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Cranium Armour 2.0

Arbaaz Memon, Prathamesh Matte, Monish Shingnapurkar, Sachin Bojewar
Department of Infromation Technology
Vidyalankar Institute of Technology Mumbai,India
khanmemn0044@gmail.com, prathameshmatte45@gmail.com, monish.shingnapurkar@vit.edu.in, sachin.bojewar@vit.edu.in

***Abstract* – The project aims to increase the percentage of riders wearing a helmet in turn ensuring safety of people. The project will make use of microcontrollers such as Arduino nano, Bluetooth module, etc. India has one of the highest number of two wheelers. Yet, a large majority of riders avoid wearing helmets. Reasons for not wearing a helmet are many, some of which are silly, but in the end the price a rider pays for not wearing the protective gear can be life threatening.**

***Keywords*– Cranium Armour 2.0, Arduino Nano, Bluetooth Module, Helmet, Rider, Bike, Safety.**

I. INTRODUCTION

India has one of the highest number of two wheelers. Yet, a large majority of riders avoid wearing helmets. Reasons for not wearing a helmet are many, some of which are silly, but in the end the price a rider pays for not wearing the protective gear can be life threatening. To encourage more people to wear helmets, we have come up with a plan which involves a simple, yet potentially effective idea. We plan to developed a special wireless helmet that is paired with a bike. In other words, the paired bike will start only when the rider wears the helmet and it turns off as soon the helmet is removed. it could work if new motorcycle buyers and young riders show interest in the initiative.
Coming to the technical specifications of the helmet, it is powered by a rechargeable battery that lasts six months. One of the latest rules imposed is compulsory helmets for pillion riders. Many of the accidents occur due to disobedience of rules. Several times, riders are seen wearing helmets only when cops are around, and carrying them in their arms when they are not.

II. LITERATURE SURVEY

As referred from papers on wireless communication through Arduino enabled by Bluetooth module, prompts the integration of numerous unobtrusive, extremely low-cost and passively powered wireless sensors into our surroundings. We are aiming to create a system that at the time of ignition can ensure that the person igniting the bike is wearing a helmet. The system will when sense at the time of when a bike rider is trying to turn the bike on if he is wearing a helmet or not. In our System the mechanism will be divided in 2 regions, one in the helmet and one connected to the ignition of the bike both connected to each other via Bluetooth. The system is aiming at bikers, the whole community of them with the intent ion of making sure that a helmet is being worn at the time of ignition. Also, we are adding other features, the primary one being the speedometer of the bike being connected to the helmet of the person, now in this feature there is a 3-party setting bike(speedometer), helmet(buzzer) and the mobile phone. We can set a certain speed limit over which we will prefer not going through our mobile phones, if that limit is being crossed the buzzer in the helmet will inform us that the bike is moving at a speed above our preferred limit.

III. PROPOSED SYSTEM

We are proposing a system design that can detect if a person is wearing a helmet or not. We aim to create this with help of two Arduino modules a system that at the time of ignition help to ensure that the person igniting the bike is wearing a helmet. The system will then sense that at the time of when a bike rider is trying to turn the bike on if he is wearing a helmet or not. In our proposed design, the mechanism will be divided in 2 regions, one in the helmet and one connected to the ignition of the bike both connected to each other via Bluetooth. We also are trying to add other features; we plan to create an android app which also will communicate via Bluetooth to the module connected to the ignition. Through the app we will set speed limit and if that is crossed a led near the speedometer will light up. To achieve this the circuitry involved will be :-
In the helmet an Arduino nano connected to an infrared sensor to detect the presence of a person the range will be set from anywhere between 2cm to 5cm, a li rechargeable battery and a HC-05 Bluetooth module for sending info. When the IR Sensor picks up presence it sends a message to Arduino nano which then through the Bluetooth module will send it to the Arduino nano module connected to the ignition system.
he mechanism near the ignition is such that an Arduino nano module connected to a led, another Hc- 05 Bluetooth module and a relay switch which will be connected to the ignition. The relay will control the turning on of the bike. When this Arduino board receives a message that a person is detected will it allow the bike to start. The led

plays its role in notifying the rider that no one is being detected wearing a helmet.
The android will be connected to the Bluetooth module in the ignition system. To make it work we are trying to create a piconet so the setup can accommodate multiple Bluetooth devices. The app will set up a speed limit which when connected to the timer counter and detected that is crossed the led will glow.

IV. IMPLEMENTATION

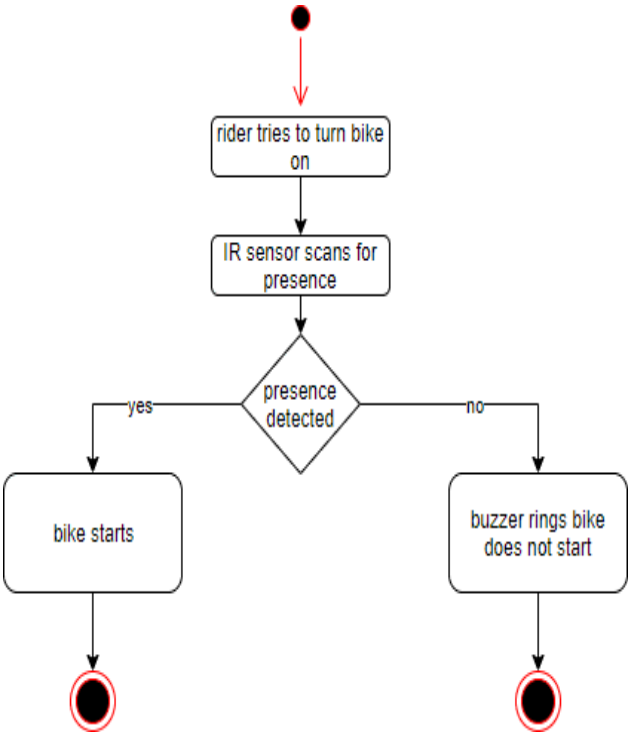

Fig.1. Activity Diagram.

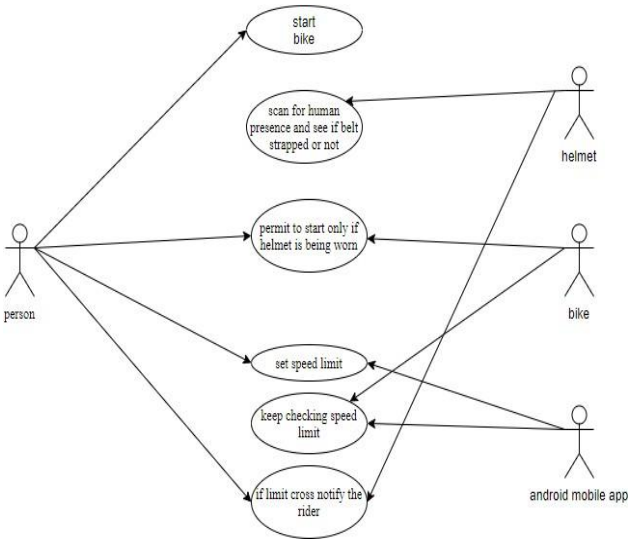

Fig.2. Use-Case Diagram.

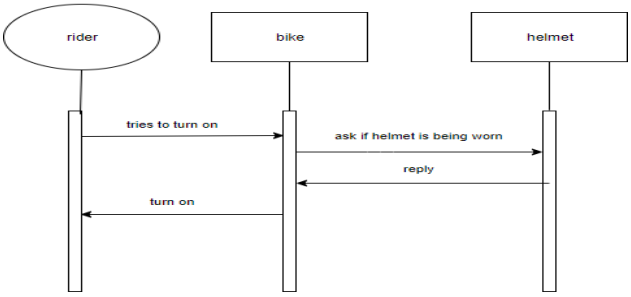

Fig.3. Sequence Diagram.

V. METHODOLOGY

The linear working of our project can be explained in the following manner:-
Step 1: Connect all the hardware appropriately apply power supply as per need.
Step 2: Rider tries to start the bike.
Step 3: Both bluetooth module are connected to each other.
Step 4: IR sensor will check for the presence.
Step 5: If no presence is sensed then the IR sensor send a message to arduino nano about so.
Step 6: If no presence is detected then the BT module will communicate so to the other module.
Step 7: The buzzer will buzz and the bike won't start.
Step 8: If the sensor detects presence then it sends so.
Step 9: The buzzer won't buzz.
Step 10: The bike will start.

VI. TEST CASES

Test case id	Objective	Test case Description	Input	Output	Test result
1	Initialize IR sensor	Connect IR to board	Connect to led	Connected	Pass
2	Initialize buzzer Sensor	Connect buzzer to Board	Input code	Connected	Pass
3	AT Command mode	Make connection to enter AT command mode	Connect hc- 05 to board to Jenter at mode	Entered	Pass
4	Bluetooth module Configuration	Give appropriate command to set as master and slave and pair	Commands to enter master/slave mode And pair	Paired	Pass
5	Master side configuration	Make appropriate connections, connect to IR and Bluetooth module	Upload master side code to send Data	Sending	Pass
6	Slave side configuration	Make appropriate connections, connect to buzzer and Bluetooth Module	Upload slave side code to receive data	Receiving	Pass

VII. CONCLUSION

Cranium Armour 2.0 is designed to ensure that a bike rider is ensuring safety of their own lives. It will make sure that a bike does not start while the sensor does not detect presence within an expected range, doing so rider is now compelled to wear helmet if he wishes to start the bike.

VIII. ACKNOWLEDGMENT

There is a lot of scope after this project is deployed in the market in full scale. First, as of today awareness is growing among the masses about road safety and its need to maintain safety, secondly government is coming up with new schemes to ensure the safety of the bike rides, third day by day the prices of electronics in the market is going down making the project more feasible. So, the probability of this being used in near future is very high.

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AUTHOR'S PROFILE

Arbaaz Memon
Student, Department of Infromation Technology
Vidyalankar Institute of Technology

Prathamesh Matte
Student, Department of Infromation Technology
Vidyalankar Institute of Technology

Monish Shingnapurkar
Student, Department of Infromation Technology
Vidyalankar Institute of Technology

Dr. Sachin Bojewar
Associate Professor,Department of Infromation Technology
Vidyalankar Institute of Technology