International Research Journal of Engineering and Technology (IRJET) e-ISSN: 2395-0056
Volume: 07 Issue: 08 | Aug 2020 www.irjet.net p-ISSN: 2395-0072

Automation System for Hybrid Vehicle

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Abstract - *The proposed paper is based on the security of bike as well as rider by immersing extra features in the bike. This helps to protect our bike against lift away, as well as roll away and ride- away theft. This project developed under the safety precautions for the electric vehicle as well as rider. The features in built like RF wireless unlock system, side stand indicator, Battery percentage and battery temperature sensor. These whole systems accessible through Arduino Pro Mini. This is an automatic and user-friendly way to providing efficient security for the electric vehicle.*

***Key Words*: Two-wheeler, RF module, Arduino Pro Mini, LM35 Sensor.**

1. INTRODUCTION

Automation is the creation of technology. It performs the tasks which were previously performed by the human. In today's world it is commonly noticed that two wheelers are the most commonly used locomotives. As day by day, population grows on increasing, there are heavy demands for the two wheelers. The motive of our project is to smart bike monitoring system that will help in saving human lives and provide security for bikes. Here four systems are involved these are RF wireless unlocks system, Side stand indicator, Temperature sensor, Battery level indicator. RF transmitter and receiver is used here to communicate between the authenticated person and electric vehicle and operates within a short range. LM 35 analog temperature sensor used to check the heat of battery to avoid the damage and alarm system merge to avoid possibility of accident when stand is in released position. Charging and discharging of battery according to growing and degrading of battery voltage is as we know that side stand plays a very important role while the vehicle is in the rest condition. It may cause the death of riders or maybe some bad injuries. In a country like India, this reason causes the increment rate of the accident. This rate is increasing day by day so it is necessary to take up some preventive measures to avoid an unwanted accident. So, to overcome on this problem our side stand indicator system is advantageous.

2. Literature Survey

In [1] this paper, Radio frequency identifications Technology is used. Two-wheeler is unlocked by transmitting the signals in form of radio waves to receiver.

In [2] this paper, side stand indicator system alerting owner stand is in released position by alarming the buzzer.

In [3] this paper, owner stay updated with charging and discharging of battery and aware where to stop.

In [4] this paper, updates about heat of battery during running condition are secured by owner with help of temperature sensor. For this purpose, LM35 analog temperature sensor is used.

3. DESIGN PROCESS

3.1 BLOCK DIAGRAM

The block diagram of automation system is shawm in figure.1. It consists of four automation systems such as Radio frequency identification wireless unlocks system, Side stand indicator, Temperature sensor and Battery level indicator. This whole automation system is based on Arduino pro mini shown in figure below. Radio frequency identification wireless technology for unlock the bike, in which tag connected to the bike and reader carried by the authenticated person. Reader will send the signal in form of radio waves to the tag in range of 10 meter around. Tag will capture the signal and process further to keep bike unlock. LM35 analog temperature sensor keeps in contact with the main battery to sense the heat or temperature of battery and which is indicated by 16×2 LCD display in degree Celsius. Also, the battery charging and discharging level is indicated on LCD screen according to growing and degrading of battery voltage.

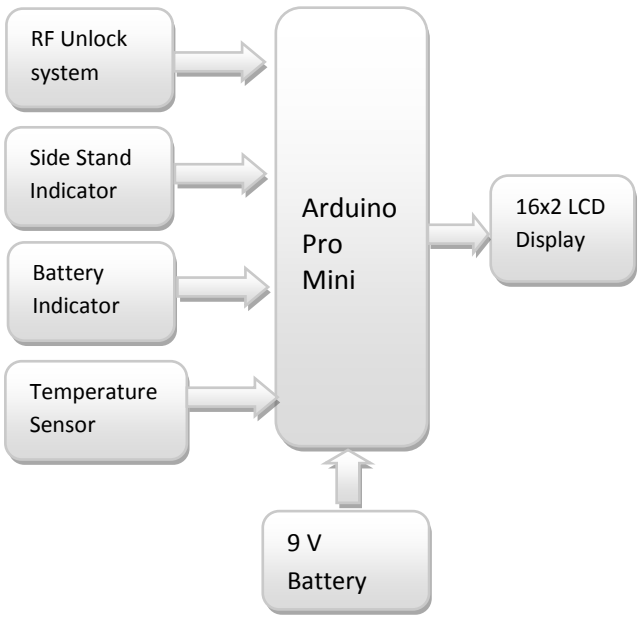

Fig -1: Block Diagram of Automation System

Last system is the side stand indicator, whenever side stand is open position buzzer will beep to alarm after comes in contact with contact switch buzzer will stop to beep.

3.2 Software Implementation:

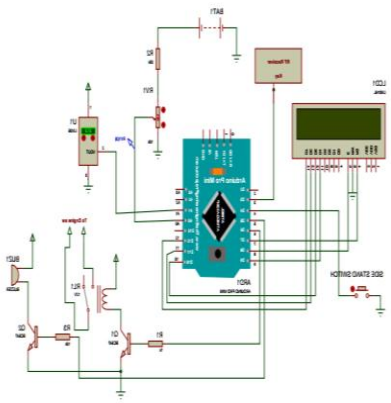

Fig -1: Proteus Design

These four automation systems which will be programmed through Arduino Pro Mini software. The Arduino Pro Mini board is designed such a way that it uses microprocessor and controllers of different types. These board have digital and analog I/O pins which are used to interface with other circuits. It is typically programmed using programming language C and C++. Analog inputs of four systems which implemented in bike serve to the Arduino Pro Mini for the further operation to indicate digital outputs on LCD screen.

3.3 Hardware implementation:

1. Temperature Sensing Unit: For sensing the heat or temperature the LM35 temperature sensor along with Arduino Uno is used. LM35 is analog, linear temperature sensor whose output voltage varies with Change in temperature. LM35 is three terminal linear temperature sensors from national semiconductors. It can measure temperature from -55degree Celsius to 155 degree Celsius.

2. Side Stand Indicator: Side stand indicator for two wheelers is one of the lifesaving electrical mechanisms which provide the rider about the negligence to release the side stand while riding by giving an indicator which optionally may be horn of the vehicle or additional siren.

3. Battery Level Indicator: A battery indicator is a device which gives information about a battery. This will usually be a visual indication of the battery's state of charge. It is particularly important in the case of a battery electric vehicle. 16x2 LCD is used to indicate the battery charging and discharging percentage which mainly in contact with lithium ion battery.

4. Arduino Pro Mini: Arduino Pro Mini is a microcontroller board based on the ATmega328.It has 14 digital input/output pins, 6analog inputs, an on-board resonator is set button and holes for mounting pin headers. A 6-pin header can be connected to an FTDI cable or spark fun breakout board to provide USB power and communication to the board.

5. Radio Frequency Module: Radio frequency module can be used to unlock the vehicle in this project which consists of RF transmitter and RF receiver. This central lock system connects to bike to RF remote and gives the power to lock unlock the ignition and start stop the engine remotely. It is about 433mhz. Operating range of RF module is near about 3 meters to 100 meters with antenna connected to the 4 th pin of IC.

4. Flow chart

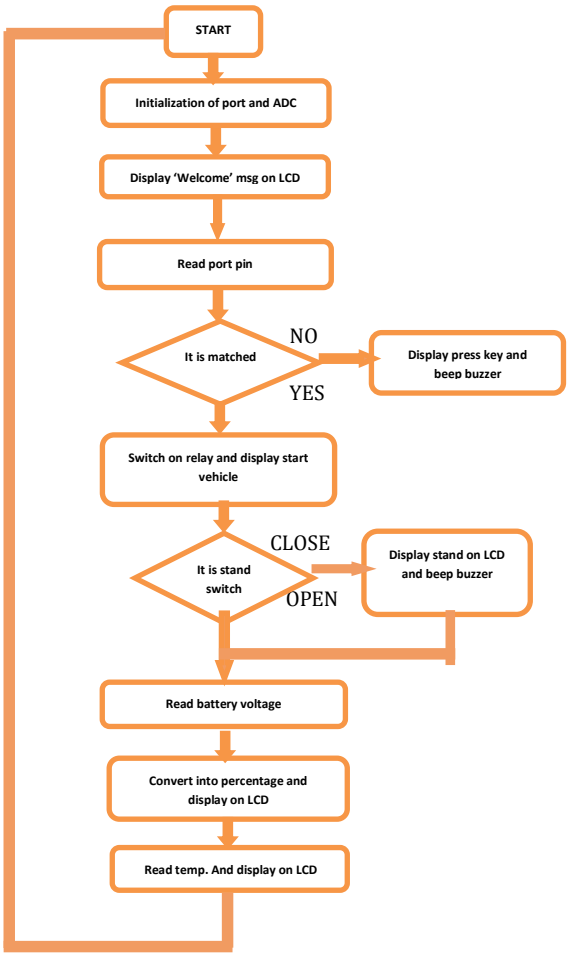

Fig-3. Flowchart

5. RESULTS:

Results on hardware after the operation of automation system:

Fig-4. First instructions on LCD is "Hybrid Bicycle".

Fig-5. Second instruction on LCD is "Keep Key".

Battery level indication and battery temperature according to battery grading and degrading voltage level is estimated trough following table.

Sr.No.	Battery voltage(volt)	Battery Percentage	Temperature (Degree)
1.	50	100%	28.25
2.	40	80%	29.35
3.	25	50%	36.27

Fig-6. Table of battery percentage and temperature reading

6. APPLICATION

- In automobile sector.
- In commercial sector.
- In industrial sector.
- In residential sector.
- The most useful application of this system is nobody will use the bike other than authentic user.

7. CONCLUSIONS

The importance of implementing the automation technologies is the need of today's infrastructure projects and construction firm in order to increase the productivity and good quality of work.

The main motto of bike security system is to prevent the bike from the unauthenticated handling and prevent stolen off the bike. This project is more users friendly and reliable.

8. ACKNOWLEDGEMENT

We would like to acknowledge the great and sincere efforts of all people who had put together their brains and who directly or indirectly helped us out in making this paper successfully. We would like to express special thanks to our

teachers and principal of ATS's SBGI College of engineering for inspiring us to publish the paper, helped us in doing a lot of research and we came to know about so many new things.

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