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ALL IN ONE WIRELESS SPEEDOMETER WITH NFC FOR TWO WHEELERS

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ABSTRACT

Internet of Things (IOT) plays a vital role in connecting the surrounding environmental things to the network and made easy to access those un-internet things from any remote location. Generally people are facing many problems on driving two wheelers such as security and speed control of bike, accident avoidance system .In this system deals with the design development of a wireless speedometer with NFC to provide theft control system for automobile and to improve the accuracy of speed in two wheelers. This system uses an embedded system based on sensor, GSM and GPS technology to control the accident on two wheelers.

Keywords - *GPS and GSM, NFC, Internet of Things, Sensor, Speedometer*

I. INTRODUCTION

The IOT is a very important topic in field of engineering circles, core industry and has become headline news in both the specialty press and the popular media. This technology is embodied in a wide spectrum of networked products, systems, and sensors, which take advantage of advancements in computing power, electronics miniaturization, and network interconnections to offer new capabilities not previously possible. IOT systems like network vehicles, intelligent traffic systems, and sensors embedded in roads and bridges move us closer to the idea of smart cities, which help congestion and energy consumption. IOT technology offers the possibility to transform two wheelers, agriculture, industry, energy production and distribution by increasing the availability of information along the value chain of production using sensors. [1, 2]

The existing design of wired digital speedometer using speed sensor is utilized [3]. However, a few demerits over the sensor results in improper speed measurement resulting in huge variation of speed. To develop highly efficient digital wireless speedometer is design and the values are compared with analog speedometer readings and a better solution is obtained.

Nowadays usage of bike is increased more and to provide security is a greater challenge. The safety of bike riders is having high impact on our society. NFC (Near Field Communication) is a very short range wireless communication technology. NFC is an automatic and user friendly way of setting up connection and exchanging the information between mobile handsets and other devices by just keeping them side by side. It supports the use of mobile handsets by touch-based interaction. This system is used to prevent the vehicle from being stolen. [4, 5]

Drunk and drive of bike is one of the major causes of the accidents on road. Accident and Alcohol detection system in two wheelers is designed as an advancement of safety. In this project, wireless speedometer with NFC and mobile charging is framed. The formulated work is to be carried out based on the following features:

1. To build up a digital wireless speedometer system for accurate speed measurement in two wheelers.
2. To build up a NFC system for prevention of bike stolen and detection of the two-wheeler mishaps.
3. To support the medical care rescue team to arrive at the accident spot without delay.
4. A prototype of this system to be implementing on hardware using Arduino kit and the performance will be evaluated on two wheelers.

II. RELATED WORK

In the existing system, a vision based accident and alcohol detection system in digital speedometer and NFC for security system can be used in separate area.

1. NFC (Near Field Communication) can be used in various types of application in everyday. It is short range wireless communication technology which supports the use of mobile handset by touch based interaction.

2. Alcohol detection is done using smart helmet system. It is used to automatically check if the person who rides the bike has worn the helmet and if he/she is non–alcoholic while riding.

3. Vehicle tracking and locking system is developed using GPS and GSM modules. GPS system is used for positioning or tracking purpose and GSM is mainly used for sending and receiving messages.

The drawback of these system are uses of digital speedometer with detection system and NFC in separate domain create more cost, consumption of power is more and efficiency is also very less in vehicular application.

III. PROPOSED WORK

To overcome the drawbacks in existing system, a new system is designed which consist of following phases are

- Wireless smart speedometer and NFC phase.
- Alcohol detection phase and Accident detection and Alert phase.

Each phase is designed for a specific operation. The overall block diagram of this proposed system is showed in Fig.1

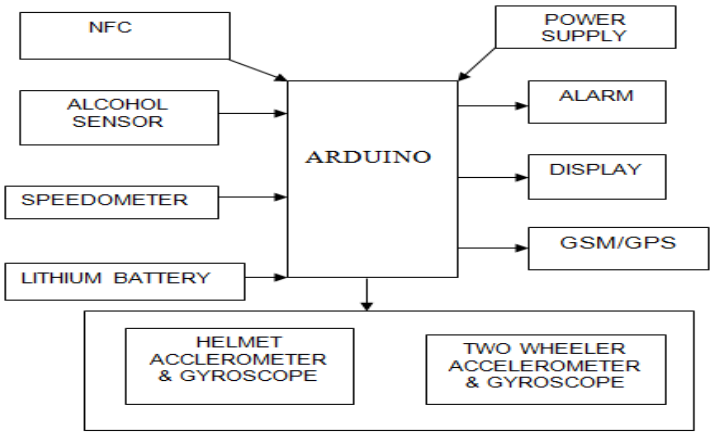

Fig 1: Overall block diagram

1) WIRELESS SMART SPEEDOMETER AND NFC

In this prototype a Hall Effect gear tooth sensor is used for speed measurements. This sensor generates square pulses as an output. Either falling or rising edge is taken for calculation of speed. The output pulses from this sensor are moved to the microcontroller via transmitter and receiver which provide wireless connectivity. From the Arduino microcontroller, the current speed is updated automatically for every second and it is displayed in LCD screen.

NFC is a very short range wireless communication technology. It supports the use of mobile handsets by touch–based interaction. This is an automatic and user-friendly way of setting up connections and exchanging the information between mobile handsets and other devices by just keeping them side by side. This system deals with development of a theft control system for an automobile, which is being used to prevent the vehicle from being stolen. [9]

When NFC mobile is brought near to NFC tag (that is connected to microcontroller) the NFC tag fetches the IEMI number of NFC mobile. If the IEMI number matches with the IMEI or International Mobile Equipment Identity in the code (that is stored in microcontroller) then ignition system will become on through relay and it is used for security purpose. The block diagram of this phase is shown in Fig 2.

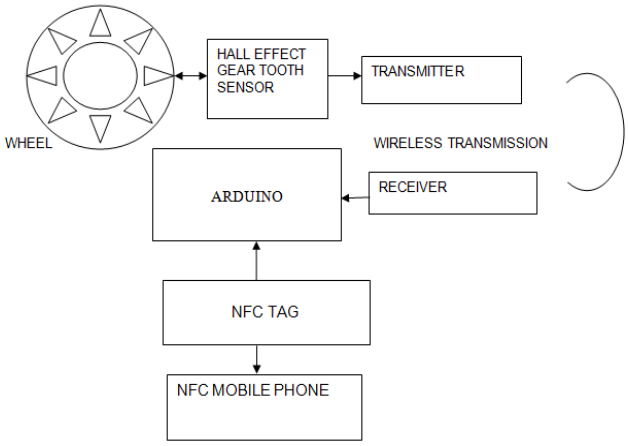

Fig 2: Block diagram of wireless speedometer and NFC

2) ALCOHOL DETECTION, ACCIDENT DETECTION AND ALERT PHASE

In this phase, alcohol detection is achieved by providing alcohol sensors on the front panel just above a speedometer .It senses the amount of alcohol consumed by individual [6, 7]. With the help of these measurements, microcontroller checks the condition that whether the person is consuming more than 60%, at once an alarm gets activated and the alarm can be turned off only by the non- alcoholic person. The layout of this phase is displayed in Fig 3.

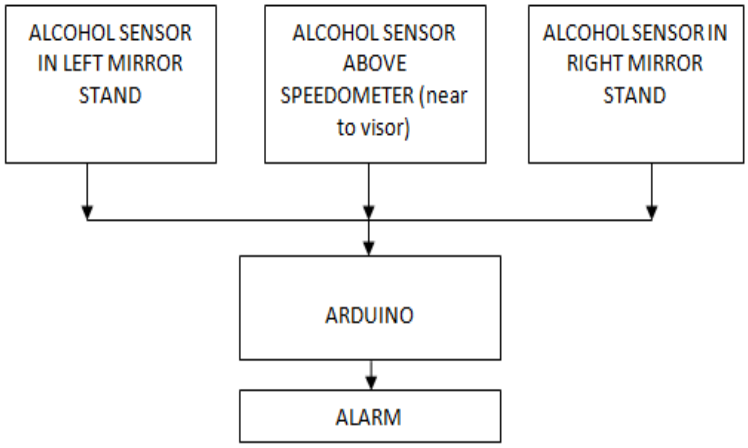

Fig 3: Block diagram of alcohol detection phase

The proposed system is again divided into two phases: the detection phase and notification phase. The detection phase system is made up by integrate in the two triple axis accelerometer with a gyro sensor. These are placed in the helmet and bike. Here the two sensor senses high variation in the acceleration or deceleration during an accident.

The gyro sensor is used to determine the orientation of a two wheeler from this data the accident is confirmed and the GSM module to the emergency recovery crew [8]. The block diagram of this phase is shown in Fig 4.

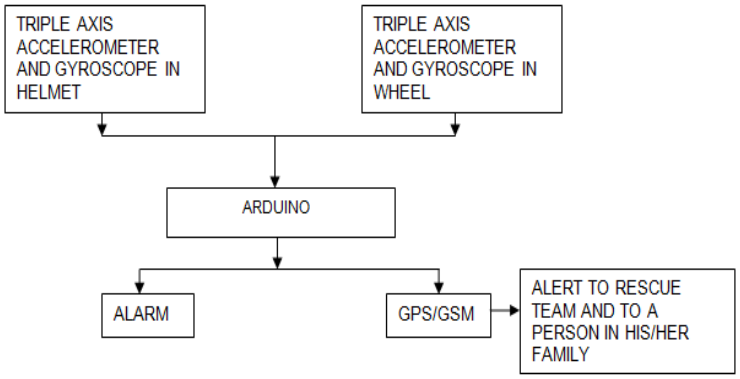

Fig 4: Block diagram of alcohol detection and alert system

IV. EXPERIMENTAL SETUP

In this section, we present our solution in the form of a hardware device that meets objective:

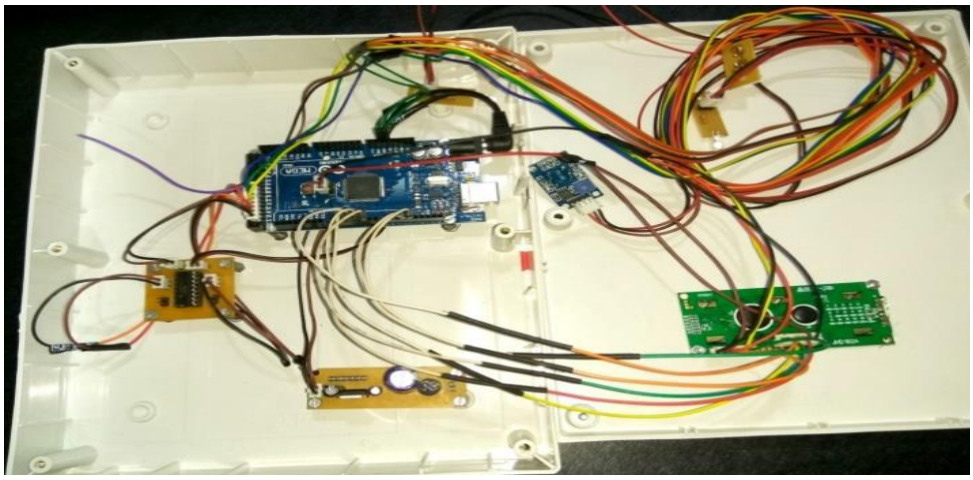

Fig 6: Experimental setup

V. CONCLUSION

In this project, low cost and highly efficient components are used. The vital information such as security, location of the accident for the emergency recovery crew, alcohol detection is provided. By this method bike will be much secured, a person can be protected from accidents, even the accident occurs that person will be assured to get medical care even at remote location or at late night. This is the main advantage over other project. The presented

wireless system for two wheeler security and monitoring takes advantage of the unique features of NFC chip, custom-developed sensors and potentially low cost in manufacturing, installation and maintenance are assured to be better.

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