

# ICSARIA-VISION

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# VISION AND MISSION

## DEPARTMENT VISION

**To impart excellent education to provide globally competent Electronics and Instrumentation Engineers.**

**To establish Centre of Excellence and Research in Electronics and Instrumentation Engineering and allied fields.**

## DEPARTMENT MISSION

**To prepare competent Electronics and Instrumentation Engineers who can pursue professional career and/or higher studies.**

**To promote excellence in teaching with academically good ambiance that allows the learners to be socially responsible with professional ethics.**

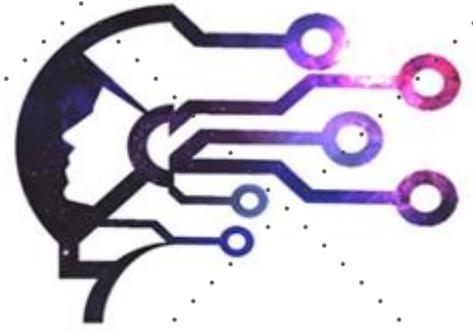
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# *From the HOD's desk*

*Work hard at what you like to do and try to overcome all obstacles*

*Laugh at your mistakes and praise yourself for learning from them*



I am having immense pleasure to note that this year's edition of "**ICSARIA-VISION**" is ready to release. I would like to congratulate the team of active students and faculty leadership for their efforts to ram-up various department activities under the aegis of department association.

The department conducts many programs aimed to nurture a professional interest towards the domain of study among all members of the department and "**ICSARIA-VISION**" is one of the means to publish various creative articles and news which reflects state-of-the art.

Technology related developments are there in the field of robotics, Iot, machine learning, automotive electronics, healthcare and so on which are closely linked with the common man's life.

Plenty of opportunities as well as challenges are awaiting. Hope that "**ICSARIA-VISION**" could be a platform for both students and faculty members to conduct fruitful discussion on all these breakthrough developments. Let us strive together for a greener, technically enriched better India!

As an Instrumentation and Control Engineers, it is the need of the time to follow these changes and understand the state-of-the art technology in order to be updated in the domain.

I wish that, this endeavor is a humble beginning in this direction and wish all the success.

## FACE MASK DETECTION USING MACHINE LEARNING

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**CLASS** : IV- EIE



Face detection has become a very interesting problem in image processing and computer vision. In this article, I will introduce you to a computer vision project on Face Mask Detection with Machine Learning using Python.

### **Introduction to Face Mask Detection**

Face mask detection has a range of applications from capturing the movement of the face to facial recognition which at first requires the face to be detected with very good precision. Face detection is more relevant today as it is not only used on images, but also in video applications like real-time surveillance and face detection in videos.

High precision image classification is now possible with advances in convolutional networks. Pixel level information is often needed after face detection, which most face detection methods do not provide.

Obtaining pixel-level detail has been a difficult part of semantic segmentation. Semantic segmentation is the process of assigning a label to each pixel in the image.

### **Process of Face Mask Detection with Machine Learning**

Step 1: Extract face data for training.

Step 2: Train the classifier to classify faces in mask or labels without a mask.

Step 3: Detect faces while testing data using SSD face detector.

Step 4: Using the trained classifier, classify the detected faces.

In the third step of the above process, you have to think about what is the SSD face detector? Well, the SSD is a Single Shot Multibox Detector. This is a technique used to detect objects in images using a single deep neural network.

It is used for the detection of objects in an image. Using a basic architecture of the VGG-16 architecture, the SSD can outperform other object detectors such as YOLO and Faster R-CNN in terms of speed and accuracy.

### **Face Mask Detection with Machine Learning**

Now, let's get started with the task of Face Mask Detection with Machine Learning by using the Python programming language. I will start this task by importing the necessary Python libraries that we need for this task:

```
import numpy as np
import cv2
import json
import os
import matplotlib.pyplot as plt
import random
import seaborn as sns
```

```

from keras.models import Sequential
from keras import optimizers
from keras import backend as K
from keras.layers import Dense, Dropout, Activation, Flatten
from keras.layers import Conv2D, MaxPooling2D, BatchNormalization
from sklearn.model_selection import train_test_split
from keras.preprocessing.image import ImageDataGenerator

directory = "../input/face-mask-detection-dataset/Medical mask/Medical mask/Medical
Mask/annotations"
image_directory = "../input/face-mask-detection-dataset/Medical mask/Medical mask/Medical
Mask/images"
df = pd.read_csv("../input/face-mask-detection-dataset/train.csv")
df_test = pd.read_csv("../input/face-mask-detection-dataset/submission.csv")

```

## Creating Helper Functions

I will start this task by creating two helper functions:

```
cvNet = cv2.dnn.readNetFromCaffe('weights.caffemodel')
```

```
def getJSON(filePathandName):
```

```
    with open(filePathandName,'r') as f:
```

```
        return json.load(f)
```

```
def adjust_gamma(image, gamma=1.0):
```

```
    invGamma = 1.0 / gamma
```

```
    table = np.array([((i / 255.0) ** invGamma) * 255 for i in np.arange(0, 256)])
```

```
    return cv2.LUT(image.astype(np.uint8), table.astype(np.uint8))
```

1. The getJSON function retrieves the json file containing the bounding box data in the training dataset.
2. The adjust\_gamma function is a non-linear operation used to encode and decode luminance or tristimulus values in video or still image systems. Simply put, it is used to instil a little bit of light into the image. If  $\gamma < 1$ , the image will shift to the darker end of the spectrum and when  $\gamma > 1$ , there will be more light in the image.

## Data Processing

The next step is now to explore the JSON data provided for the training:

```

jsonfiles= []
for i in os.listdir(directory):
    jsonfiles.append(getJSON(os.path.join(directory,i)))
jsonfiles[0]

```

```
{'FileName': '2349.png',
'NumOfAnno': 4,
'Annotations': [{'isProtected': False,
'ID': 193452793312540288,
'BoundingBox': [29, 69, 285, 343],
'classname': 'face_other_covering',
'Confidence': 1,
'Attributes': {}},
{'isProtected': False,
'ID': 545570408121800384,
'BoundingBox': [303, 99, 497, 341],
'classname': 'face_other_covering',
'Confidence': 1,
'Attributes': {}},
{'isProtected': False,
'ID': 339053397051370048,
'BoundingBox': [8, 71, 287, 373],
'classname': 'hijab_niqab',
'Confidence': 1,
'Attributes': {}},
{'isProtected': False,
'ID': 100482004994698944,
'BoundingBox': [296, 99, 525, 371],
'classname': 'hijab_niqab',
'Confidence': 1,
'Attributes': {}}]}
```

- The Annotations field contains the data of all the faces present in a particular image.
- There are different class names, but the real class names are face\_with\_mask and face\_no\_mask

```
df = pd.read_csv("train.csv")
df.head()
```

	name	x1	x2	y1	y2	classname
0	2756.png	69	126	294	392	face_with_mask
1	2756.png	505	10	723	283	face_with_mask
2	2756.png	75	252	264	390	mask_colorful
3	2756.png	521	136	711	277	mask_colorful
4	6098.jpg	360	85	728	653	face_no_mask

Using the mask and the non\_mask labels, the bounding box data of the json files is extracted. The faces of a particular image are extracted and stored in the data list with its tag for the learning process.

```
data = []
```

```

img_size = 124

mask = ['face_with_mask']
non_mask = ["face_no_mask"]

labels={'mask':0,'without mask':1}

for i in df["name"].unique():

    f = i+".json"

    for j in getJSON(os.path.join(directory,f)).get("Annotations"):

        if j["classname"] in mask:

            x,y,w,h = j["BoundingBox"]

            img = cv2.imread(os.path.join(image_directory,i),1)

            img = img[y:h,x:w]

            img = cv2.resize(img,(img_size,img_size))

            data.append([img,labels["mask"]])

        if j["classname"] in non_mask:

            x,y,w,h = j["BoundingBox"]

            img = cv2.imread(os.path.join(image_directory,i),1)

            img = img[y:h,x:w]

            img = cv2.resize(img,(img_size,img_size))

            data.append([img,labels["without mask"]])

random.shuffle(data)

p = []

for face in data:

    if(face[1] == 0):

        p.append("Mask")

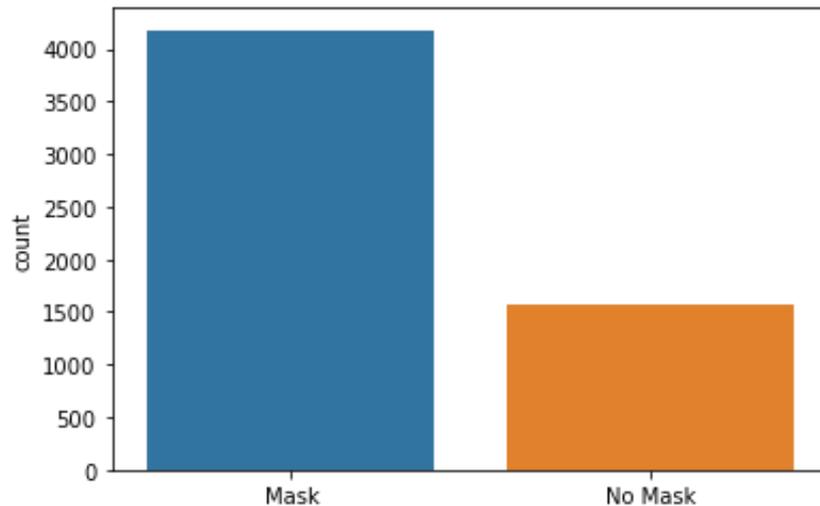
    else:

        p.append("No Mask")

sns.countplot(p)

```

[view rawface\\_mask\\_detection.py](#) hosted with ❤ by [GitHub](#)



The visualization above tells us that the number of mask images > Number of images without a mask, so this is an unbalanced dataset. But since we're using a pre-trained SSD model, which is trained to detect unmasked faces, this imbalance wouldn't matter much. But let's reshape the data before training a neural network:

```
X =
[]
Y = []
for features, label in data:
    X.append(features)
    Y.append(label)

X = np.array(X)/255.0
X = X.reshape(-1,124,124,3)
Y = np.array(Y)
```

## Training Neural Network for Face Mask Detection

Now the next step is to train a Neural Network for the task of Face Mask Detection with Machine Learning:

```
model = Sequential()

model.add(Conv2D(32, (3, 3), padding = "same", activation='relu', input_shape=(124,124,3)))

model.add(Conv2D(64, (3, 3), activation='relu'))

model.add(Conv2D(128, (3, 3), activation='relu'))

model.add(MaxPooling2D(pool_size=(2,2)))

model.add(Dropout(0.25))

model.add(Flatten())

model.add(Dropout(0.5))
```

```

model.add(Dense(50, activation='relu'))
model.add(Dropout(0.5))
model.add(Dense(1, activation='sigmoid'))
model.compile(loss='binary_crossentropy', optimizer='adam', metrics=['accuracy'])
xtrain,xval,ytrain,yval=train_test_split(X, Y,train_size=0.8,random_state=0)

    featurewise_center=False,

    samplewise_center=False,

    featurewise_std_normalization=False,

    samplewise_std_normalization=False,

    zca_whitening=False,

    rotation_range=15,

    width_shift_range=0.1,

    height_shift_range=0.1,

    horizontal_flip=True,

    vertical_flip=False)

datagen.fit(xtrain)

history = model.fit_generator(datagen.flow(xtrain, ytrain, batch_size=32),

    steps_per_epoch=xtrain.shape[0]//32,

    epochs=50,

    verbose=1,

    validation_data=(xval, yval))

```

## Testing The Model

The test dataset contains 1698 images and to evaluate the model so I took a handful of images from this dataset as there are no face tags in the dataset:

```
test_images = ['1114.png', '1504.jpg', '0072.jpg', '0012.jpg', '0353.jpg', '1374.jpg']
```

```
gamma = 2.0
```

```
fig = plt.figure(figsize = (14,14))
```

```
rows = 3
```

```
cols = 2
```

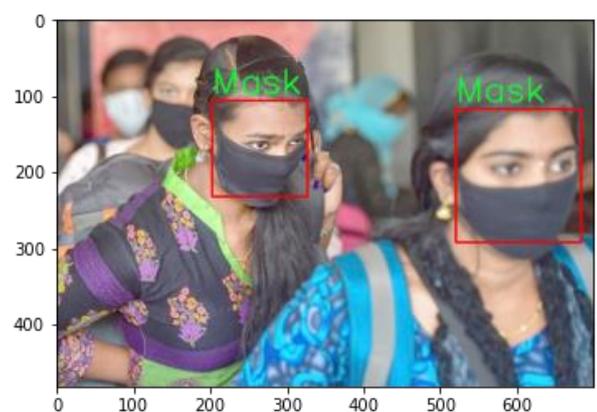
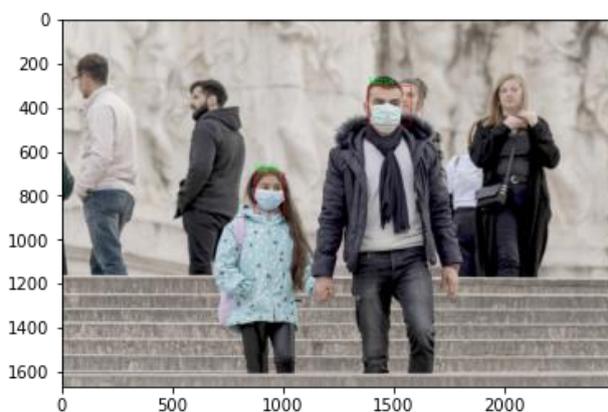
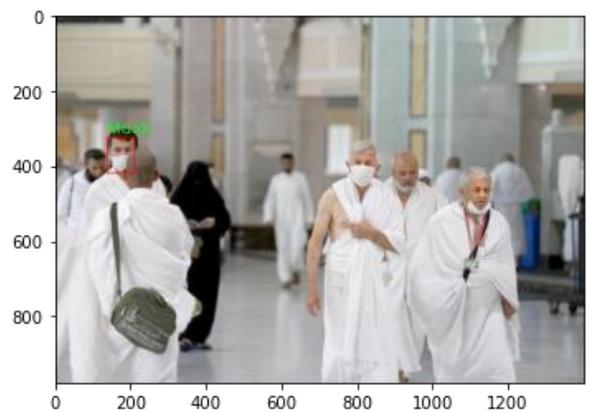
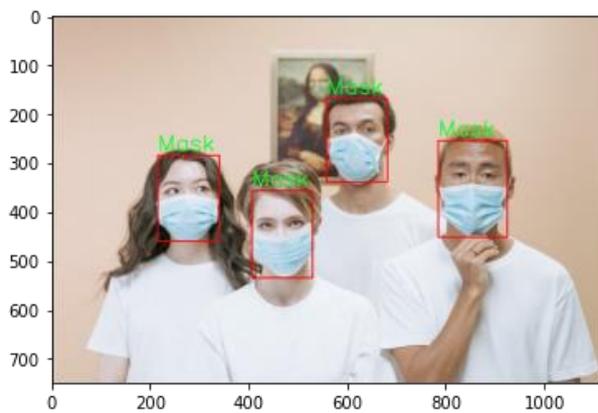
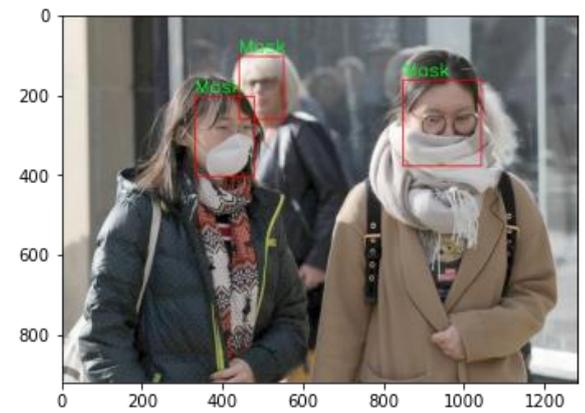
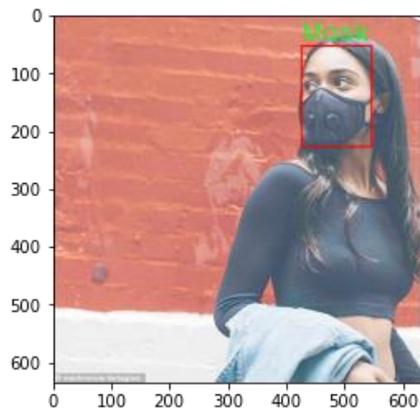
```
axes = []
```

```
assign = {'0': 'Mask', '1': "No Mask"}
```

```

for j,im in enumerate(test_images):
    image = cv2.imread(os.path.join(image_directory,im),1)
    image = adjust_gamma(image, gamma=gamma)
    (h, w) = image.shape[:2]
    blob = cv2.dnn.blobFromImage(cv2.resize(image, (300,300)), 1.0, (300, 300), (104.0, 177.0,
123.0))
    cvNet.setInput(blob)
    detections = cvNet.forward()
    for i in range(0, detections.shape[2]):
        try:
            box = detections[0, 0, i, 3:7] * np.array([w, h, w, h])
            (startX, startY, endX, endY) = box.astype("int")
            frame = image[startY:endY, startX:endX]
            confidence = detections[0, 0, i, 2]
            if confidence > 0.2:
                im = cv2.resize(frame,(img_size,img_size))
                im = np.array(im)/255.0
                im = im.reshape(1,124,124,3)
                result = model.predict(im)
                if result>0.5:
                    label_Y = 1
                else:
                    label_Y = 0
                cv2.rectangle(image, (startX, startY), (endX, endY), (0, 0, 255), 2)
                cv2.putText(image,assign[str(label_Y)] , (startX, startY-10),
cv2.FONT_HERSHEY_SIMPLEX, 1.5, (36,255,12), 2)
            except:pass
        axes.append(fig.add_subplot(rows, cols, j+1))
        plt.imshow(cv2.cvtColor(image, cv2.COLOR_BGR2RGB))
    plt.show()

```



By analyzing the output above, we can observe that the whole system works well for faces that have spatial dominance. But fails in the case of images where the faces are small and take up less space in the overall image.

For best results, different image preprocessing techniques can be used, or the confidence threshold can be kept lower, or one can try different blob sizes.

## **DIFFERENT APPLICATIONS OF ROBOTICS FOR MOBILE COMMUNICATION**

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**ROLL No :208W1A1093**  
**CLASS : IV- EIE**



### **Abstract:**

This overview work discusses some of the major focuses of current mobile robotics research, introduces a specific application of mobile robotics — automated inspection using autonomous novelty detection — and presents one of the future challenges of mobile robotics research: that of applying quantitative methods in mobile robotics, in order to change the discipline from an empirical one to a more precise science.

### **INTRODUCTION**

In recent years, mobile communication technology has given rise to a large number of available mobile tools and their emerging applications are becoming more and more sophisticated by years. Therefore, many mobile robot platforms use mobile communication technology to communicate with off-line computing resources, human machine interfaces or others robots. Many mobile robots have equipped with mobile communication technology such as Bluetooth, Wi-Fi, Wireless LAN etc. A. Mobile Communication Review of technology for mobile devices has also been carried out starting from the 1G (first generation) until 3G (third generation) [8].

1G wireless communications network is used for analog voice services with speeds up to 2.4 kbps. In this 1G, Frequency Division Multiple Access (FDMA) is used as an analog frequency modulated using a mobile radio system frequency band 824MHz - 894MHz. 2G is based on digital technologies such as Time Division Multiple Access (TDMA) and Code Division Multiple Access (CDMA). In this generation of Global Systems for Mobile Communications (GSM) is a popular wireless technology, a combination of FDMA and TDMA. 2G + will use the technology of High- Speed Circuit-Switched Data (HSCSD), General Packet Radio Service (GPRS) and Enhanced Data Rates for Global Evolution (EDGE).

3G wireless technologies is the concentration of various 2G wireless telecommunications systems into a single global system that includes certain components and satellites. One of the most important aspects of 3G wireless technology is the ability to unify existing cellular standards such as CDMA, GSM, and TDMA on the one umbrella. Telecommunication network or a line of 3G is faster than the previous range of technologies such as GSM, GPRS and EDGE technology, better known as 1G and 2G. This factor allows it to do various things that cannot be done by the previous technology generation. For example, a video call, only 3G technologies that allows callers to make video calls that can view video images of friends and chat with[9]. But, the caller and call recipient must have a 3G phone and subscribe to 3G services from existing telecommunications companies. According to [10], apart from that, this 3G technology also incorporates other media of communication such as wireless communications and global internet.

1) Bluetooth Most wireless technologies such as Bluetooth and IrDA standard provide the ability to strengthen the local wireless network. Bluetooth technology was created by

Ericsson in 1994 and is used to replace the cables in the office, in laboratories or at home [11]. Bluetooth is a radio frequency cable with a short distance to replace the unlicensed technology with 2.4GHz bandwidth in the scientific industry. Typically, Bluetooth devices have a range of approximately 10 meters and it can support both voice and data communications with broadband 1 MB per second [12]. Because of the advantages of Bluetooth, such as low costs and low power and nature can be pointed to different directions, parts of Bluetooth has been integrated into various types of mobile devices such as mobile phones, PDAs and other wireless set.

Research from In-Stat / MDR and Frost & Sullivan has estimated the use of Bluetooth will be sold around 200 million units in 2001 and will increase to one billion in 2006. Therefore, currently the usage of Bluetooth technology was developed for mobile robot controller. With Bluetooth, mobile robots then can be easily handled with a push of button from our common electronics gadgets such as hand phones or PDA. Fig. 1 shows the architecture for a Bluetooth enabled autonomous mobile robot. In this project, a Bluetooth device in the server connected to the serial port of the PC. Then, for the mobile robot, a Bluetooth device is connected to the RS232 of the Handy Board. During the navigation of the mobile robot, all the sensor readings can be viewed from server (PC). At the same time, PC can send direction command to the mobile robot. 2) Wi-Fi or Wireless LAN Wi-Fi or WLAN (Wireless Local Area Networks) is a wireless network based on a series of specifications from the Institute of Electrical and Electronics Engineers (IEEE) called 802.11.

Wi-Fi uses unlicensed radio frequency, mostly in the 2.4GHz band. It enables a person with a wireless-enabled computer or PDA to connect to the Internet via a wireless access point. The geographical region covered by one or several access points is called a hot spot. Wi-Fi was intended to be used for mobile devices and local-area networks, but it is now often used for Internet access outdoors. There are several types of WiFi: • 802.11a (offering transmission speeds of 24mbps to 54mbps) • 802.11b (6mbps to 11mbps) and 802.11g (24mbps to 54mbps) • 802.11n (50mbps to 100mbps) is a proposed specification that will become a Wi-Fi standard once it's finalized by the IEEE, and the Wi-Fi Alliance completes its interoperability testing. WLAN has changed the interaction manner through wire line between operators and robots in the past.

### **New Applications for Mobile Robots**

Mobility promises to be the next frontier in flexible robotics. While fixed robots will always have a place in manufacturing, augmenting traditional robots with mobile robots promises additional flexibility to endusers in new applications. These applications include medical and surgical uses, personal assistance, security, warehouse and distribution applications, as well as ocean and space exploration. "We see increased interest in mobile robotics across all industries. The ability of one mobile robot to service several locations and perform a greatly expanded range of tasks offers a great appeal for specialized applications," says Corey Ryan, Medical Account Manager at KUKA Robotics Corp. (Shelby Township, Michigan). Mobile Apps Mobile robots are proliferating says Rush LaSelle, Vice President and General Manager with Adept Technology Inc. (Pleasanton, California). "In the industrial space, mobile robots are redefining the playing field for autonomous guided vehicles (AGVs) in that modern mobile platforms are capable of operating in areas without requiring alterations or investment into existing infrastructure. Mobile robots overcome a historical impediment of AGVs, their inability to dynamically reroute themselves. Mobile robots are outfitted with advanced sensory and enhanced intelligence systems." Reduced costs enable deploying both large and small fleets of vehicles in warehouse distribution and line-side logistics applications, LaSelle adds. Mobile robots can be particularly useful in painting and depainting applications, says Erik Nieves, Director of Technology in the Motoman Robotics Division of Yaskawa America

Inc. (Miamisburg, Ohio). “Mobility is a force multiplier for robots and I see that in depainting very large structures such as C-130 aircraft. Two fixed robots cannot de-paint an entire aircraft between them because they cannot reach everywhere.” More than two fixed robots constitutes too much hardware with very little throughput. “Each robot is painting a little piece then sit idle, parked more than moving,” says Nieves. Nieves suggests that rather than adding additional fixed robots around the aircraft, end-users needs a way to have two robots deal with an entire aircraft. “To de-paint an entire aircraft with two robots, those two robots need to move.” Putting the robots on servo tracks or a gantry is unfeasible due to aircraft’s geometry. “Putting two seven-axis robots on mobile platforms and driving them around the aircraft” is a better solution, Nieves says. Likewise, Paul Hvass, Senior Research Engineer with the Southwest Research Institute (SwRI, San Antonio, Texas) says mobile robots facilitate cost-effective paint removal from large aircraft. “The motivation behind the development of our MetrologyReferenced Roving Accurate Manipulator (MR ROAM) was to demonstrate highaccuracy, industrial-grade mobile manipulation for very large workspaces, an enabling capability for applications like aircraft paint stripping. SwRI has a 25-year history of developing, deploying, and supporting custom robots for fighter jet paint stripping and other large scale applications.” Hvass goes on to say, “To economically strip paint from larger planes, mobile automation is needed. In the future, we envision mobile robots developed for largescale tasks including aerospace, off-shore, and road, bridge, and building construction. These robots will initially undertake lightduty tasks such as painting, cleaning, and inspection before moving on to heavier-duty tasks as mobile robotic technology matures,” Hvass concludes.

### **Medical/Surgical Applications**

Corey Ryan talks about potential uses of mobile robotics in medical and other life sciences applications. “Medical applications are always a growing field with huge untapped applications like drug delivery, or the development of mobile treatment systems for specialized equipment.” Autonomous mobile robots (AMR) can play a role in assisting doctors in surgical procedures, says, Bill Torrens, Director of Sales and Marketing with RMT Robotics Ltd. (Grimsby, Ontario, Canada). “AMR technology is applied in surgical applications. Based on inputs, the robot arm assists the surgeon to perform a task. Pathplanning algorithms move the robot autonomously.” Sean Thompson, Applications Engineer at MICROMO (Clearwater, Florida) sees an increase use of robotics for automated Thermal monitoring is of special interest to Internet server farms and other sensitive electronic or mechatronic systems. Water ingress is also commonly monitored by way of mobile robotics, LaSelle notes.

Mobile robots are finding their way into other non-industrial applications. “The reduced cost of deployment and ownership mobile robots have extended their reach into non-factory applications. The current generation of smart vehicles is leading hospitals, laboratories, and some offices to employ mobile robots to alleviate the use of skilled labor for mundane transport tasks.” Continuing, LaSelle adds, “Mobility is already the norm in service applications and this sector is primed for tremendous growth. Service robotics is expected to overshadow the industrial robot sector in a matter of a few years. Adept believes mobile robots will be an exciting area in coming years,” reports LaSelle.

## **IOT BASED SCHOOL CHILDREN TRANSPORTATION SAFETY SYSTEM**

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### **ABSTRACT**

With the rising measurements of traffic accidents and child abduction, there is a requirement for a robust framework that empowers steady tracking for a huge number of children in transit driving from and to schools. With arising of Internet of Things (IoT) technology, notwithstanding Radio Frequency Identification (RFID), growing such framework gets plausible. This framework gives total perceivability children tracking. In this paper, we propose a total minimal expense plan and execution of an IoT-based framework that permits schools, guardians, and power to follow the development of the children during their essence in the school bus, which ensures solace for guardians and safety for children. The framework depends on, a minimal expense Nano RFID per user and a GPRS module both interfaced with Arduino microcontroller. The Nano RFID per user is utilized as an interface for giving the per user with a intend to get to the internet over 3G/4G organization. We assemble Mysql information base and convey it on Heroku's cloud stage, which makes building applications and sending them quick, secure, simple and adaptable. By taking these necessary steps, the child's safety throughout the fleet is achieved.

**Keywords:** Safety System, RFID, IOT (Internet of Things).

### **INTRODUCTION**

Parents are often concerned with their child's safety and are stressed from an ever-increasing number of accidents that occur on a daily basis. They cannot help but wait until evening to know about their child's well-being with all those unpleasant thoughts held-in. Thus tracking school buses have a very vital role to play not only in regard of a child's safety but also in regard of a parent's well-being and the school's responsibility. The proposed system addresses these very problems in an efficient and cost effective way. This system helps track live location of students, pick-up and drop times with the aid of real time monitoring. In emergency conditions, parents and school administration, along with necessary help can quickly reach out to children's aid, with the help of real time monitoring. This system describes a school bus display that is low price and tracks varied parameters like students aboard, adherence to route and schedule, location, speed and different data necessary for school and parents. Notification system helps to confirm individual safety of wards and additionally wastage of your time whereas students await delayed buses are self-addressed during this system with the assistance of real time observation. Moreover, instructional boards like CBSE have started advocating the need for varsity bus observation systems. The geographical coordinates of the bus are browsed by the GPS module and are then uploaded into information within the remote server over Wi-Fi. This information is then utilized by parents, bus drivers and school administration through a database which may be accessed by them via a mobile application.

Researchers and engineers are pulling graphics out of your television screen or computer display and integrating them into real-world environments. This new technology, called augmented reality, blurs the line between what's real and what's computer-generated by enhancing what we see, hear, feel and smell.

On the spectrum between virtual reality, which creates immersive, computergenerated environments, and the real world, augmented reality is closer to the real world. Augmented reality adds graphics, sounds, haptic feedback and smell to the natural world as it exists. Both video games and cell phones are driving the development of augmented reality. Everyone from tourists, to soldiers, to someone looking for the closest subway stop can now benefit from the ability to place computer-generated graphics in their field of vision.

## II. SYSTEM ARCHITECTURE

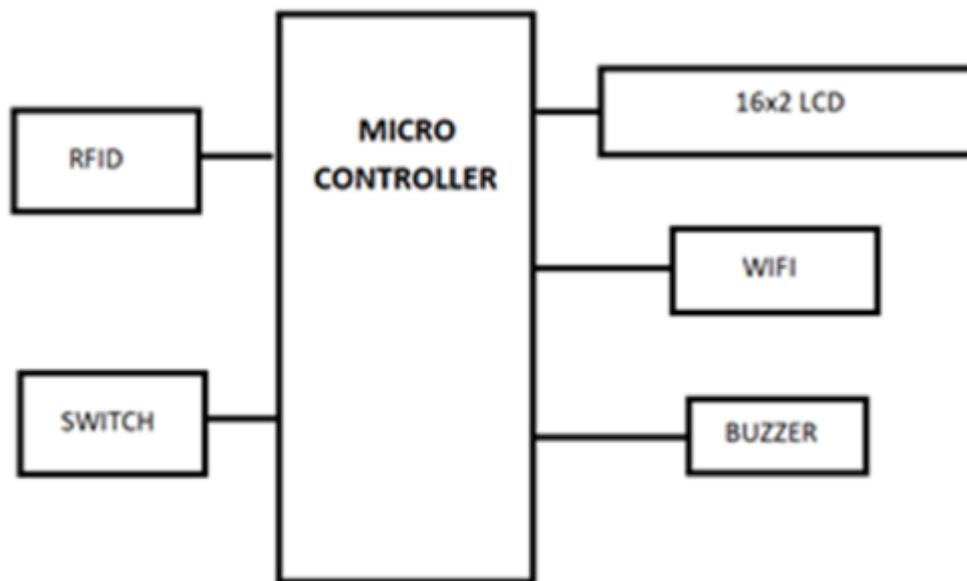


Fig.1. System block diagram for based school children transport safety system

The proposed system has two main units namely the Bus unit and the school unit. The bus unit will be fixed at the entrance of the bus where as the Server unit will be in school.

System Design Requirements Our system is designed with the following engineering requirements:

- The system should recognize each child and detect when every child boards or leaves the bus.
- The system should have a database to store student's information. • The system should be easy to re-configure.
- The communication should be reliable. Database of The System The database of the system has to meet certain business rules. A business rule is "a brief, precise, and unambiguous description of a policy, procedure, or principle within a specific organization". It helps to determine entities, attributes and relationships of the database. The business rules of the database of our system are:
  - A child can be in only one bus, but a bus may have many children.
  - A child has one or many relatives.

- A relative may have many children registered at the school.
- A bus may be driven by one or more drivers, but a driver can drive only one bus.
- A child may have many attendance records, but an attendance record has one child

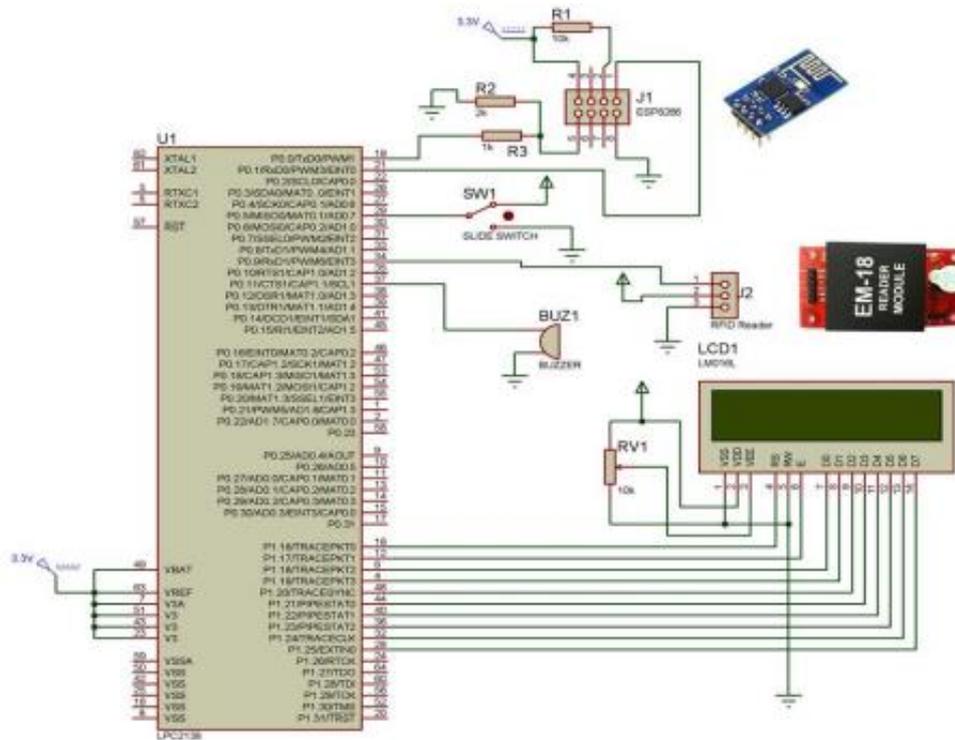


Fig 7: SCHEMATIC DIAGRAM

The above schematic diagram of IoT-based school children transport safety system explains the interfacing section of each component with microcontroller. RFID is connected to 34th pin of microcontroller. An RFID reader identifies each student as they board or alight the vehicle by reading the ID from their RFID tags. WiFi module (ESP8266) is connected to 19th and 21st pins of microcontroller. This WiFi module is used to upload data into the internet. Switch is connected to 29th pin of microcontroller and it is used to know the status of bus that is going to school or coming back from the school. Buzzer is connected to 37th pin of microcontroller and it is used to alert a user of an event corresponding to switching action.

LCD consists of 14 pins and pins 7 to 14 are connected to port 1 pins of microcontroller. **WORKING** The system allows the parents to be notified when their children entered or not entered into the bus. We make use of RFID and connect them to a remote server over Wi-Fi using an ESP8266 microcontroller. An RFID reader identifies each student as they board or alight the vehicle by reading the ID from their RFID tags. The system uses the microcontroller to upload the information from the peripherals to the LCD. The information can be accessed by the parents through a mobile application and this helps them track their wards effectively. The school administration can also access the application to ensure student safety and contact a driver or a parent. The application also allows the administration to be informed of emergencies or complaints.

## **IMPLEMENTATION UBIDOTS:**

Ubidots started as an engineering services firm in 2012, Ubidots delivered end-to-end IoT solutions in tandem with its partner and co-founding company Netux, to remotely monitor, control, and automate processes for healthcare clients as well funded startups and Fortune 1,000s in the American Southeast and across Latin America. Between 2012 and 2014, Ubidots accomplished countless internet connected projects across Healthcare, Energy / Utilities, Manufacturing, Transportation, and Retail – learning the many small characteristics of IoT and Cloud enablement that digital transformation experts cannot speak to unless they have gotten their hands dirty in the field. With a strong backbone and a steadfast determination to become a product-led company, Ubidots joined the Boston MassChallenge Accelerator in 2013, pivoting into a global tech startup, gaining US venture and support, and leaving behind the local services business.

Since Ubidots pivot in 2014, Ubidots has become known within hardware, software, embedded engineering, and maker circles as the affordable, reliable, and most usable platform in the IoT Application Enablement ecosystem. In line with Ubidots guiding principles, in 2018 Ubidots spun out and repurposed its first ever cloud version as Ubidots STEM. Rather than retiring this shared-resources platform, Ubidots instead empowers 60,000+ students, makers and researchers to explore and develop technology and solutions, giving all users their first 3 devices free, always. Figure 8 and figure 9 shows the Student Details such as Student Name and whether he/she is in or out

The hardware components used in the proposed system are shown in Figure 10. The system consists of the following components: 1. microcontroller that acquires data from all the modules. 2. RFID Reader which monitors bus attendance and usage. 3. RFID Card that is given to each student. 5. A Wi-Fi module that acts as an Internet Hotspot using 3G/4G service

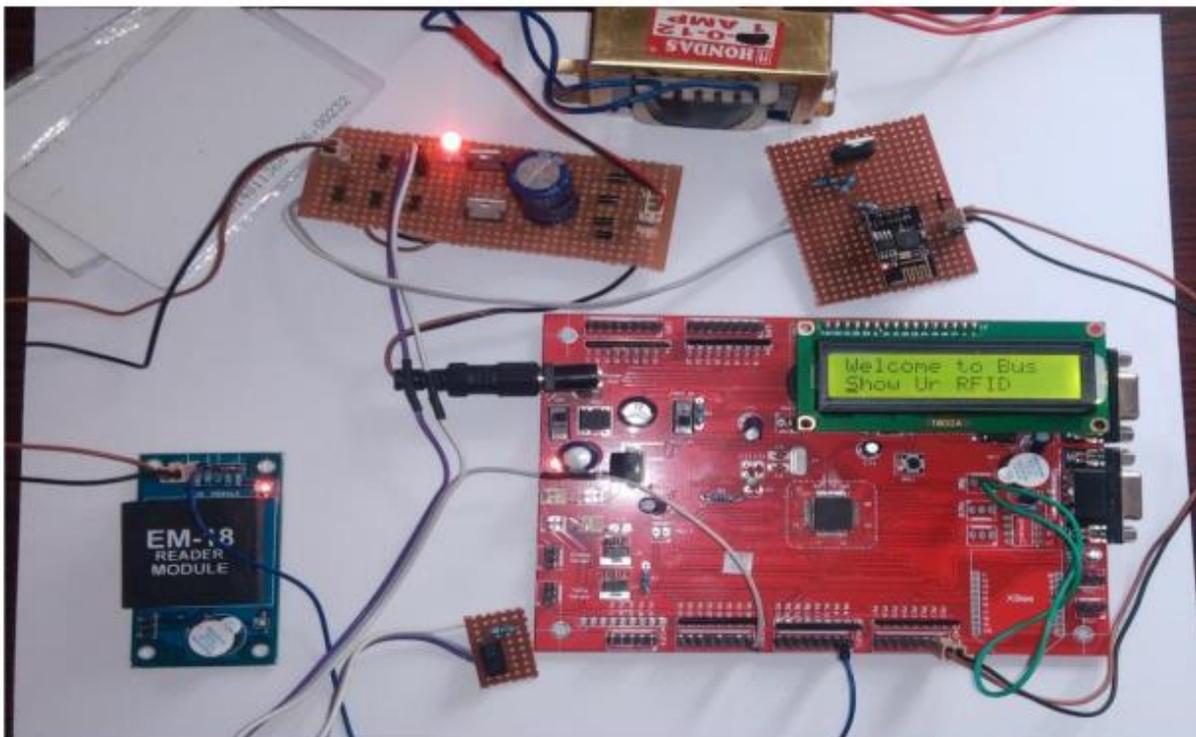


Fig 10: Hardware components of the proposed system

## **CONCLUSION**

Parents can easily follow the bus and affirm its direction moving at safe velocities, safeguard the experts responsible for postponements or deviations, be up to this point on the progressions in the plan also, address drivers or specialists if fundamental. The school bus application could be an individual amicable device for guardians to imagine their wards and school the board to notify the drivers. In outline, this assignment has made a school bus insurance gadget that has extensive security to the drive. The gadget makes some genuine memories following, understudy ID, delays, and researcher nonappearance.

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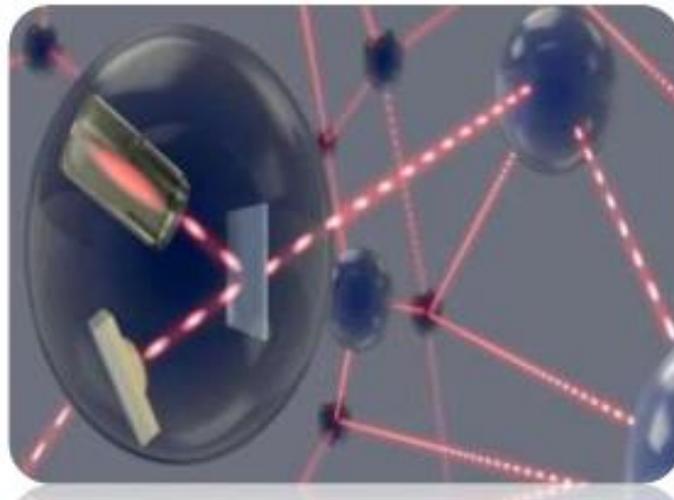
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## HIGH-SPEED QUANTUM MEMORY FOR PHOTONS

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Physicists have developed a memory that can store photons. These quantum particles travel at the speed of light and are thus suitable for high-speed data transfer. The researchers were able to store them in an atomic vapor and read them out again later without altering their quantum mechanical properties too much. This memory technology is simple and fast and it could find application in a future quantum Internet. Even today, fast data transfer in telecommunication networks employs short light pulses. Ultra broadband technology uses optical fiber links through which information can be transferred at the speed of light. At the receiver's end, the transmitted information has to be stored quickly and without errors so that it can be processed further electronically on computers. To avoid transmission errors, each bit of information is encoded in relatively strong light pulses that each contain at least several hundreds of photons. For several years, researchers all over the world have been working on operating such networks with single photons. Encoding one bit per photon is not only very efficient, but it also allows for a radically new form of information processing based on the laws of quantum physics. These laws allow a single photon to encode not only the states 0 or 1 of a classic bit, but also to encode a superposition of both states at the same time. Such quantum bits are the basis for quantum information processing that could make unconditionally secure communication and super fast quantum computers possible in the future. The ability to store and retrieve single photons from a quantum memory is a key element for these technologies, which is intensively investigated. Simple and fast A team of physicists led by the professors Philipp Treutlein and Richard Warburton from the University of Basel has now developed a particularly simple and fast quantum memory that stores photons in a gas of rubidium atoms.



A laser controls the storage and retrieval processes. The technology used does not require cooling devices or complicated vacuum equipment and can be implemented in a highly compact setup. The researchers were also able to verify that the memory has a very low noise level and is suitable for single photons.

## **One step closer to the quantum internet**

- "The combination of a simple setup, high bandwidth and low noise level is very promising for future application in quantum networks," says Janik Wolters, first author of the study. The development of such quantum networks is one of the goals of the National Center of Competence in Quantum Science and Technology (NCCR QSIT) and of the EU Framework Programme for Research and Innovation that have funded this study. In the future, quantum networks could lead to unconditionally secure communication, the networking of different quantum computers and the simulation of complex physical, chemical and biological systems.

## FIRST PROOF OF QUANTUM COMPUTER ADVANTAGE

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Quantum computers promise to revolutionize the future of computing. Scientists have now demonstrated for the first time that quantum computers do indeed offer advantages over conventional computers. They developed a quantum circuit that can solve a problem that is unsolvable using any equivalent classical circuit.

For many years, quantum computers were not much more than an idea. Today, companies, governments and intelligence agencies are investing in the development of quantum technology. Robert König, professor for the theory of complex quantum systems at the TUM, in collaboration with David Gosset from the Institute for Quantum Computing at the University of Waterloo and Sergey Bravyi from IBM, has now placed a cornerstone in this promising field.

### **Why should quantum computers be faster?**

Conventional computers obey the laws of classical physics. They rely on the binary numbers 0 and 1. These numbers are stored and used for mathematical operations. In conventional memory units, each bit -- the smallest unit of information -- is represented by a microscopic dot on a microchip. Each of these dots can hold a charge that determines whether the bit is set to 1 or 0. In a quantum computer, however, a bit can be both 0 and 1 at the same time. This is because the laws of quantum physics allow electrons to be in multiple places at one time. Quantum bits, or qubits, thus exist in multiple overlapping states. This so-called superposition allows quantum computers to perform operations on many values in one fell swoop whereas a single conventional computer typically must execute these operations sequentially. The promise of quantum computing lies in the ability to solve certain problems significantly faster.

### **From conjecture to proof**

König and his colleagues have now conclusively demonstrated the advantage of quantum computers. To this end, they developed a quantum circuit that can solve a specific "difficult" algebraic problem. The new circuit has a simple structure: it only performs a fixed number of operations on each qubit. Such a circuit is referred to as having a constant depth. In their work, the researchers prove that the problem at hand cannot be solved using classical constant-depth circuits. They furthermore answer the question of why the quantum algorithm beats any comparable classical circuit: The quantum algorithm exploits the non-locality of quantum physics.

- Prior to this work, the advantage of quantum computers had neither been proven nor experimentally demonstrated -- notwithstanding that evidence pointed in this direction. One example is Shor's quantum algorithm, which efficiently solves the problem of prime factorization.

However, it is merely a complexity-theoretic conjecture that this problem cannot be efficiently solved without quantum computers. It is also conceivable that the right approach has simply not yet been found for classical computers.

### **A step on the road to quantum computing**

- Robert König considers the new results primarily as a contribution to complexity theory. "Our result shows that quantum information processing really does provide benefits -- without having to rely on unproven complexity-theoretic conjectures," he says. Beyond this, the work provides new milestones on the road to quantum computers. Because of its simple structure, the new quantum circuit is a candidate for a near-term experimental realization of quantum algorithms.

## A MACHINE LEARNING MODEL OF AVERAGE FUEL CONSUMPTION IN HEAVY VEHICLES

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**CLASS** : II- EIE



**Abstract:** In this work we used vehicle travel distance rather than the traditional time period when developing individualized machine learning models for fuel consumption. This approach is used in conjunction with seven predictors derived from vehicle speed and road grade to produce a highly predictive neural network model for average fuel consumption in heavy vehicles. The proposed model can easily be developed and deployed for each individual vehicle in a fleet in order to optimize fuel consumption over the entire fleet. The predictors of the model are aggregated over fixed window sizes of distance travelled. Different window sizes are evaluated and the results show that a 1 km window is able to predict fuel consumption with a 0.91 coefficient of determination and mean absolute peak-to-peak percent error less than 4% for routes that include both city and highway duty cycle segment

**Keywords:** vehicle modeling, neural networks, average fuel consumption, data summarization, fleet management

### 1.0 INTRODUCTION

Fuel utilization models for vehicles are important to producers, controllers, and customers. They are required across every one of the periods of the vehicle life-cycle. In this paper, we center around displaying normal fuel utilization for weighty vehicles during the activity and upkeep stage. Compromises among the above procedures are basically regarding cost and precision according to the prerequisites of the planned application. This exploration was upheld to a limited extent by Allison Transmission, Inc.

### 2.0 REVIEW OF LITERATURE

Ability to display and foresee the fuel utilization is essential in upgrading mileage of vehicles and forestalling deceitful exercises in armada the board. numerous techniques for anticipating weighty/medium-obligation vehicle fuel utilization in light of driving cycle data. presents the utilization of three Machine Learning procedures to fuel utilization displaying of verbalized trucks for an enormous dataset. Specifically, Support Vector Machine (SVM), Random Forest (RF), and Artificial Neural Network (ANN) models have been produced for the reason and their presentation thought about.

#### 2.1.1 EXISTING SYSTEM

Previously proposed machine learning models for average fuel consumption use a set of predictors that are collected over a time period to predict the corresponding fuel consumption in terms of either gallons per mile or liters per kilometer. In contrast, previous machine learning models must not only learn the patterns in the input data but also perform a conversion from the time based scale of the input domain to the distance-based scale of the output domain (i.e., average fuel consumption).

### **2.1.2 DISADVANTAGES OF EXISTING SYSTEM**

Collected over a time period to predict the corresponding fuel consumption in terms of either gallons per mile or liters per kilometer.

### **2.1.3 PROPOSED SYSTEM**

In this concept to predict average fuel consumption in heavy vehicles using Machine Learning Algorithm such as ANN (Artificial Neural Networks). This approach is used in conjunction with seven predictors derived from vehicle speed and road grade to produce a highly predictive neural network model for average fuel consumption in heavy vehicles.

### **2.1.4 ADVANTAGES OF PROPOSED SYSTEM**

It is easily be developed and deployed for each individual vehicle in a fleet in order to optimize fuel consumption over the entire fleet. The predictors of the model are aggregated over fixed window sizes of distance travelled.

## **3.0 UML DIAGRAMS**

UML stands for Unified Modelling Language. UML is a standardized general-purpose modelling language in the field of object-oriented software engineering. The standard is managed, and was created by, the Object Management Group. The goal is for UML to become a common language for creating models of object oriented computer software. In its current form UML is comprised of two major components: a Meta-model and a notation. In the future, some form of method or process may also be added to; or associated with, UML.

The Unified Modelling Language is a standard language for specifying, Visualization, Constructing and documenting the artifacts of software system, as well as for business modelling and other non-software systems. The UML represents a collection of best engineering practices that have proven successful in the modelling of large and complex systems. The UML is a very important part of developing objects oriented software and the software development process. The UML uses mostly graphical notations to express the design of software projects.

### **The Primary goals in the design of the UML are as follows:**

1. Offer consumers an expressive, ready-to-use visual modelling language so they can create and trade meaningful

models.

2. Offer methods for specialization and extensibility to expand the fundamental ideas.
3. Not depend on a certain development methodology or programming language.
4. Offer a formal foundation on which to comprehend the modelling language.
5. Promote the commercial expansion of OO tools

## 4.0 USE CASE DIAGRAMS

### 4.1 USE CASE DIAGRAM

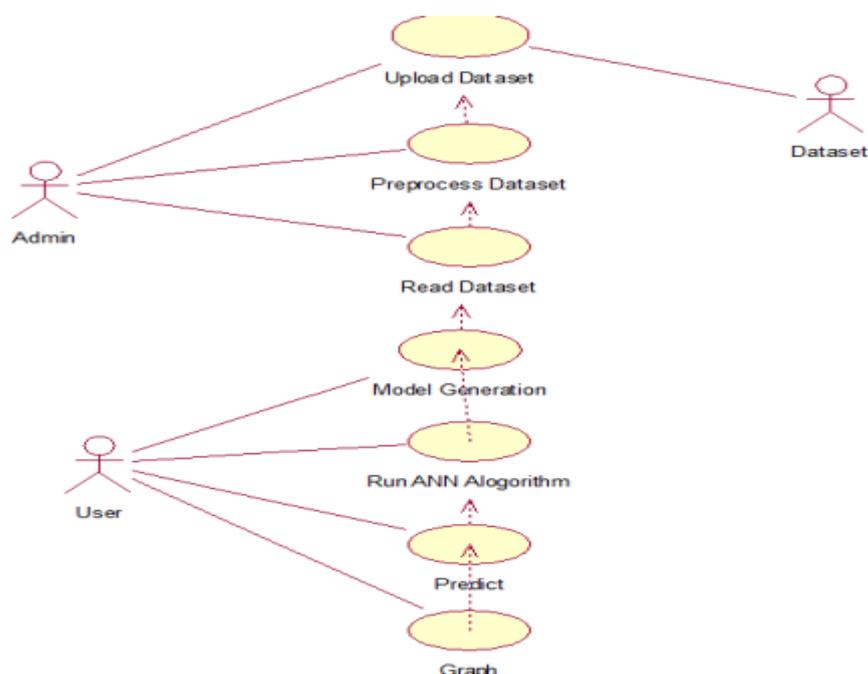
In the Unified Modeling Language (UML), a use case diagram can summarize the details of your system's users (also

known as actors) and their interactions with the system. To build one, you'll use a set of specialized symbols and

connectors. An effective use case diagram can help your team discuss and represent:

1. Scenarios in which your system or application interacts with people, organizations, or external systems
2. Goals that your system or application helps those entities (known as actors) achieve

The scope of your system



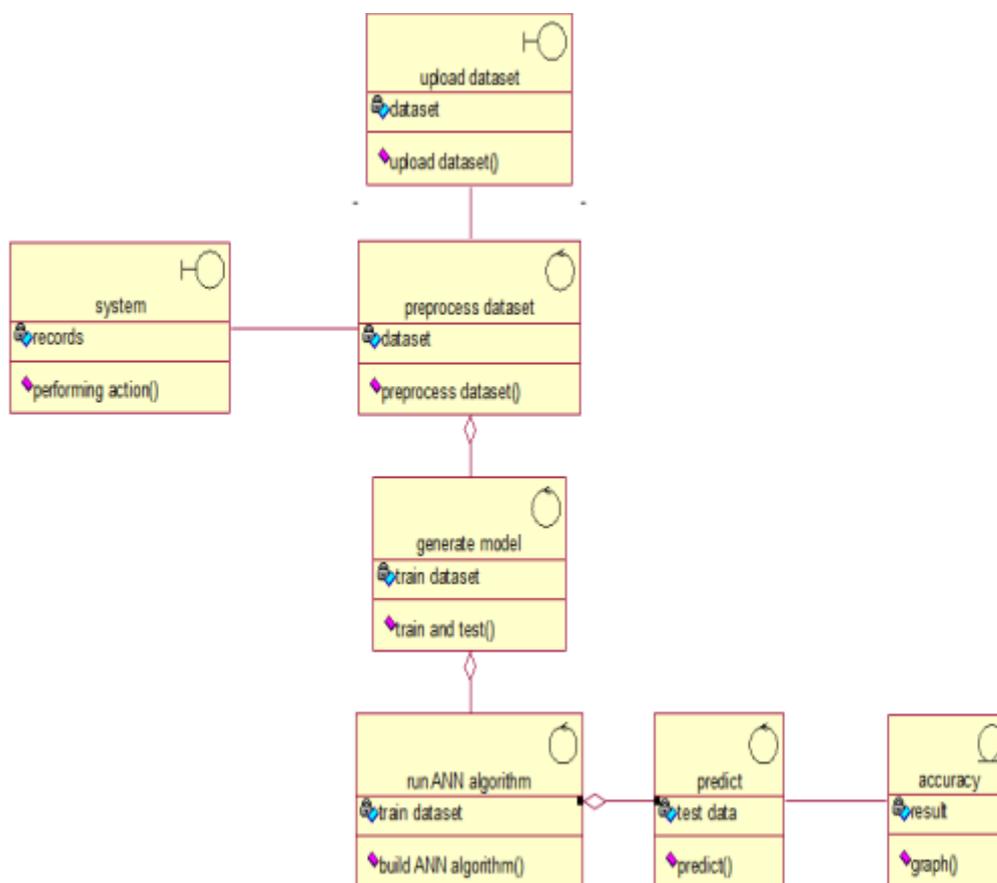
## 4.2 CLASS DIAGRAMS

The main purpose of class diagrams is to build a static view of an application. It is the only diagram that is widely used for construction, and it can be mapped with object-oriented languages. It is one of the most popular UML diagrams.

**Following are the purpose of class diagrams given below:**

- It analyses and designs a static view of an application.
- It describes the major responsibilities of a system.

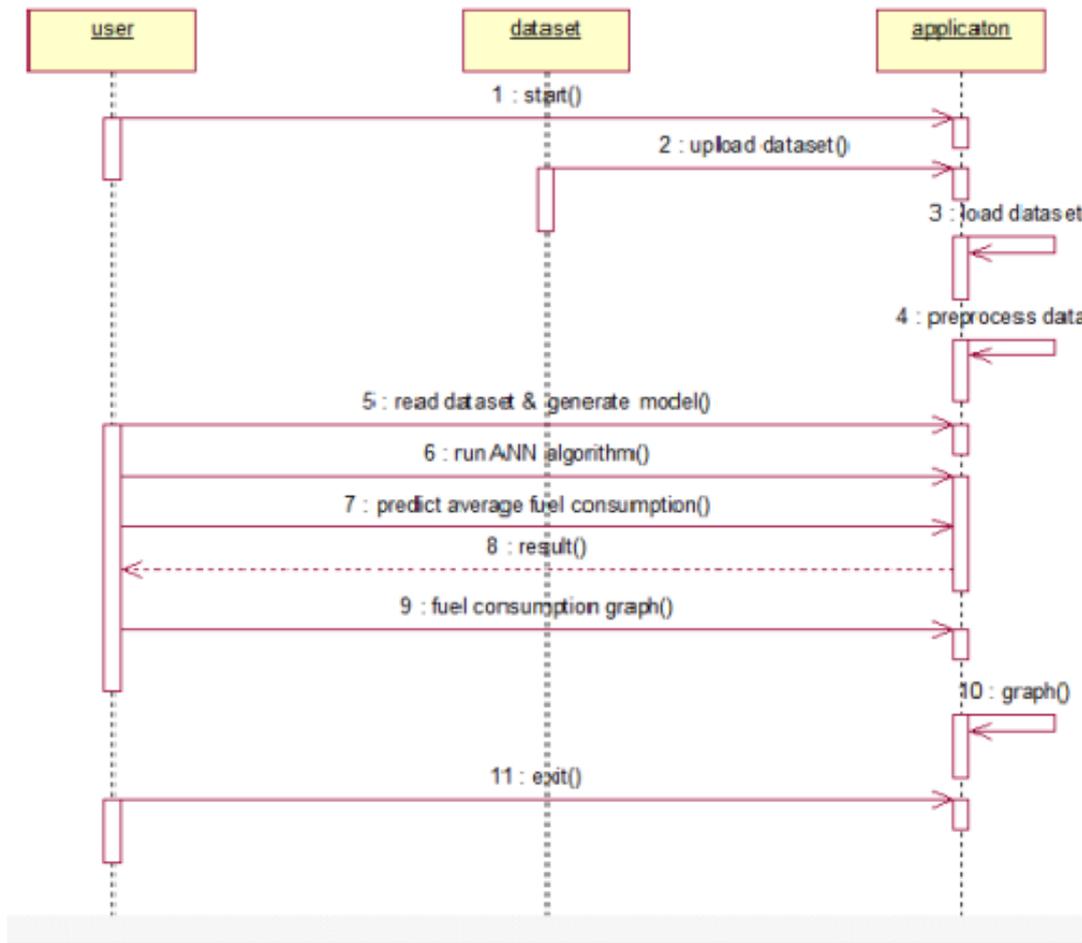
It is a base for component and deployment diagram



## 4.3 SEQUENCE DIAGRAM

The sequence diagram represents the flow of messages in the system and is also termed as an event diagram

- To model high-level interaction among active objects within a system.
- To model interaction among objects inside a collaboration realizing a use case.
- It either models generic interactions or some certain instances of interaction.



**Figure: Sequence diagram**

## 5. CONCLUSION

This paper presented a machine learning model that can be conveniently developed for each heavy vehicle in a fleet. The model relies on seven predictors: number of stops, stop time, average moving speed, characteristic acceleration, aerodynamic speed squared, change in kinetic energy and change in potential energy. The last two predictors are introduced in this paper to help capture the average dynamic behavior of the vehicle. All of the predictors of the model are derived from vehicle speed and road grade. These variables are readily available from telematics devices that are becoming an integral part of connected vehicles.

Moreover, the predictors can be easily computed on-board from these two variables. The model predictors are aggregated over a fixed distance traveled (i.e., window) instead of a fixed time interval. This mapping of the input space to the distance domain aligns with the domain of the target output, and produced a machine learning model for fuel consumption with an RMSE < 0.015 l/100km. Different model configurations with 1, 2, and 5 km window sizes were evaluated.

The results show that the 1 km window has the highest accuracy. This model is able to predict the actual fuel consumption on a per 1 km-basis with a CD of 0.91. This performance is closer to that of physics-based models and the proposed model improves upon previous machine learning models that show comparable results only for entire long-distance trips.

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## BLOCKCHAIN AND ITS APPLICATIONS

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### **Introduction:**

A blockchain is actually a digital ledger of transactions that is copied and distributed across the network of computer systems. Each of the blocks generated after every transaction holds various information about the transaction and gets itself updated in every participant's ledger which once written cannot be changed. Every participant in the chain of transactions is a vital part of the network.

In simple terms, it is distributed database that everyone can get a copy of. Every person with a copy can add new records to this database but cannot change any record that's already in there. So, how can it be used? Let us start with the most obvious and most popular applications of blockchain and that is:

- **Cryptocurrencies:** A cryptocurrency is a digital currency, basically designed to be used as a medium of exchange wherein each coin ownership record is stored in a decentralized ledger. Cryptocurrencies use 'decentralized control', which suggests that they are not controlled by one person or government. When Bitcoin launched in 2008, it allowed people to directly transact with each other without having to trust third parties like banks. Since then 4000 different cryptocurrencies have been created. Some examples are Bitcoin, Ethereum, Dogecoin, Fantom, etc. The blockchain is the technology behind cryptos where all the exchange or transaction information is stored which cannot be hacked or changed and a copy of the ledger is distributed among all the participants of the network. It records every single transaction. Each and every person can buy/sell or deal in cryptos and be a part of the network. Nowadays, several financial applications provide a user with the luxury of doing so.
- **Cars:** Let us see how can blockchain be used in cars. Ever heard of odometer fraud? By tampering with the odometer, someone can make a car appear to be newer and less worn out, resulting in customers paying more than what the car is actually worth. The government tries to encounter by collecting the mileage of cars when they get a safety inspection, but that's not enough. So, instead, we could replace regular odometers with smart ones that are connected to the internet and frequently write the car's mileage to the blockchain. This would create a secure and digital certificate for every car. And because we use a blockchain, nobody can tamper with the data/information, and everyone can look up a vehicle's history to ensure it's correct. In fact, this has already been developed used by Bosch's IoT lab and they are currently testing it on a fleet of 100 cars in Germany and Switzerland.

- Legal Documents:** So, blockchains are great at keeping a good track of data over time. So, besides odometers, you can keep track of things like intellectual property or patents or it can even function as a notary. A notary is someone (for example the Central Government) who can confirm and verify signatures on legal documents. But we can just as well use blockchain for it. The online website stampd.io as an example, allows you to feature the documents to the Bitcoin or Ethereum Blockchain. Once, a document has been added you can always prove that you simply created a document at a particular point of time very similar to a notary, although right now blockchains are not on the same level as notaries in a legal perspective.
- Digital Voting:** Another interesting application is digital voting. Right now voting happens either on paper or EVM (electronic voting machines) which are special computers running proprietary software. Voting on paper costs a lot of money and wastage and electronic voting has security issues. In recent years we have seen countries move away from digital voting and adopting paper again because they fear that electronic votes can be tampered with and influenced by hackers. In our country as well, we have seen politicians fight over “EVM hack” things. But, in place of paper ballots or EVMs, we could use blockchains to cast and store votes. Such a system would be very transparent and everyone could verify the voting count for themselves and it would make tampering with it very difficult. The Swiss company Agora is already working on such a system and it is going to be completely open-source. But there are many challenges. First, you have to be able to verify voters without compromising their privacy. Secondly, if you allow people to vote with their own computers or phones, you have to take care of the situation that those devices might be infected with malware designed to tamper with the voting process. And a final example: a system like this also has to be able to withstand denial-of-service attacks that could render the whole thing unusable. Definitely, a very tough nut to crack but if it becomes reality it could make for a more transparent and practical voting system.
- Food and Medical Industry:** They could use blockchain technology to track their food products from the moment they are harvested or made, to when they end up in the hands of the customers. See, every year almost half a million people die because of food-borne diseases and that’s partly because it takes too long to isolate the food that is causing harm. Blockchains could help us to create a digital certificate for each package of food, proving where it came from and where it has been. So, if contamination has been detected i.e. the manufacturer wants to revert a batch of food because of certain quality issues, we can trace it back to its root and instantly notify other people who bought the same batch of bad food. Walmart and IBM are the two big giants currently working on such a system. It allowed them to trace the origin of a box of mangoes in just 2 seconds, compared to days or even weeks with a traditional system. A system like this could be applied to other similar industries as well. We could use it to track medicines, and other regular products and battle counterfeit goods by allowing anyone (the officials in general) to verify whether or not the product comes from the original and authentic manufacturer.
- Logistics and Supply-chain:** Another idea would be to track packages and shipments using blockchain. That is something that IBM and container shipping giant Maersk Line are working on a decentralized ledger to help with making the global trade of goods more efficient. Many hackathons on blockchain have this topic for college students to build the project. It is still in the development phase and companies are trying to come up with such a system to track their package pinpoint.

- **Smart Contracts:** So far, we have looked at ways blockchains can be used to keep track of information and verify its integrity. But blockchains are even more powerful when we use them as smart contracts as one of its applications. These contracts live on the blockchain and can perform actions when various conditions are met. Insurance companies could use smart contracts to validate claims and keep a record of all the people who are buying insurance and paying their premiums on time so as to continue the terms of the policy. Or they could allow us to only pay for car insurance when we are driving. But it goes even further, with smart contracts we can our own data on a blockchain. In the same fashion, you could store your personal identity there and choose what data you want to reveal.
- **Original Content Creation and Royalties tracking:** Think about collecting royalties for artists. A beautiful idea for the use case would be streaming platforms could set up two smart contracts: one where users send a monthly subscription to and one that keeps track of what song or video a particular user is consuming and how many times the song has been played or a video being watched. At the end of each month, the smart contract that holds the subscription fee can automatically distribute the money to artists, based o how many times their songs have been played. People can have smart contracts for their content and have proof that they were the creators and no other. Mediachain is one of the companies working in the music industry using blockchain and smart contracts. Similarly, smart contracts can be used in other places as well, some of them are:

Blockchain technology can be used in so many different ways and we are still discovering and finding other ways out. This list is just a brief of what things are happening around this space.

Similarly, **other applications are:**

- **Real Estate:** Propy, a California-based company is using blockchain as a title registry system for property ownership with distributed and decentralized systems.
- **IoT Devices:** Filament, a Nevada-based company, creates IoT microchip hardware and software that lets the connected devices run on blockchain technology. The product's encrypted and secured ledger data distribute information to other blockchain-connected devices and allow monetization of machines based on the usage of time stamps and others. A cybersecurity company, HYPR, is using this technology to secure IoT devices with a decentralized credential system. By taking passwords away from a centralized system to make devices even more secure and unhackable.
- **Documents:** Many countries are adopting blockchain technology to store their data and people's data, this way they are bringing transparency and security to the documents like birth certificates, social security numbers, and voter registration cards, and much more.
- **Non-Fungible Tokens (NFTs):** These are the new trend in the world after cryptocurrencies survive upon blockchain technology. The year 2020-2021 gave rise to digital items at par. NFTs are also digital items that include videos, photos, arts, GIFs, and other media that are sold over blockchain such that the owner of the media created can claim his/her full rights. The Nyan cat meme that was a trend in 2011, that GIF was sold for \$600,000.



detail the exchange agreement, it provides a record that compels offer and acceptance.

**Logically, a blockchain can be seen as consisting of several layers:**

- infrastructure (hardware)
- networking (node discovery, information propagation and verification)
- consensus (proof of work, proof of stake)
- data (blocks, transactions)
- application (smart contracts/decentralized applications, if applicable)

**Uses of the Blockchain:** Blockchain technology can be used to create a permanent, public, transparent ledger system for compiling data on sales, tracking digital use and payments to content creators, such as wireless users or musicians. The Gartner 2019 CIO Survey reported 2% of higher education respondents had launched blockchain projects and another 18% were planning academic projects in the next 24 months. In 2017, IBM partnered with ASCAP and PRS for Music to adopt blockchain technology in music distribution. Imogen Heap's Mycelia service has also been proposed as blockchain-based alternative "that gives artists more control over how their songs and associated data circulate among fans and other musicians."

New distribution methods are available for the insurance industry such as peer-to-peer insurance, parametric insurance and microinsurance following the adoption of blockchain. The sharing economy and IoT are also set to benefit from blockchains because they involve many collaborating peers. The use of blockchain in libraries is being studied with a grant from the U.S. Institute of Museum and Library Services.

**Other designs include:**

- Hyperledger is a cross-industry collaborative effort from the Linux Foundation to support blockchain-based distributed ledgers, with projects under this initiative including Hyperledger Burrow (by Monax) and Hyperledger Fabric (spearheaded by IBM).

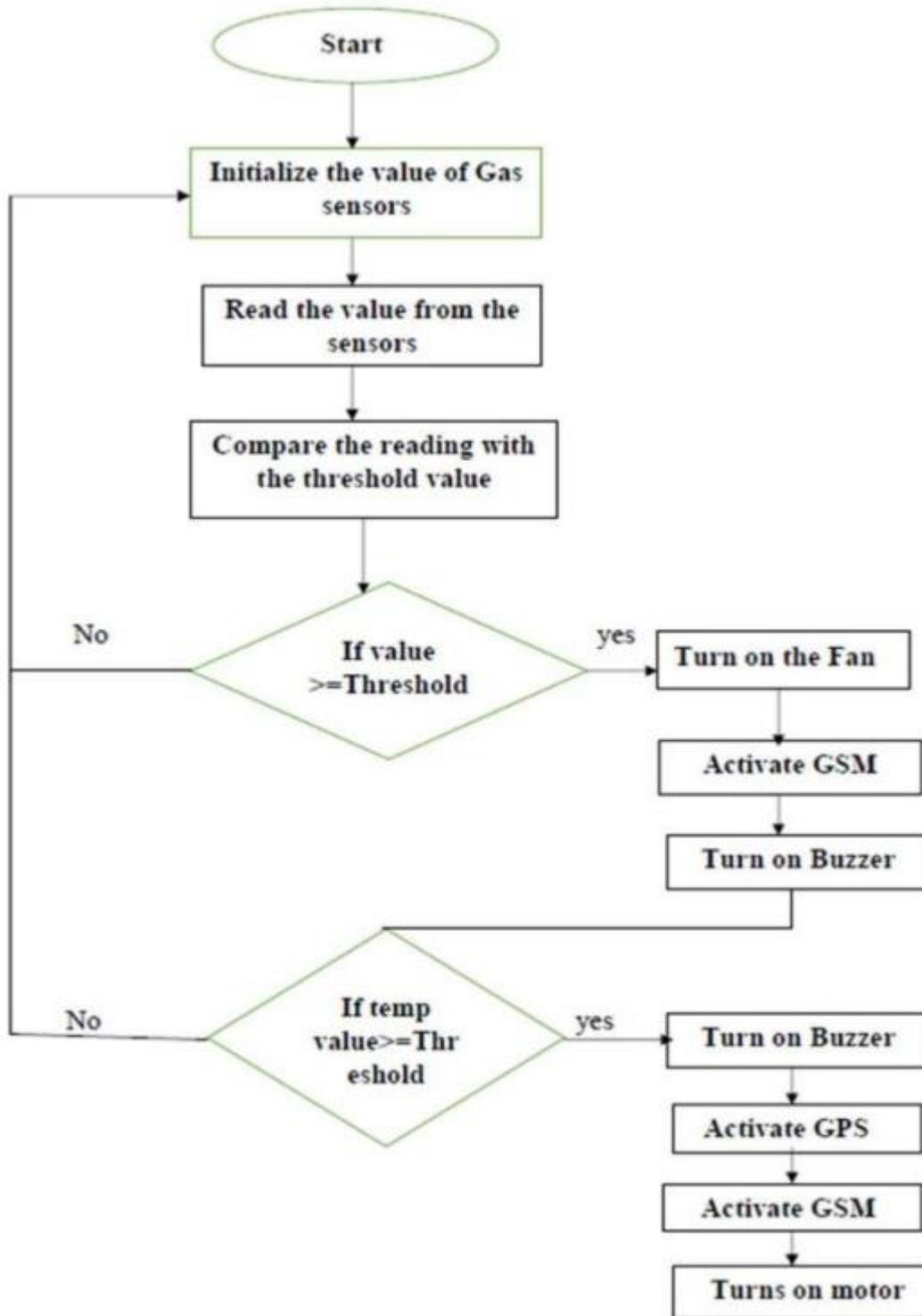
## **GAS LEAKAGE & TEMPERATURE MONITORING SYSTEM**

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**CLASS : II- EIE**



### **Abstract:**

Rapid urban and economic development results in global warming, climate change, and energy imbalance ecosystem pollution and other forms of environmental contamination issues. The combustion of fuel creates carbon dioxide and both carbon monoxide and methane contribute to global warming. Sulphur dioxide and nitrogen oxide were also emitted. and particle matter are the most significant contributor's pollution in the air. The prototype's central concept is to save human lives from hazardous gas leakage accidents. We planned to build this prototype after reading several articles about the Bhopal gas tragedy and the Vishakhapatnam gas leakage incidents. The prototype relies heavily on GPS and GSM modules to track the location of the gas leak and send an alert message. These two modules, along with the buzzer that alerts the surrounding area of the leakage-prone area, can be embedded in the Arduino UNO microcontroller. As a result, our prototype will be useful for both industrial and domestic purposes.



High population and urbanization growth rate raises the issue of air pollution in recent years. The issue of air pollution has recently come to light due to rapid population and urbanization growth. Now that the project is being implemented, we are evaluating the air using gas, smoke, and flame sensors to see how the environment is. If poisonous gas is detected, the system detects it, activates the exhaust fan, sounds the bell, and then notifies the local authority and our neighbors. It aids in lowering the likelihood of accidents. In today's modern world, accidents are increasing on a day by day and fire-related mishaps are the most common, according to data. As we consider some of the previous fire accidents which are occurred due to the leakage of the gas.



## IMPOSSIBLE?

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Do you still have unachieved dreams? Has engineering sparked an interest in you to know more? Are you aiming for a better career with better job opportunities? Do you like adventure, travelling abroad and experiencing different cultures? If you have answered most of these questions with a yes, then a Master's degree is perfect for you. Pursuing a Master's degree is an important decision which has to be decided by you and your family. It is highly advantageous if this decision is made as early as possible.

Universities abroad look for high performing students who are clear in their goals and have a passion to study. I would like to share with you steps to apply for a Master's program abroad and tips to get into top-ranking universities. Firstly, your CGPA is important. A lot of students take their undergraduate education lightly.

However, all universities have a minimal GPA cut-off and it is important to have a decent CGPA, preferably above 8 if you are aiming for a good university. The main reason for this is that, they want to know if the student is serious about their education, consistent in their efforts and willing to succeed.

Participate, participate, and participate! Universities look for all-rounded individuals who not only study well but also participate in co-curricular and extra-curricular activities. They prioritize students with research papers published in journals and those who actively involve themselves in conferences and projects. They also appreciate students who have taken up leadership positions.

I would like to stress on the importance of all of these because students who have low CGPA's have received admits from top-ranked universities because of their projects and publications. Do not wait for the last two years to begin this step, instead start early. Get help from your Professors and seniors, and soon you will not only have a great resume, but you will also learn and gain experience.

Internships are also highly valued as they are a form of work experience. Apply to places where you know somebody, as you will have a greater chance of being accepted. I would suggest that you opt for internships over in-plant trainings as they have a much higher value. Internships, projects or publications within the domain that you plan to pursue for your Master's degree would be an added plus point to your resume when reviewed by the admission board.

Students involved in sports receive high commendation abroad and have a high chance of getting sports based scholarships if they show proof of participation in the National or International level. Proof of speaking, writing or teaching skills will be advantageous to help you attain teaching or research assistantships abroad. Being a member of professional bodies such as the IEEE, IETE etc. will also be an added value to your resume. Plan ahead. Identify the degree that you would like to pursue and the country in which you would like to study with regard to the reputation of the program within that country as well as availability of job opportunities. For the US, the MS program is a thesis based program

meant for students who wish to continue with their Ph.D. while the ME program is a more practical program meant for students who would like to begin working.

Determine the requirements of the universities within the country and plan ahead. Most colleges in the US require the GRE/GMAT and the TOEFL/ IELTS examination. Take care while choosing these exams as different countries/ universities have different exam requirements. For instance, Germany does not require a GRE and certain countries prefer IELTS over TOEFL. Usually, UK, Canada, Australia, and New Zealand prefer IELTS while USA prefers TOEFL. However certain universities in the USA may also accept the IELTS and vice versa. GMAT is for students who wish to pursue an MBA.

**Prepare.** Try to begin your preparation for these examinations at the earliest. It is ideal to start in your fourth or fifth semester if your target is to join the university during Fall (August). Avoid applying for the Spring (January) semester as most colleges do not accept international Spring applications. My suggestion is, to begin with the GRE exam and then proceed to the required English exam, as the verbal section of the GRE will prepare you with the skills required for the English exam.

Your GRE result is extremely significant to get you into a top-ranking institution as it is one of the most important ways for the university to measure the academic ability of students from different parts of the world who come from different academic backgrounds. All universities have a minimum TOEFL/ IELTS cut-off score and a good score can be beneficial for a teaching assistantship. Prepare well and take several mock tests before your big day.

**Apply.** The next step involves recognizing 4 to 8 universities, 70% of which are at your academic level, 20% of which you can be confident that you will get through and 10% of which are your dream colleges. Choose your universities carefully and consider their tuition EIE 2021 68K fees, program ranking as well as the environment while making your decision. For Fall, it is important that you complete the previous steps by September so that you can get ready with the necessary documents for the application process.

A transcript is a form of consolidated mark sheet provided by JNTU University and is usually required for application to most colleges. It is suggested that you go to the JNTU University office a couple of weeks in advance and apply while providing the necessary documents along with the payment as specified in the JNTU University website. Make sure that you submit your application before the priority deadline. An early submission of the application would convince the board that the individual is truly interested in the university. GRE/GMAT and TOEFL/ IELTS score reports must be ordered and transcripts must be sent by courier (if required) several weeks in advance.

Identify potential recommenders and request them to prepare recommendation letters with the college letterhead. These letters must be sent directly to the institution by the recommenders. The recommendation letters (LOR's) and the statement of purpose (SOP) is extremely crucial in any application. It must be unique and speak of the individual's qualities and abilities which would convince the reader that he/ she will succeed in the program. The SOP which is written by the applicant must ooze with passion and should talk about achievements, goals and how that particular university is the best fit for the applicant. Once the application process is complete, the wait begins. Meanwhile, if required, begin considering the process for the application of loans.

Private Banks have higher interest rates when compared to National Banks such as the SBI. However, application for loans at private banks are speedy while National banks have a tedious process and require additional effort. Once you have received acceptance letters,

you can decide on which university to attend and further apply for your visa. Studying abroad can be challenging but at the same time can provide opportunities for growth, both academically and for you. I encourage you not to settle for less but strive for greater heights.

**~ Wishing you all the best.**

## HOW TO GET PLACED IN A COMPANY

### SUCCESS IS NO ACCIDENT

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Hi, Each and every one of you have an unique dream, some want to get placed in a core company, some in an IT industry. Some of you want to pursue higher studies, some want to become an entrepreneur. Some want to do family business. The desire of each person's life may vary. Those who want to start their carrier as an employee in an industry this article will definitely help you to attain your goal. Generally, the companies are categorized in two ways,

1. Product or service based Company.
2. Core Company.

### **To get into Core Company:**

Getting offer in a core company is simple than getting in an IT industry. Need to have a complete knowledge about our core subjects what we have learnt so far. Simple mantra is "Stop Studying the subjects and start Learning". Current world is a competitive world, we all have to equip ourselves so that we can sustain in that. There is no mercy and no frees, one who can adopt to the new technologies can able to get and survive in this corporate world. So start to equip you all now itself.

### **The rounds in the core company:**

- Aptitude plus technical MCQ's
- Face to Face interview (Technical and General HR rounds)

For first round, go through RS Aggarwal book, India Bix, 2braces, Exam Veda websites and know some basic concepts in all subjects to clear this round. For second round, main thing to clear these rounds is to have more faith and confidence upon yourself. Communicating language is secondary, have to deliver the content which you are coming to say clearly and boldly though you are not sure about that.

### **To get into IT industry:**

Have to learn many things apart from your curriculum, this shows how much interest you are having in learning new things. As an EIE student if you are well versed in programing equal to CSE student, preference will always been given to us.

### **Rounds in an IT industry:**

1. General and Technical Aptitudes
2. Programming round
3. Group Discussion

#### 4. General and Technical HR

**First Round:** As I said above go through all the sites which is enough to clear this round.

**Second Round:** Have to write a program for the given scenario more effectively. I will tell you all secret or mantra which I always use to solve a particular program. First go through the given scenario and see the sample test cases. If you can able to understand the sample input and output then it is easy to solve the code. See, The Computer is a senseless machine, we need to tell everything clearly so that it can do. Just back track your mind, while you read the input and output samples how your mind have understood that. If you found that way, that is nothing but an algorithm. Once algorithm is framed writing program is so simple. So for all the problems, you will definitely have the solution in your mind, the only thing you need to do is search for it without getting panic.

**Third Round:** To clear this round, a simple quality you should have that is having a faith and confidence upon you and you should possess a sound listening skill. You need to believe that you can do!!

**Fourth Round:** As I said previously, you have to speak clearly and boldly and instead of speaking unnecessarily have to strict to the point. Mostly all the companies will have the same interview process like I mentioned above. Don't get worried if you don't know anything till now..."Never it is too late to start a thing" so start working towards your dream by today itself...Because no one knows what tomorrow will bring. Whatever the situation may be never let you to hate yourself. If everyone demotivates you, never let your heart to accept that. Those who all are achieved big, loved themselves more than anyone. If you had a faith upon you, though you don't know how to solve a particular problem in your life your mind and heart will surf it for you. "World is full of Opportunities" for those who searched for it. Always keep in this in your mind, "Whenever there is a problem there will be a solution for that particular problem". For every problem the solution will always be simple. The only thing we need to do is surf for it. This is applicable to life as well as for the program...

**ALL THE VERY BEST** to all and  
wish you all to have a wonderful life and future...

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