NFC BASED SUPER SECURE BIKE

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Abstract - *NFC (Near Field Communication) 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 the design development of a theft control system for an automobile, which is being used to prevent the vehicle from being stolen. The system uses an embedded system based on Global System for Mobile communication (GSM) technology. The designed & developed system is mounted in the vehicle. If the vehicle is stolen, the complete information of the current location of the vehicle is passed on to the user which is in the form of the short message service using Global Positioning System (GPS) and GSM module.*

Key words: NFC, LCD, SENSORS, GSM, GPS

1. INTRODUCTION

The main aim of the system is to construct a control system that enables the complete control of the interface it is based on.

Our main motive is to get the co-ordinates of the vehicle through Short Message Service (SMS), to effectively receive and transmit data via SMS, to eliminate the need of being physically present in any location for security of the bike and use of NFC(Near field communication) for security of bike. The system is aimed to design and develop an advanced bike locking system in the real time environment. The user will send a status message from his mobile handset and it will check for the user's authentication when the GSM module gets the message, and if found to be valid, it will immediately forward the details of the locations like the latitude and the longitude using GPS device to the user. Also if it is detected that the bike is stolen SMS will be sent to the user/owner in an interval of 10 minutes with location so as to track the bike and subsequently the thief.

2. LITERATURE SURVEY

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

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 [2]. 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 [3].
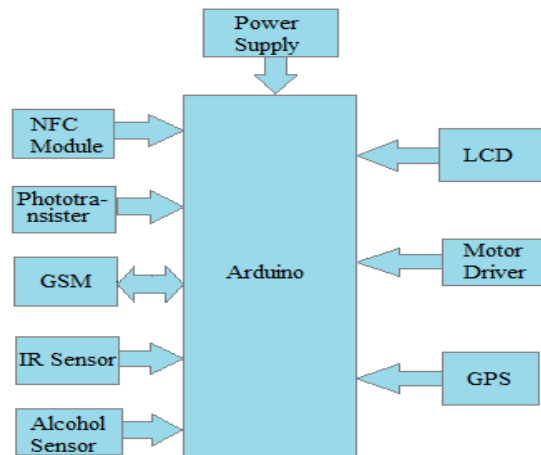
3. BLOCK DIAGRAM OF PROPOSED SYSTEM

Fig 1: Block Diagram of NFC Bike

3.1 NFC Module

Near Field Communication is a short-range high frequency wireless communication technology which allows the exchange of data between devices over about a 10 cm (around 4 inches) distance. The technology is a simple extension of the ISO/IEC 14443 proximity-card standard (proximity card, RFID) that combines the interface of a smartcard and a reader into a single device. An NFC device can communicate with both existing ISO/IEC 14443 smartcards and readers, as well as with

other NFC devices, and is thereby compatible with existing contactless infrastructure that is already in use for public transportation and payment. NFC is primarily aimed at usage in mobile handsets..

NFC technology is currently mainly aimed at being used with mobile phones. There are three main use cases for NFC.

- Card emulation: The NFC device behaves like an existing contactless card.
- Reader mode: The NFC device is active and read a passive RFID tag, for example- for interactive advertising.
- P2P mode: Two NFC devices can communicate together and exchange Information.

3.2 Alcohol Sensor

The MQ-3 alcohol sensor detects the concentration of alcohol gas in the surrounding air. It then outputs its reading as an analog voltage. The Sensor has a range of 0.05 mg/L to 10 mg/L. The legal BAC ("Blood Alcohol Content") legal limit in India is 0.03% or 30 µl alcohol in 100 ml blood. The sensor is very sensitive to alcoholic content present in air and has an appropriate range of detection. The response time for measuring the alcohol content is quick and it can operate between temperature ranges of -10°C to 50°C. The MQ-3 sensor meets the criteria that are required to allow it to serve as the sensor for this project.

When a bike user exhales with helmet on, the alcohol sensor that is placed inside the helmet, it detects any alcohol present in their breath is oxidized to acetic acid, an organic acid. The resulting chemical reaction produces an electrical current. The difference of potential produced by this reaction is measured, processed, and displayed as an approximation of overall blood alcohol content.
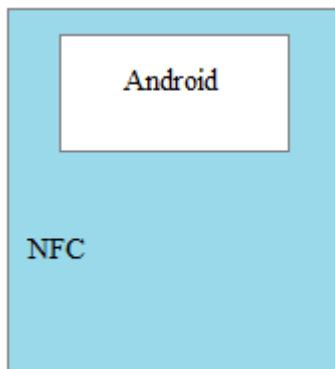
4. USER SIDE

Fig 2: User side

5. FLOW OF WORKING

Android mobile in built NFC -- Design one app.
Helmet side-- IR and battery.
Dashboard side-- Keypad, NFC reader, Relay, GSM, GPS, photo transistor, alcohol sensor, LCD.

1. Condition to start the bike: When NFC mobile is brought near to NFC tag(that is connected to the controller), the NFC tag fetches the IEMI number of NFC mobile. If the IEMI number matches with the IMEI in the code (that is stored in Arduino) then ignition system will become on through relay. Person other than the bike owner, can access the bike when he/she brings his/her NFC mobile handset near to NFC tag which fetches all the information and send this information to the owner. If the owner gives permission to access the bike then only the person desiring to ride the bike can get access to bike.

2. For helmet detection--- If IR sends signal to Photo transistor then bike will start.

3. Theft control-- If stolen, bike owner gets message after every 10 min with the location of the bike   (that is possible because of GSM and GPS kit).

4. Facility to stop bike-- When the bike gets theft, the user sends SMS to the bike and bike will stop instantly. We are placing IR sensors on the bottontip of front suspension. At the time when the bike is in off state, if IR signal gets cut due to forcible pushing of the bike the controller detects this action as theft and send the SMS to the owner saying that the bike is being stolen and continuously sends the location of the bike to the owner at an interval of 10 minutes. If user wants to stop his bike then he has to send only a STOP SMS to the bike and the bike will stop.

5. Facility in app-- Owner and other users of the bike have to register using the mobile app. Only after the registration, user can start the bike. Owner has a facility that he/she can see the location of his bike anytime.

6. EXPERIMENTAL PART

In this section, we present our solution in the form of a hardware device that meets the objective:
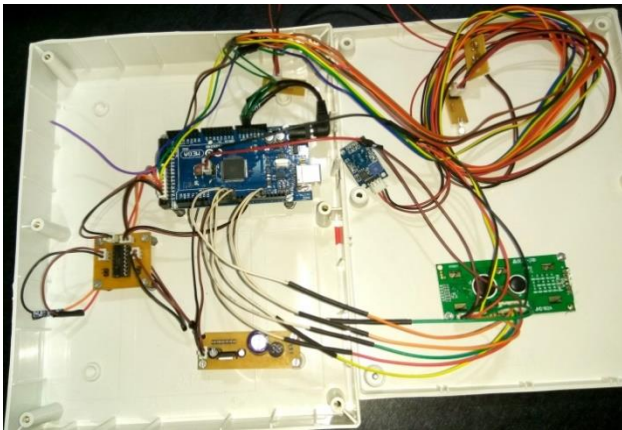
Fig 3: Experimental Setup

7. FUTURE SCOPE

1. Limiting the speed: Young bikers have habit to ride the bike with high speed. Due to which cases of accidents are increasing. We can develop a system such that if biker increases the speed over a predefined limit the bike or the system will send a SMS to his/her parents, police and bike will stop for some time.

2. Instruction to change the Gear: While riding a bike, it is often that the rider has to change the gear according to the road condition, traffic conditions etc. But sometimes rider neglects to change the gear due to which bike may get damaged. So we can develop the system such that if there is a need to change the gear the system will show a message on the digital display to change the gear (increase or decrease).

3. One hand driving: Sometimes riders ride the bike with one hand. It may increase chances to meet with an accident. We can develop the system such that it will detect one hand drive and if detected bike will stop.

4. Triple seat detection: Bikes are mainly two sitters. But people go with more than two seats. So it is difficult for the rider to control the bike and increases chances of accident. We can develop the system such that it will detect the load on the bike. If the load is increased over the predefined value of load, the bike will not start in any case. The predefined value is set by the designer.

8. SUMMARY

In this paper, we focus on security of the bike using NFC. We develop a system that secures the bike from thefts. An accident is a specific, unexpected and unintended external action which may occur at any time and place with no apparent and deliberate cause. So we develop a system that detects whether the rider has worn the helmet using helmet detection technique and also if he/she is non-alcoholic using alcohol detection technique for his/her safety. We have also added some extra features such as toing, fuel theft to secure the bike from the thieves.

9. REFERENCES

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