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A Review - Nirbhaya: Smart Security System for Women in Public Transportation

Prof.A.G.Patil[1], Ashwini Dhage[2], Poonam Shirsath[3], Eakansh Sharma[4], Roshani Sonawane[5]
[1]*Assistant Professor, Computer Engineering, Sandip Institute of Engineering & Management*
[2, 3, 4, 5] *B.E. Computer Engineering, Sandip Institute of Engineering & Management*

Abstract: ***The status of women in India has gone through many great changes over the past few decades. But in modern India, women continuously facing social challenges and are often victims of abuse and violent crimes. As per normal survey, we can easily conclude that when any women faces abusing situation, she don't have that much of time to get her phone and ask for help. At the moment she only screams loudly help word. So the motive of proposed system is to recognize the need and serve help to victim. So the Smart System will serve help to victim after recognizing the word help. In this paper, we proposed a system which focuses on providing security and safety to women while they travel alone and late nights in public transportation, E.g. Autos, Cabs. Here, an intelligent women safety system is developed using effective Speech Recognition and Face detection along with Global positioning system (GPS). The main idea here is recognizing a help word frequently 3 times at particular frequency and start capturing images. Later on, captured images, vehicles R.T.O. number, drivers profile and GPS location aresending to nearest Police helpline centre.***

Keywords: Speech Recognition, Image capturing and Face Detection, GPS Module, GPRS Sheild, Data Transferring, Portable Device, Raspberry Pi 3*.*

I. INTRODUCTION

In this paper, proposed system focuses on a security system that is designed solely to serve the purpose of providing security and safety to women while they travel alone and late nights in public transportation. E.g. Autos, Cabs. The project is proposed using Speech Recognition and Image Processing technology. Project acquires a Smart System which can identify an abusing situation with an individual and as well as it collects evidences of crime scene.

According to the reports of WHO, NCRB-social-government organization 35 percent Women all over the world are facing a lot of unethical physical harassment.[1]Also according to a global poll conducted by Thomson Reuters, India is the fourth most dangerous country in the world for women.[2]

Smart System is proposed for the safety of women in public transportation. When any women start travelling in public transportation and if she faces any abusing or groping situation, then as she will scream for help. These help word frequently 3 times and at particular threshold or pressing of panic button will be input to system. After recognizing speech or event system will start capturing images. As 3 to 4 images got snapped, immediately this images along with vehicles R.T.O. number, drivers profile and GPS location will be send to nearest Police helpline centre.

If any victim does not file case against criminal, then also the complaint is register to police with evidences of crime scene. So the police can investigate the matter and can also arrest the criminal. Anyone before doing any crime against the women will be deterred as he has instilling doubt or fear of the consequences by knowing the security factors installed.

Speech Recognition is major tasks in proposed system. The factors affecting Speech Recognition are Vocalization, Pitch, Tone, Noise, Frequency, Loudness, Speed, Accent and so on. Speech Recognition requires efficient models, algorithms and programming frameworks to analyze the real-time data. The developments in parallel computing platforms open major possibilities for Speech Recognition systems.

Effective face detector when human captured picture quality is corrupted by additive Gaussian noise and blur. It is observed that, an adequate increase in picture quality can improve face detection performance. These results can be utilized to guide data transfer capacity which regards with face detection task. One problem is the extremely varying lighting conditions,

namely daytime and nighttime. An automatic system equipped with a camera on the dashboard of the system, must detect face of criminal in poor lighting conditions. The face detection should be independent of lighting conditions.

II. EXISTING SYSTEMS

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A. Abhaya : An Android App for the safety of women

An Android Application for the Safety of Women. This particular application can be activated by a single click, whenever victim faces a abusing situation. Access to the app is just user has to click once on app single and it identifies the movement of the user through GPS and sends a message containing this location URL to the registered contacts and also call on the first registered contact to help the one in dangerous situations.[3]

B. HearMe : A smart mobile application for mitigating women harassment

It is a smart mobile application, namely HearMe, with multiple unique features including lock screen access and siren on the receiver device. The HearMe application can be activated through hardware buttons in order to quick access to the victim. One important feature of HearMe, if the mobile isin silent mode still blowing a loud siren at the receivers phone, increasing the possibilities of getting help to victim from family or police.[4]

C. VithU: A mobile application for Women's Safety initiated by channel V

It is an application to help women when they feel unsafe. The Application can be accessed by a single click on app. A single click on this app identifies the location of victim through GPS and sends a message to the registered contacts to help the one in abusing situations. The location of the victim can be quickly tracked and can be rescued safely.[5]

D. FightBack:It is an application specially designed by CanvasM to enhance Women Safety

The app is just getting instigated by pressing a panic button whenever any individual feels unsafe. After getting instigated it tracks users location through GPS (Global Positioning System) and sends location details to the server. Unique feature is, it shows user's current location on the Google map. FightBack uses GPS, SMS, location maps, GPRS ,email and your Facebook account to inform your family, friends in case you are in danger. App functions only for registered users.[6]

E. Smart foot device for women safety

The smart device will be attachedto the footwear of the user. When any women feels unsafe, she have to tap her footwear. On tapping one foot behind the other four times, an alert is sent via Bluetooth communication to an application of users phone, so on it willgenerate a message to seek help by sending location.[7]

F. A mobile application for Women's Safety: WoS-App

When it comes to safety of women, the most primary issue in handling such cases by the police lies in constraints. Constraints like not knowing the location of the crime, & even not knowing its happening at all. So system helps victim to place an emergency call to the police. It can be done with help of pressing a PANIC button on the screen or the calling function by shaking her phone. A message containing the geographical location is also send.[8]

G. Smart security solution for women based on Internet Of Things(IOT)

This is a device which contains software and hardware integration. Hardware comprises of a wearable Smart band & Software comprises of a mobile application. The Smart band is continuously connected to Smart phone which has access to internet. The application is programmed and loaded with all the required data. This generates a signal which is transmitted to the smart phone. The application has access to GPS and Messaging services which is preprogrammed in such a way that whenever it receives emergency signal, it can send help request along with the location to the nearest Police station, relatives and the people in the near radius who have app.[9]

H. Prototype of an intelligent system based on RFID and GPS technologies for women safety

Here an intelligent women safety system is developed using Radio Frequency Identification (RFID) and Global positioning system (GPS). The main idea here is using a active RFID tag with passive RFID reader to scan the information and this information is transferred to the AT89C52 microcontroller. Once the information is received by the controller, it sends the message to the contacts through GSM module and the location is tracked through the GPS.[10]

All above systems are based on mobile applications. When any women faces abusing situation, she don't have that much of time to get her phone and even don't have immediate access to application so that she can ask for help. Also systems are available which are integrated in hardware like Smart bands. But its functioning is depending upon the mobile application which must have

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continuously access to internet. But the proposed system is hand free device because it is already resembles in vehicles. And functioning depends on speech signals like individual generally screams in distress or groping situations.

III. PROPOSED SYSTEM

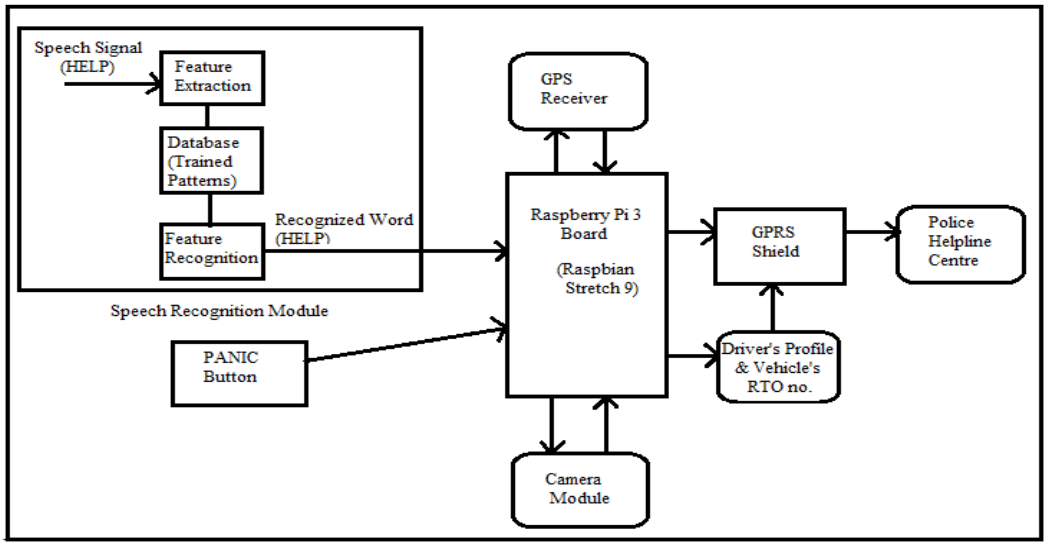
The proposed system is to design a portable device which resembles in vehicles. It consist speech recognition module to sense the input word HELP and also consists a panic button. During travel, if women or any person faces any distress or abuse will scream loudly 3 times HELP or in case can also press a panic button. As the speech recognition module recognizes the help word frequently 3 times on a particular frequency or panic button is pressed then immediately system will start clicking images. After clicking images, the snapped images, location of vehicle, profile of driver and vehicle's RTO number will be sent to nearest police helpline center.

Speech Recognition is major tasks in proposed system. The factors affecting Speech Recognition are Vocalization, Pitch, Tone, Noise, Frequency, Loudness, Speed, Accent and so on. And the system input is based on speech recognizing on particular threshold. So Speech Recognition requires efficient models, algorithms and programming frameworks to analyze the real-time data. The developments in parallel computing platforms open major possibilities for Speech Recognition systemsare: Increasing recognition accuracy, increasing recognition throughput, reducing recognition latency and reducing recognition training period..

After Speech or Event Recognition the system starts clicking images of situation in case of supporting and speeding an investation. So while clicking images the main factor raises is an effective Face detection. If because of any reason picture quality gets corrupted then no evidences can be useful. So,effective Face detection is another major part of system in case of collecting a real-time evidences of crime scene. Captured picture quality can be corrupted by additive Gaussian noise and blur. It is observed that, an adequate increase in picture quality can improve face detection performance. These results are going to be utilized to guide useful evidences data which regards with face detection task.

But another major problem arises while clicking images is the extremely varying lighting conditions,namely daytime and nighttime. An automatic system equipped with a camera on the dashboard of the system, will detect faces of image in poor lighting conditions also. The face detection will be independent of lighting conditions.When Speech Recognition module receives speech signal (HELP), it starts extracting features. Then trained patterns are matched from database. If patterns got matched, then features are recognized and we got output the recognized word (HELP). System has alternative input which is PANIC Button. In distress situation, Panic Button can also be a signal to system.

After effective Speech Recognition or Event Recognition by theRaspberry Pi 3 board installed, system starts functioning and effective images got snapped. Also GPS location is tracked. Then images along with additional data can be send to nearest Police Helpline Centre in case of seeking immediate response with the help of GPRS Shield. Additional data along with snapped images can be vehicles RTO number, drivers profile and GPS location. As soon as message is sent by GPRS Shield to nearest Police Helpline Centre, they can help to victim. As now police have complaint against particular vehicle and driver with evidences, they can investigateparticular matter.



Fig(1) : System Architecture

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A. Advantages:

1) Alone or night travelling becomes more secure.
2) Independent women will fully feel secure
3) If any victim do not register a complaint against any abuse or groping then aslso it gets known to police as they can investigate on basic level.
4) We provide Speech Recognition as well as PANIC Button for asking help indistress situation.

IV. CONCLUSION

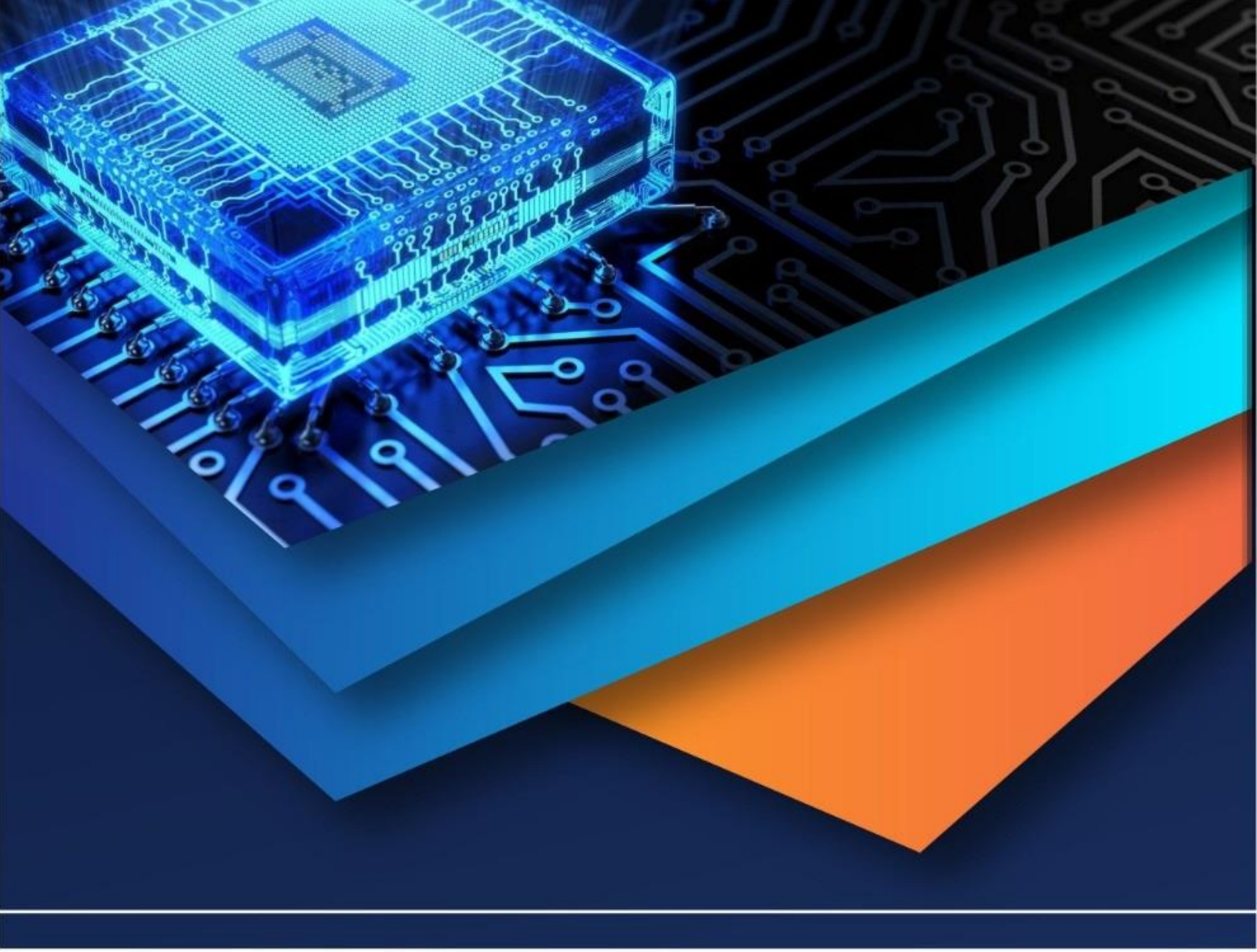
It can be concluded that the system helps to supports safe environment to women in the society, and allows them to work till late nights. Anyone before doing any crime against the women will be deterred as he has instilling doubt or fear of the consequences by knowing the security factors installed. The proposed system provides the tool for women safety in public transportation. The crime incidence can be captured through images and profile of vehicle along with location and captured images can be send to police and taken action.

It helps reducing the crime rate against the women. Women's security is a critical and social issue in today's world. The crime while travelling alone or late night against the women or individual can be now brought to an end with the help of real system implementation of proposed model.

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