Design and Development of Image Capturing Cab Security System

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Abstract- The proposed system describes about a safety system for women, built in public transport vehicles such as cars, buses, Cabs and auto-rickshaws as nowadays women are being molested, kidnapped and harassed by the drivers. Hence implemented electronic system is fitted in the vehicle which has display, keypad, GPS, GSM and embedded board to control and interconnect all of the above. As journey is started passenger can her guardian, friend or relative mobile no, he/she is going to get all the notifications of the female passenger journey. First of all the driver's name, mobile number, vehicle registration number and the secure pin generated by passenger is sent by SMS to the concern person of passenger . The proposed system consists of GPS to continuously locate the vehicle location and web cam to monitor inside the vehicle and send the location information along with image captured to IoT cloud in predefined intervals, from where the authorized user (guardian) will access the details with mobile application. The proposed system also consists of emergency button, when it is pressed the system will capture the details and send to the Police, hospital along with guardian.

Index Terms- Image capturing, GPS, GSM, Raspberry Pi, Image database

I. INTRODUCTION

The EICPS (Embedded Image Capturing and Processing System) was created with the goal of capturing an image and later using it to recognize a person. There were several in the past that could be overcome using biometrics, because every human being has a different and unique biometrictrait. Biometric identification has gotten a lot of press in recent years. Fingerprint, palm print, handwriting, facial pattern, and voice pattern are among the many ways utilized for such identification.

The following are some of the benefits of facial recognition. The acquisition of a user's face image can be done without their knowledge. It's a non-invasive system because it doesn't require any physical contact. Facial recognition is the most accurate method and has the lowest false recognition rate since it is extremely unlikely to find two people with similar face textures anywhere on the planet. Face recognition is a stable type of biometric identification because, unlike other biometric identification methods, it contains more features and does not change over time. Face recognition has been widely utilized in research and development to create a system for security, accessing an equipment, or access to a secured / prohibited place, among other things, due to these advantages.

EICPS collects data from the camera, which is then sent to the Raspberry Pi system and processed for storage in a database or recognition of the person using available face signatures. VLSI (Very Large Scale Integration) provides a large number of low-cost computing devices that utilize very little power. The design method for an embedded picture capture and processing system is proposed in this research.

 SystemHardware Design: The designedsystemhas thefollowingblocks
- Imagecapturingcamera
- RaspberryPiboard
- DVIcompatiblemonitors

<div align="center">II.   PROPOSED WORK</div>

Entireblockdiagramof thedesignedembedded imagecapturingandprocessingsystemis shown inFigure 1.
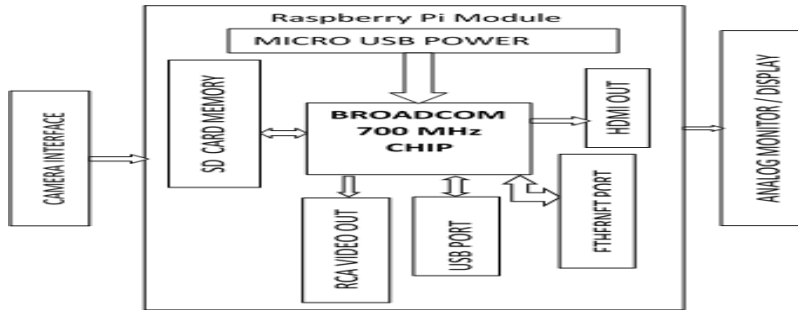

<div align="center">Figure.1. Block diagram of embedded image capturing and processing system</div>

Raspberry Pi Board: The central module of the embedded image capturing and processing system is Raspberry Piboard. Main parts of the Raspberry Pi board are main processor, memory to store programs and images, powersupply,HDMIOut,Ethernet   port,USBports   andabundantglobalinterfaces. RaspberryPiboardanditsperipheralsareshown in figure 2.

Main Processing Chip: The main signal processing chip in Raspberry Pi board is a Broadcom 700MHz Chip witha 32 bit ARM1176JZF-S RISC processor. It has very rich peripheral. This chip connects the camera unit and alsocapturesthe images through thecamera
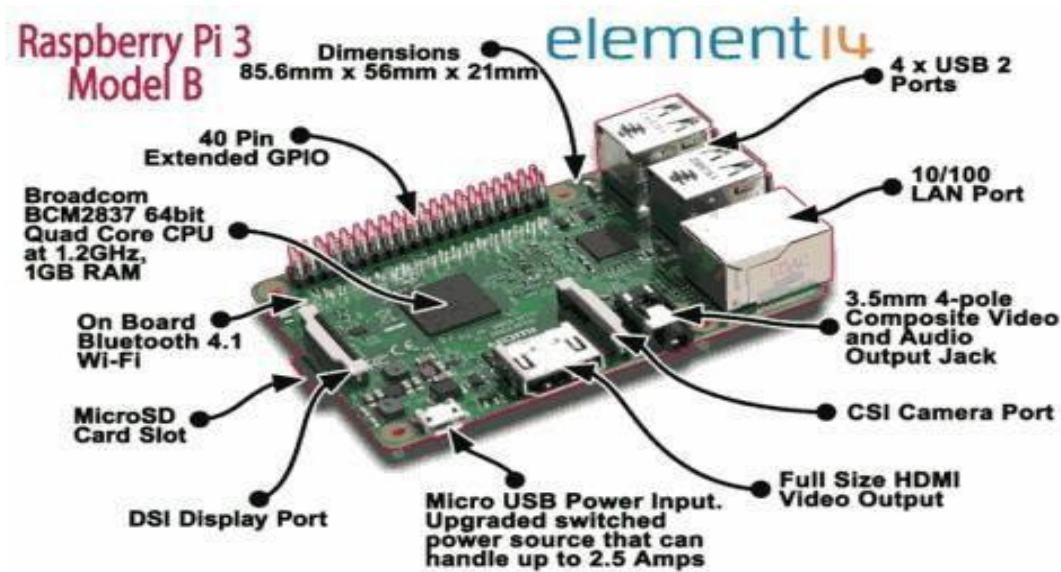

Figure.2. RaspberryPiBoard

Memory: The Raspberry Pi board does not have a built in memory like hard disk. This made us to depend on anexternal SD card for storing the operating systems (Linux based OS) and application programs. This Raspberry Pimodule hasaMicro SDcard adaptor toinsertthe SDcard memory.

Interfaces: Interfacesavailableinthe RaspberryPiboard are

- 2USBports
- HDMIout
- Astandard RCAcompositevideo
- Lead
- Ethernetport
- Audiolead
- SDcard Slot

USBports areusedtoconnectkeyboardandmouse. HDMIoutisusedfor connectingHDTVs to viewthefaceacquired while training the system. If needed an analogue display can also be interface using standard RCAcomposite video lead. Ethernet port is used for networking for updating and getting new software for Raspberry Piboard.Audiolead can be used for hearingthe stereoaudio.

CameraInterface: Camerainterfaceconsistsoffollowingmodules

- Programmablecontrolsforframerate
- 32bytesofembeddedonetimeprogrammable(OTP)memory
- Digitalvideoport(DVP)paralleloutputinterface
- ExcellentImagingandvideocapturing.
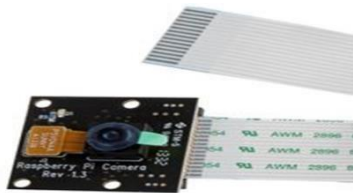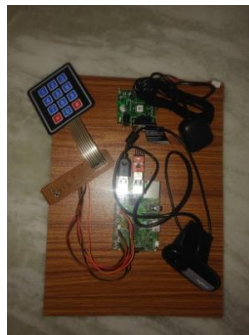

Figure.3. Camera Board Working of the System

Figure.4.Hardware Kit

It is dividedinto twoare

- Trainingmode
- Recognitionmode.

Thisis shown infigure 4.Akeyin thissystemis usedaninputtoselect anyoneofthesemodes.

Training Mode: Inthismode, thesystemiscaptures theuser'simagesin ordertogeneratea faceimagedatabase.

Images are captured by the camera which is later sent to the Raspberry Pi board using CSI flat cableconnector.AHDMIcompatibleDisplayisusedheretoshowtheuseraboutthecapturedimagewhichinturnstoredin the face image database. Like this, a large number of images of different users are captured and a face imagedatabaseiscreated and stored inthe SDcard memory.

Recognition Mode: In this mode, the images which are captured from the camera module are processed andcompared with the face image database available in the SD card memory. Here Eigen face algorithms are used forface recognition. Once the images are recognized with the face image database, the system gives authentication fortheuserotherwiseitdeniesthe access.

Merits

1. The secure system against various known attacks.

2. Deter Crime: This is the biggest and the most obvious benefit of installing security cameras. Once they are placed, you will be able to see their effect on people almost immediately. Even if they are placed discreetly, you will start feeling a sense of security, which is priceless.

3. Monitor Scenarios and Activities: Extremely helpful as they enable you to monitor the activities of people visiting your home and office as well as the goings-on at these places. This is a great way to detect suspicious people and keep tabs on their activities.

4. Gather Evidence: This is particularly helpful when dealing with a legal scenario, wherein the eye witness may have forgotten a certain important detail or may be providing with an accurate account of what really transpired. With a security camera, the legal authorities can see the series of events as they really unfolded.

5. Arrive at the Right Decisions: Incorrect, inappropriate or fabricated claims made by customers or other authorities can be sorted out when you make your security camera your ally.

De-Merits

1. Requiresuninterruptedpowersupply.

2. **CostlyAffair**:Whiledummycamerasmaynotbeexpensive,therealone'scostshundreds, even thousands of dollars depending on the features and the number ofcamerasandmonitoring systemsyou buy.

   TheycanbeVulnerable: tech-savvy criminals might have understood the technologyandworkedoutwaystodisable/disconnectthemfromtheirpowersource.Plus,ifhedetectsyourcameras asfake/dummies,theycanbeutterlyuselessinanycrimeprevention.In worst cases, hackers can play havoc withyour security camera systemby using the Internet and use them to spy on you instead. This makes security camerasvulnerableto damageand/or misuse.

6. **Can't Stop Theft:** Cameras enable users to record footage for later viewing, and to helpnab criminals, and receive justice from the law. They cannot, however, stop a crimewhen it is in progress. They do not alert neighbors or the police like an alarm systemwould. This means that you will incur losses even as you run to the court, makeinsurance claims and reorder stolen inventory, which may no longer make you feelabsolutelysafeandevencauseyou to losefaith in them.

III. CONCLUSION

It can be concluded that the system helps to supports safe environment to women inthe society, and allows them to work till late nights. Anyone before doing any crime againstthe women will be deterred as he has instilling doubt or fear of the consequences by knowingthe security factors installed. The proposed system provides the tool for women safety inpublic transportation. The crime incidence can be captured through images and profile ofvehicle along with location and captured images can be send to police and taken action. Ithelps reducing the crime rate against the women. Women's security is a critical and socialissue in today's world. The crime while travelling alone or late night against the women orindividual can be now brought to an end with the help of real system implementation ofproposedmodel.

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