calibrators**". Calibrations are performed using calibrators to establish a complement at specific points within the instrument's operating range. On a practical aspect, a settlement must be made between the desired level of product performance and the effort correlated to conclude the calibration.

PORTING CONTIKI TO CUSTOMIZED TELOSB MOTE

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Abstract—**Wireless sensor networks are characterized by severely constrained resources like memory and power. Thereby efficiently using the above constrained resource is challenging task. TelosB, standard wireless sensor hardware is powered TI's microcontroller.MSP430F1611 providing 48KB of flash memory. Contiki is one such OS which specifically designed for wireless sensor networks. In order to provide more flexibility to the application developer of contiki on a TelosB mote, we have replaced the microcontroller by MSP430F1612. Contiki support for this modified TelosB is not available. We hereby have made an attempt to understand contiki as a RTOS and port the same to the modified TelosB**

I. INTRODUCTION TO WSN

A wireless sensor network is a collection of nodes organized into a cooperative network [1].The nodes communicate wirelessly and often self-organize after being deployed in an ad hoc fashion. WSNs' are characterized by low energy consumption and dynamic and autonomous operational network. The sensor devices (motes) are often severely resource constrained (memory, available power). Moreover, the small physical size and low per-device cost limit the complexity of the system. A Typical sensor device [2, 10] is equipped with 8-bit microcontrollers, code memory on the order of 100 kilobytes to the maximum, and less than 20 kilobytes of RAM. Moore's law predicts that these devices can be made significantly smaller and less expensive in the future. While this means that sensor networks can be deployed to greater extents, it does not necessarily imply that the resources will be less constrained.

The characteristics of WSNs impose additional challenges on OS design for WSN, and consequently, OS design for WSN deviates from traditional OS design. In Brief the OS acts as a resource manager for complex systems [3]. Application programmers can invoke different OS services through system calls. An OS multiplexes system resources in two ways i.e., in time and in space [3]. Considering the resource constraints of typical sensor nodes in a WSN, a new approach is required for OS design in WSN [3]. For a designer of an operating system for sensor nodes, the challenge lies in finding lightweight mechanisms and abstractions that provide a rich enough execution environment while staying within the limitations of the constrained devices.

II. INTRODUCTION TO CONTIKI

Contiki[2] is a small highly portable multitasking computer operating system developed for use on a number of memory-constrained networked systems ranging from 8-bit computers to embedded systems on microcontrollers, including sensor network motes. A typical Contiki configuration needs 2 kilobytes of RAM and 40 kilobytes of ROM. Contiki provides IP communication, both for IPv4 and IPv6.Contiki provides dynamic loading [10] and unloading of individual programs and services. The kernel is event-driven, but the system supports preemptive multi-threading that can be applied on a per-process basis.

Architecture

The Contiki OS follows the modular architecture. Contiki combines the benefits of both event-driven [systems and preemptible thread [10], thus following the hybrid system. At the kernel level it follows the event driven model, but it provides optional threading facilities to individual processes. The Contiki kernel comprises of a lightweight event scheduler that dispatches events to running processes.

Power save Mode

In sensor networks, being able to power down the node when the network is inactive is the best way to reduce energy consumption. Power conservation mechanisms depend on both the applications [4] and the network protocols [5]. The Contiki kernel contains no explicit power save abstractions, but lets the application specific parts of the system implement such mechanisms.

Programming Model

Contiki supports preemptive multithreading model. Multi-threading is implemented as a library on top of the event-driven

Energy Model for the Configured MSP430F1612 on a TELOSB Mote with the Help of Contiki

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Abstract Wireless sensor networks (WSN) are attracting a wide range of application because of its exponential growth in its performance. However, there are certain drawbacks with respect to the power available in the node. In this paper, we present a hardware configuration of TelosB mote with the help of Contiki OS which improves the performance of the mote by supporting with additional inbuilt flash memory. The paper includes the energy calculation of the new hardware configured. The existing hardware MSP430F1611 provides 48 kB of flash memory which is replaced by MSP430F1612, and Contiki is one such OS which is specifically designed for WSN. In order to provide more flexibility to the application developer, requires of Contiki on a TelosB mote. Contiki support for this modified TELOSB is not available, thereby making an attempt to understand Contiki and port to the modified TELOSB.

Keywords Contiki · Energy model · MSP430F1612

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