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Design and Development of Vehicle Block System for Avoidance of Drunk and Drive and Accidents

K Bindu Madhavi[1], K. Ramoji Rao[2], M. Vishvesh Chary[3], P. Kiran Reddy[4]
[1]Associate Professor[1], Dept of ECE, Hyderabad Institute of Technology and Management, Gowdavelly Medchal Mandal, Hyderabad, Telangana, India.
[2,3,4]Student, Dept of ECE, Hyderabad Institute of Technology and Management, Gowdavelly Medchal Mandal, Hyderabad, Telangana, India.
Emails: *bindumadhavi.t@gmail.com[1]*

Abstract
This AI-based medical Chabot, particularly in disease prediction, highlighting the limitations of earlier Chabot's that rely on Long Short-Term Memory (LSTM) networks, such as narrow disease coverage and reduced accuracy. Recurrent neural networks (RNNs) are proposed as a promising alternative due to their enhanced capabilities in processing complex patient queries and providing accurate health recommendations. A systematic review emphasizes the need for medical Chabot's to integrate extensive disease databases and advanced natural language processing (NLP) techniques to improve interaction quality. Despite NLP's potential, current systems face challenges like language asymmetry, leading to response inaccuracies. Additionally, emerging trends such as hybrid AI models and modular design approaches are fostering greater adaptability in Chabot development. This survey identifies key challenges, including data dependency, scalability, and the necessity for improved accuracy in real-world applications, suggesting that a shift to RNN-based architectures and broader training data could significantly enhance the practical utility of medical Chabot's, ultimately improving patient outcomes and healthcare support reliability.

Keywords: *AI, LSTMs, RNNs, NLP.*

1. Introduction

Many people die in accidents. Auto accidents are an important social issue in many countries. The issue is still enhancing because of reckless driving and drunk driving by drivers. These issues can be rectified by using black box system analysis. Automotive and computer technology create new levels of data services within the vehicle. Automated black boxes have similar functionality to airplane black boxes. It is used to investigate the reasons behind auto accidents and prevent property damage and loss of life. An automated black-box system prototype that can be set up in a vehicle. Our everyday lives are greatly impacted by transport, whose advancements have made many of our jobs easier. Accidents have increasingly increased along with a continuing increase in the use of automobiles. According to the World Health Organization (WHO), 1.3 million people die in accidents every year, and many more suffer injuries or disabilities [11]. Accidents are primarily caused by gap in between vehicles, drunk and drive and lack of sleep [12]. These days, the Internet of Things (IoT) has made great progress in tracking vehicles and tracking accidents. The IoT is expected for major effect as data can be transferred from sensors to cloud and stored anywhere to access for detection as well as actions also [4]. Sensors like gas, humidity, vibration, fingerprint, temperature, and infrared (IR) sensors are used. Atmospheric emissions of gas levels are detected using devices known as gas sensors [1]. As the material resistance of the sensor changes with gas concentration, capability differences develops that will be evaluated as output voltage. Vibration sensors measure the intensity as well as frequency of devices, systems, or machines. These indicators can be used to predict defaults as well as detect asset imbalances and other issues. The engine coolant temperature is measured using a temperature sensor. A humidity sensor monitors the humidity to prevent battery consumption. The sensors send signals to the Engine

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Control Unit (ECU). The sensor data is then used to adjust the mixture and burning timing. A fingerprint scanner is used to detection and check user fingerprint. Using fingerprint reader and scanner for privacy verification is secured and reliable. Data transfer among the vehicle terminals and the observing centres are possible through communications links using the Global System for Mobile Communication (GSM) as well as base station controllers. Satellites are used by the Global Positioning System, or "GPS," to determine an object's location. GPS consists of satellites which are located several kilometres away from the earth's surface. Global Positioning System broadcasts messages containing spacecraft trajectory, time, position, and precise data. Information of Latitudinal and longitudinal is gathered from satellites through Global Positioning System and stored in a buffer microcontrollers. Tracking is done by forwarding a message to the Global System for Mobile device that tells the vehicle's location. Tools that deliver messages through Subscriber Identity Module (SIM) are called global mobile communication systems. The Global System for Mobile requires commands from the American Telephone (AT) [8] for the function. When the sensor's logical function is exceeded, GSM is activated and a message is forwarded to the emergency contact via the microcontroller. It also activates when an IR sensor detects an accident, a temperature sensor detects a fire or vehicle-related theft. At Aeroplanes, this system is commonly utilized for information gathering in accident investigations. The same black-box approach is utilized in described systems of on-road vehicle. Critical data like engine temperature, vibrations and driver alcohol consumption are stored locally and retrieved from all data through IoT. All of the information required to determine the cause of an accident is gathered from various local sources. Investigators typically gather such data by gathering rumors or soliciting information from passers during the course of an accident. Now, black box system is utilized to identify the parts which are controlled for traffic accidents by automobiles. The main elements are the image capturing and the video signals compression. Incase accident happen then the system gets the notification and the sever of the police-station also receives the notification along the location of the incident. When the system receives an alarm, it uses the Global Positioning System (GPS)/On-Board Diagnostics (OBD) module to check with the database. So, in the worst case, black boxes have to be installed in the vehicle along with other accidents prevention and accident warning systems.

2. Literature Survey

W. Rassameepaiboon and W. Assawinchaichote, et.al [13] "Analysis of Car Avoidance Using Two-Step Motion Flow Cluster" was the proposal. The road accidents are mainly prevented by black box system. Automakers have built systems are reducing and preventing these accidents. Therefore, the models cannot cover all cases and can lead to more accidents. Therefore, an interactive accident-avoidance system with two-stage motion prediction is the preferred system for more efficient mitigation and prevention of accidents. In this study, it focuses on forward movement detection and automatic avoidance of obstacles, which are the functions of this system. Faiz A. B., Imteaj A. and Chowdhury M., et.al [17] "Smart Vehicle Accident Detection and Alarming System Using a Smartphone" was explained. A traffic accident is a serious accident that affects people's lives and can result in serious injury or even death. Automakers have made great strides in mitigating this problem, but the potential negative consequences of accidents remain unmitigated. Exceeding the speed limit is one of the root causes of traffic accidents. Therefore, the change in the inclination angle between the external pressure and the road surface causes this accident. If the ambulance service could learn something about the accident, that impact would be further mitigated. Freitas Pereira T. de, Anjos A. and Marcel S., et.al [9] Using domain-specific units for heterogeneous face recognition. The task of heterogeneous facial recognition is to match facial images captured in various areas, like sketches and pictures (visualized spectral image), etc. It is described that deep convolutional neural network functions are informed on spectral images which are highly independent and encoded faces captured in various areas. Modifying "domain-specific units,"

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which are low-level features of deep convolutional neural networks used to match the different flat feature detector for each new image, is a general method stated. G. Punyavathi, M. Neeladri, M.K. Singh,et al. [2] introduced an IoT-based technology for vehicle detection and tracking. Vehicle detection will attained with conventional as well as deep learning techniques. The initial technique uses classical Scharr-Sobel edge prediction. The second technique is to develop algorithms for detection and analyze blobs. The third method uses the You-Only-Look-Once (YOLO) v3 deep learning model. High flow makes them hard for identifying. For supporting the flow of statistics and real-time detection the structure of the network is changed by utilizing principal of spatial integration. Hence, the deep learning model performs better than conventional system and provides better results. M.W.Raad, M.Deriche, T.Sheltami et al. [5] created a system for tracking school vehicles that makes use of mobile data and radio frequency identification, or RFID. The readers are placed at bus pick-up locations, next to bus stops, and at school entrances. The administrator installs the system database for mobile operation. An application using Heraku's cloud platform is connected to a MySQL database. Additionally, the system offers security and enables the owner to use bus routes to access the Internet to verify security. Dashora C., Sudhagar P.E., Marietta J. et al. [6] announced a vehicle accident detection model using IoT. To automatically detect car crashes, a device was continuously developed that transmits data to the control room through a Wireless Local Area Network (WLAN) module. "Thingspeak" is utilizes for online cloud operated by others. The software utilizes the sequence observer to monitor information as well as to know whether the information is passed to the cloud or not. It provides the exact data for controller's accelerometer for measuring. Parameters have been determined and it is possible to establish as the incident is serious or not. M. Anil Kumar, M. Venkata Suman et al. [14] Developed an accident investigation system that utilizes black boxes and cloud storage. Many people die accidentally. This document describes about the cars which can be made safer and systems, which can notify drivers to drive attentively. This analysis explains Internet of Things (IoT)-based continuous observation of driver in driving and vehicles execution through sensor. The system receives information from multiple devices like acceleration, a breath analyzer, the vehicles distance as well as push and panic buttons. If the driver exceeds the drinking limit, an emergency contact will be notified. In the event of an accident, the police station along with nearby hospitals receive the data that is provided by the Global System for Mobile and Global Positioning System, which is used to locate the car. The place is trace constantly by utilizing Internet of Things platform services. Danger and push buttons are used 24/7 to warns administrators and requesting accident assistance. Mallidi S.K.R., Vineela V.V., et.al [15] created an SVMS, or smart vehicle monitoring system. IoT is used by SVMS to remotely monitor and control vehicles. The Raspberry Pi (RPi) has sensors for incidents detection. The RPi is provided with a camera which detects the seriousness of an accident. The images are utilized to classify police and hospitals about severity. SVMS also includes GPS technology for vehicle tracking and allows tracking vehicle's position. This data is utilized to detect the vehicle in the object of an accidents or thefts. Shoaib A.M., Liwen C., Saleem A., Ullah H. et al. [3] described a system to predict accidents by implementing YOLOv3 algorithm. After detection, it sends accident images and videos to save the person such as police-stations as well as ambulances by an app. Therefore, with the help of Google Maps, trace the accident location and the path to achieve the scene as soon as possible. The model worked effectively using constant light and camera position conditions, as well as camera quality. M.Costa, D.Oliveira, S.Pinto, A.Tavares et al. [10] described a non-invasive model to observe driver tiredness, distractions, and activities. The described model considers new sensors and machine learning algorithms for data extraction and modeling. In the field of monitoring the tiredness, it describes various functions that take into account the degree of vehicle automation. The implementations of support vector machines and random forest trees experiment achieves an accuracy of 89% to 93%. Kassem, Jabr

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& Abdallah, Rabih & Salamouni, Maalouf, Ziad &Ghady et.al [18] described "Vehicle Black Box System" a paradigm of cars model. This model will help for safer vehicles; improve care for accident, searching assistance as well as saving. The system can be modeled with minimal circuitry and includes speed sensor, water sensor, light sensor, crash sensor and seat belt sensor. S.Kannan, A.A.Kadar, D.S.Divya et.al [7] described "Embedded Accident Prevention Technology Using Image Processing" specifies accident prevention through road monitoring. Capturing of object picture from the front view and it is processed for warnings that produced by sensor that is brake. If the warning is properly responded then the user is saved for an obstacle as the brakes are applied by circuit. As the Automatic braking system is implemented for the reduction in human reaction time. Nanda S., Joshi H. and Khairnar S. et.al [16] described ” the "Smart System for Accident Prevention and Detection Using IOT", This introduced a system that detects unintentional acceleration or steering errors when the driver is sleepy or not stable by depressing the wrong pedal. There is a risk of stricking with other vehicles or concretes barriers.

3. Methodology

The block diagram can be seen in Fig.1. An automatic Black Box system prototype that is put in the cars is described in this analysis. This framework realizes accident analysis by impartially tracks the vehicles. The system also enhances protection by avoiding tampering with black box data. It contains microcontroller will help the devices that connected with a Universal Serial Bus cable, and power it with an Alternative Current –Direct Current adapter/battery and it is good start the vehicle. The RPi is low cost and small size that can connect to monitor or TV. It's a powerful small device for different age group people can use to explore computing of programming in languages like Scratch and Python. Similar to traditional breath analyzers, this alcohol sensor is appropriate for observing the concentration of alcohol in the air to breathe. It features are highly sensitive and quick responding The sensors produce an analog resistance output depended on alcohol percentage. The driving circuit is very simple and need the resistance. Car engine receives the sensor and doesn’t starts the engine. The ultrasonic sensor utilizes sonar to measures the gap among the objects. Excellent non-contact distance sensing with high accuracy and consistent measurements is provided, making package calculations simple. Vibration sensors are utilized to predict larger amplitude vibrations on car body, most often indicating a car accident (Figure 1)

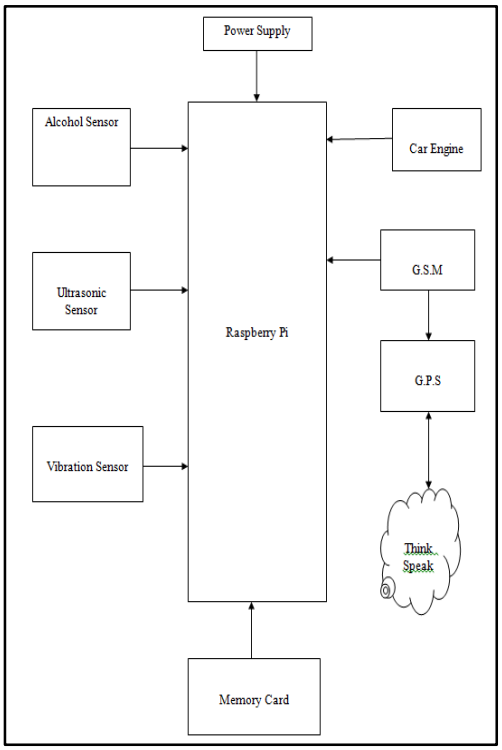

Figure 1 Block Diagram

The sensitivity of these sensors can be low or high than normal range. Sensor sensitivity can be selected according to the applications. Therefore, it is important to determine the range of vibration amplitudes that the sensors will experience during measurements. a dual-band general packet radio service (GPRS)/GSM system that may be integrated with client applications. It provides low power consumption, tiny form factor, and industry standard GSM/GPRS 900/1800MHz performance for voice, SMS, and data as fax. SIM900A is applicable to most space requirements of user requests, particularly simple and compact design requirements. The GPS module is a powerful complete receiver with an

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antenna that produces powerful satellite searching capabilities. Power and signal indicators allow to monitor module status. It made possible to detect and investigate accidents using the sensors mentioned above. The sensors collected data is stored on the SD card module. In the event of an accident at any time, the stored data can easily be used by the police to examine and identify the true cause of the accident. Data collected by the sensors is transmitted to police and hospitals through GSM and IoT in an emergency and stored in a black box for further investigations. Step1 begins the operation with raspberry Pi. Incase if the person is alcoholic then the 'Yes' it stop the engine. Incase if the person is non- alcoholic, it processed to the ultrasonic sensor. If any object is at the front of vehicle. Then the command 'yes' then engine stops. If command 'no' then the engine starts and proceeds for next step to vibration sensor that detects the accidents incase vibration sensor receives the command 'yes' then GSM, GPS and cloud gets activated (it send information to police station, emergency clinic and save information. Also sends location). If command is 'no' then checking is done until engine stops. (Figure 2)

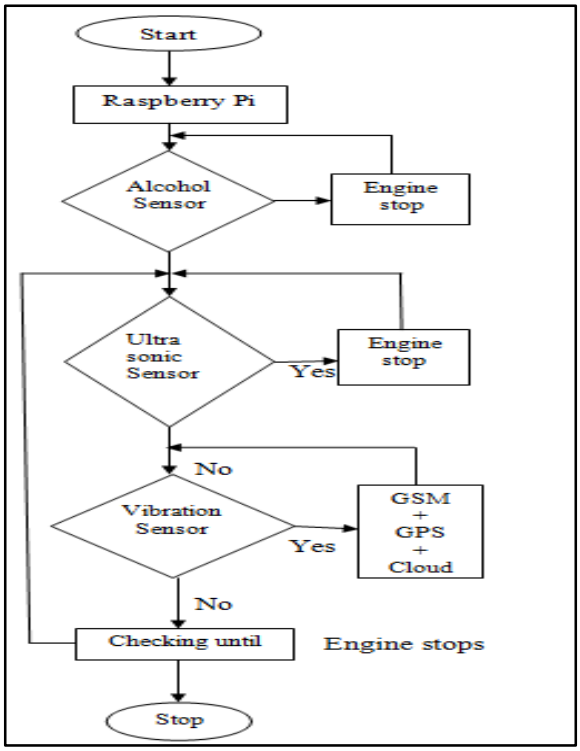

Figure 2 Flow Chart

4. Result Analysis

The performance analysis of blackbox system for accident analysis is seen in this section. This system is compared with RFID in terms of reduction rate of accidents and security. In Figure 3, accident rate comparison graph is observed between RFID and black box system. The black box system shows low accident rate. (Figure 3)

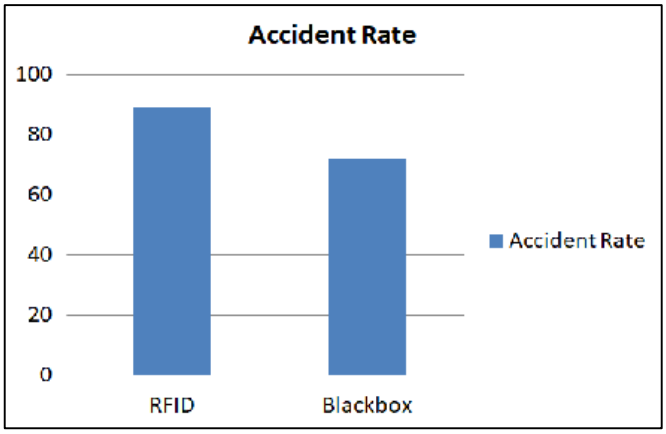

Figure 3 Accident Rate Comparison Graph

Security comparison graph is observed between RFID and black box system. The black box system shows high security rate in (Figure 4,5)

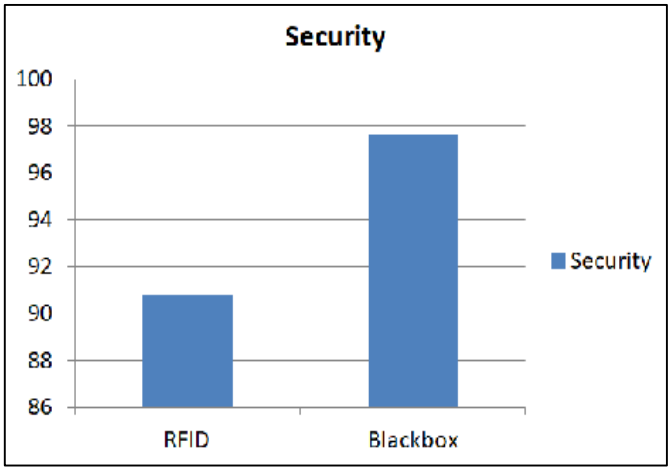

Figure 4 Security Comparison Graph

Table 1 Performance Analysis

Parameters	RFID	Blackbox
Accident Rate	89	72
Security	90.8	97.6

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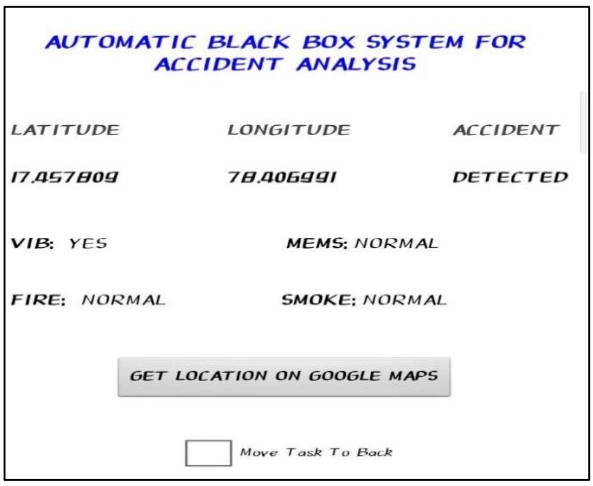

Figure 5 Blackbox

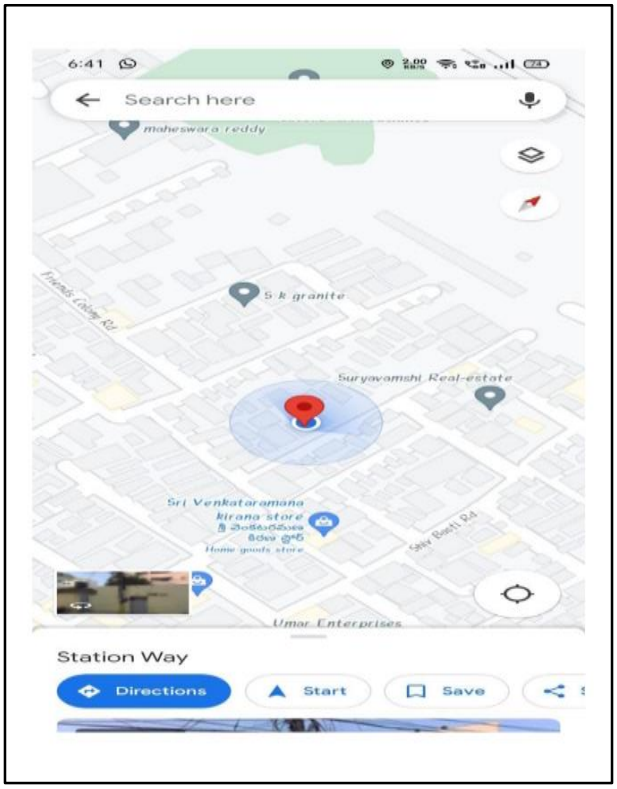

Figure 6 Detection of Location

Conclusion

The described model contributes to the prevention of accidents for the development of safer transportation by issuing an alarm in the event of an accident to improve victim support and rescue.The whole system is low-cost and efficient for every system.The described model will assist searching and save aid in post-accident observations. The saved information is used by the organization for live vehicle monitoring, accident analysis, and insurance claim investigations. In the event of an accident and will get immediate clinical help from the nearby hospitals for capturing an alert that including the exact location of the vehicle. This frame achieved excellent outcomes in terms of safety and reduces the accident rate.

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