

ACCIDENT SENSING AND BROADCAST USING RFID

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Abstract- In recent times due to the increasing traffic we have a lot of accidents taking place and we propose this project to prevent the loss of lives by increasing the scope of accident recovery management. In this project, we will detect the accident using RFID sensors and then broadcast to a web server. Using this web server we can detect the location of the accident. The goal of this project is to detect the location where accident took place and project the details of accident to nearby hospital to dispatch ambulance, to the nearest police station and to divert traffic preventing more accidents to happen in that particular location. In this project RFID sensors play prominent role, which can track nearby field for any existence or entrance of RFID tags which are attached to the vehicles. RFID tags are used as crash sensors which triggers the wireless mesh network in case of occurrence of any accident nearby. The mesh network send a service request to public safety forces after examining and assessing the occurrence and severity of the accident.

I. MOTIVATION AND BACKGROUND

In this project, we are addressing the accident sensing technique. The main motivation for Accident Sensing and Broadcasting using RFID is reducing the loss of lives of vehicle drivers and co-passengers, and even eliminating the excessive cost of traffic collisions. According to World Health Organization, road accidents annually cause approximately million deaths worldwide. This number can be reduced by deploying this accident sensing and broadcasting technique.

Here, we use a continuous tracking of traffic condition using RFID near field system. In this system, as soon as accident is detected a service signal is triggered to service station to verify between congestion or accident and after validation is done by service station, an emergency signal is given to public safety forces urging them for an immediate response and recovery, the second part of the system automatically tracks the accidents victims using a PTZ (Pin Tall Zoom) camera's face recognition technique, after recognizing victim the health data is retrieved from the database and the health condition of the victim is informed with required medicines and health precautions.

II. CHALLENGES

- The RFID reader should be placed under the roads to detect an accident.
- It is a complex job to keep RFID sensors everywhere.
- The cost of PTZ (Pin Tall Zoom) camera would typically cost about \$2000 to cover a region of 1000 meters.
- Range of RFID plays a prominent role. The RFID readers needs to cover highest region as much as possible in turn reducing the number of readers.
- Broadcasting requires network even if our RFID detected. We need to have a good network in that region to send the signal to public safety forces.

III. PROPOSED SOLUTION

We intend to work on already proposed project accident detecting using RFID and we would like to enhance the system working capability by adding an automatic broadcast system and patient monitoring system.

The protocol we have envisioned works on the above mentioned approach. we would concentrate mainly on our extensions.

IV. IMPLEMENTATION TOOLS USED

Hardware Tools Used:

- EM-18 RFID Reader Module
- Raspberry Pi

Software Tools Used:

- Python version 7.1.4
- HTML
- Raspbain – OS
- Minicom
- Scrot
- Flask

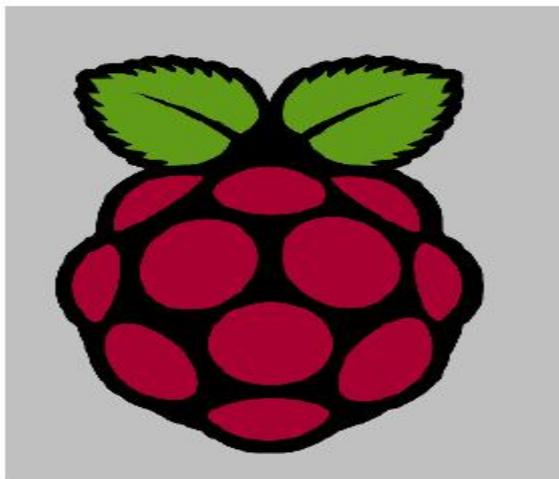
We have designed a prototype using EM-18 RFID reader module and Raspberry Pi of the model B+.



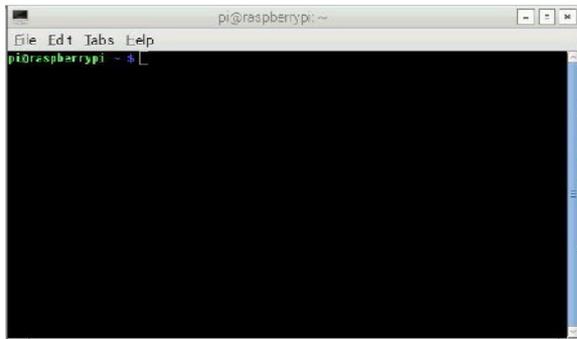
Raspberry Pi



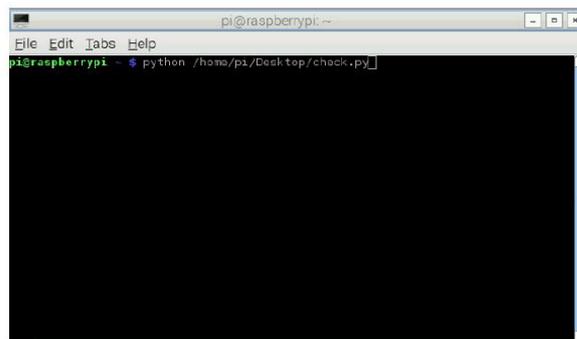
We have installed Raspbian on Raspberry Pi



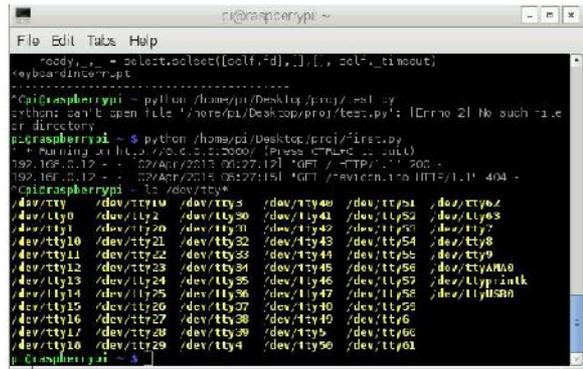
And we run all the scrip's on the terminal which is a command terminal for the Raspbian



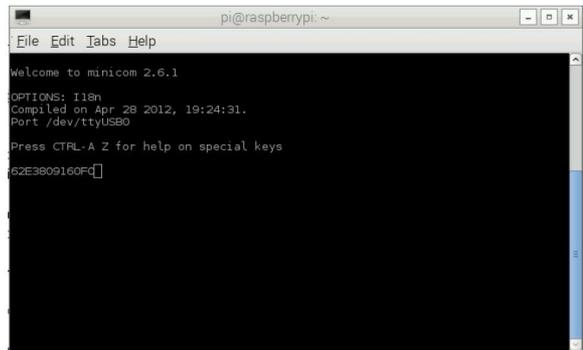
And we have installed Python and Flask.



And we have connected the EM-18 RFID module using PL2303 RS232 to USB converter and we have analyzed the 16bit data using minicom.



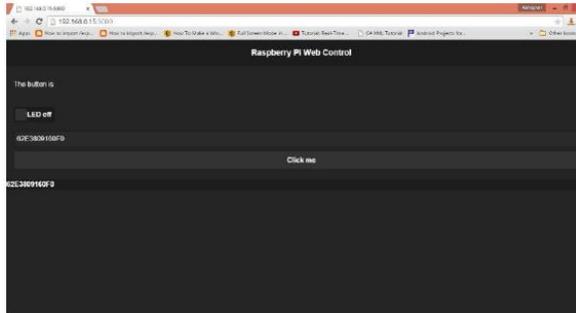
Also we have analyzed the 16bit data



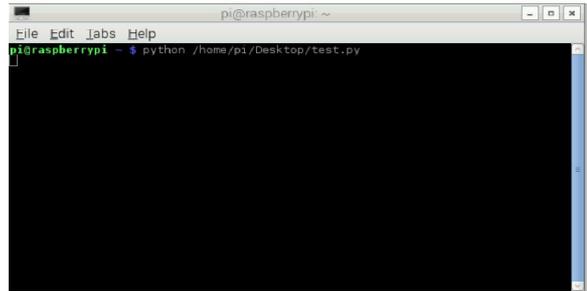
Further we ran a pilot server program where the server says as follows when the URL of the server is entered



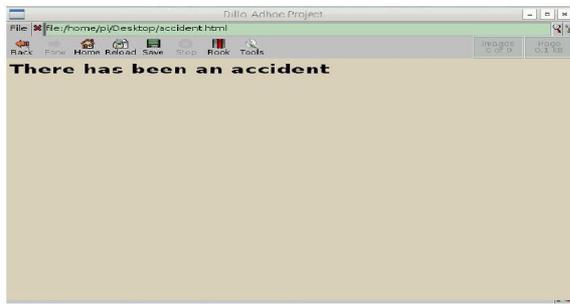
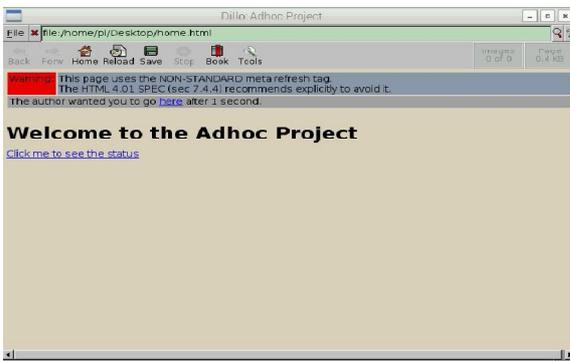
This showed that the server is posted and is working successfully, Hence the server is working. We tried to send the 16bit data from the server to client



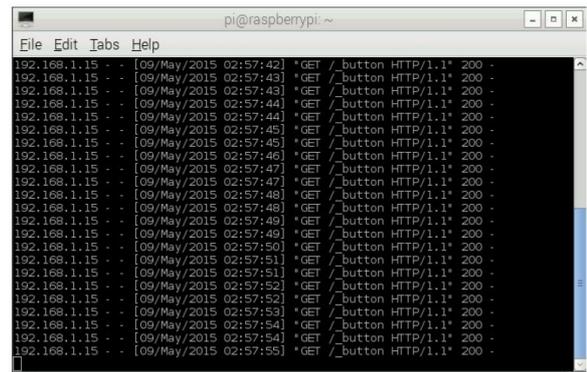
The simultaneous Rfid Detection



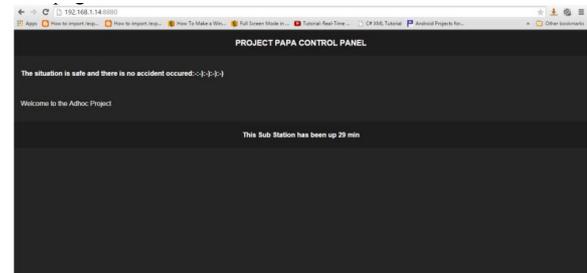
Few HTML pages which has to be invoked



Connection of base station to server

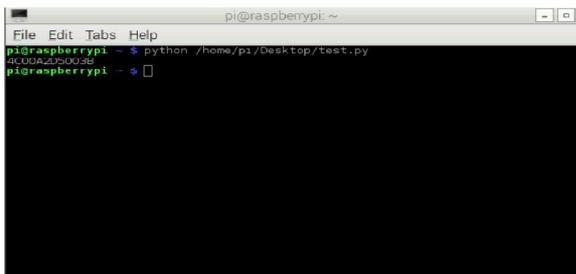
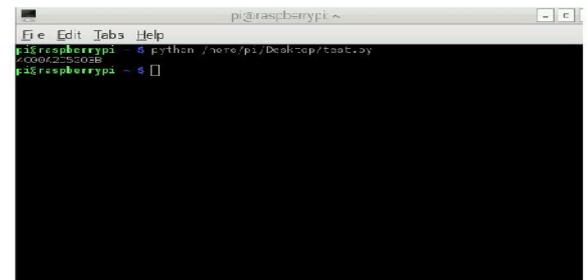


Webpage of the base station



We developed a python code to continuously track RFID presence and as soon as the long presence of RFID is detected and an UI is invoked via a HTML page. A surveillance system which is a part from this tracking system need to be developed, which sends health cautions and details about the victims. The uplink of the server

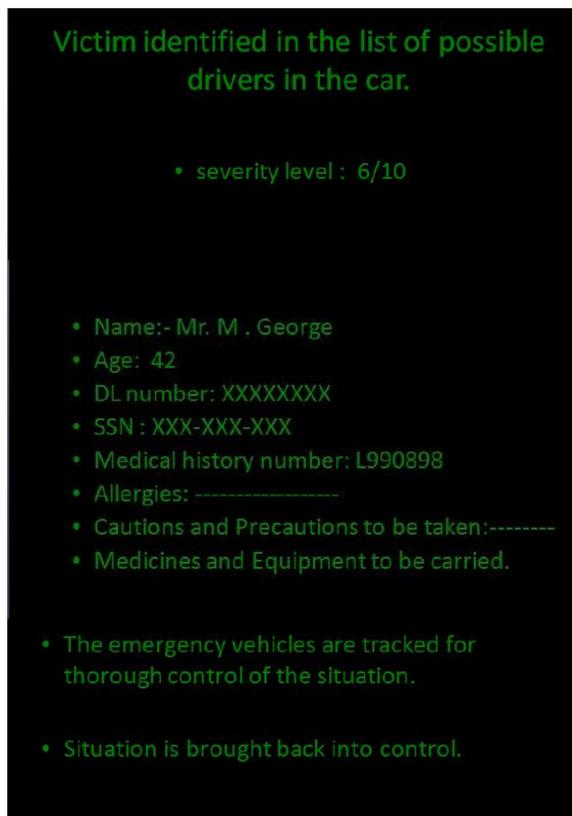
RFID detection



Change of the webpage



Patient details in the base station sent to public safety services



Working of the whole model:

The server is activated using the python code and the url is made available to the web, simultaneously rfid is tracked continuously as soon as the rfid id is detected the variable value is sent to the webpage using json (ajax request).and the status of the webpage is change to danger.

V. LIMITATIONS

- we are not using an auto Focus Camera for the face detection.
- For immediate rescue a trickle of data must be robustly maintained as this may become a major constrain when the person is an illegal resident.
- The surveillance camera that we use is a normal camera that can cover only a certain range of area which is limited.

VI. FUTURE SCOPE

- Automatic Drone rescue system
- The PTZ (pan tilt zoom) camera could be used instead of using the normal camera for surveillance as it can cover a wide range comparatively.
- Inter communication between vehicles can help in understanding the road safety better. By using few protocols like Bluetooth we can know the diversions in the roads also the accident safety warnings etc.

CONCLUTIONS

We would like to conclude our project by stating the accident id detected and the diagnosis steps are flowed carefully .The important characteristics if the project are firstly considering the size of the RFID readers and tags which comes handy, the RFID tags are fixed to vehicles. The cost of these RFID readers and tags are very low and affordable. Now considering the weight, the weight of these readers and tags are very light (i.e., RFID readers weight from 400 to 500 grams, tags are very light under 200 grams).

REFERENCES

- [1] Al-Khateeb, K.; Johari, J.A.Y., "Intelligent dynamic traffic light sequence using RFID, " ICCCE 2008 International Conference on Computer and Communication Engineering, 2008., Volume, Issue, 13-15 May 2008.
- [2] TranSystems corp., "Statewide Transit Intelligent Transportation Systems Deployment Plan, " Iowa Department of Transportation, May 2002.
- [3] M. Antonini, M. Barlaud, P. Mathieu and I. Daubechies, "Image Coding Using Wavelet Transform" IEEE Trans. Image Processing, vol.1, no.2, pp.205-220, 1992.
- [4] Abadpour, S. Kasaei, "A new principle component analysis based Colorizing method, " in: Proceedings of the 12th Iranian Conference on Electrical Engineering (ICEE2004), Mashhad, Iran, 2004.
- [5] Rovid, A & Melegh, G., "Modeling of road vehicle body deformation using EES values detection, ". Proceedings of the IEEE Conference on Intelligent Signal Processing, pp. 149-154, 2003.
- [6] Kubota, S., Okamoto, Y., and Oda, H., "Safety Driving Support System Using RFID for Prevention of Pedestrian-involved Accidents, " 6th International conference on ITS Telecommunication Proceedings, 226-229, 2006.
- [7] VII. RFID Handbook: Fundamentals and Applications in Contact less Smart Cards Identification, 2ed, Klaus Finkenzeller, Wiley, 2003.

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