SMART HELMET SYSTEM

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Abstract - *Accidents have occurred for many years, folks died as a results of each the automobilist and a rider within the vehicle. Collisions will occur for a range of reasons, however the foremost common associated minor error that ends up in an accident is "Drink and Drive" issues. Despite the very fact that the govt has already passed numerous laws and strategies to prevent it, some folks don't take it seriously and find yourself endangering their own and others' lives. The project's goal is to form associate intelligent device capable of detection alcohol consumption and preventing all kinds of accidents. this technique contributes to driver safety by protective them from road accident.*

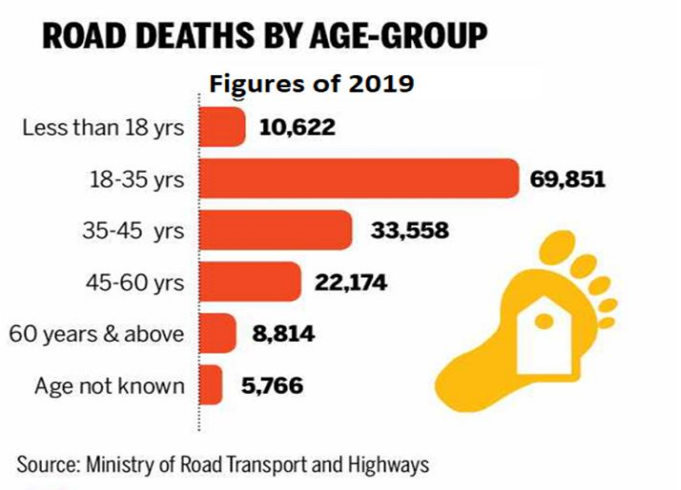
Key Words: **Alcohol Sensor (MQ3 Sensor), Rf Transmitter/Receiver, GPS System, GSM Module, Accelerometer, ATMega 328P micro-controller, Smart/Intelligent Helmet**

1. INTRODUCTION

Accidents have happened for decades, resulting in the death of both the driver and a passenger in the car. Accidents can occur for a variety of causes, but the most common and simple error that leads to an accident is "Drink and Drive" concerns. Even though the country has created many laws and methods to prevent it, individuals do not always take it seriously, putting their own and others' lives in danger.

So, in order to address the issue of road safety, we developed the Smart Helmet with Alcohol Detection System. This employs a mechanism that makes it difficult to circumvent the basic guideline of wearing a helmet and to refrain from driving while intoxicated.

Over speeding and driving while intoxicated have become commonplace. Catastrophes occur as a result of a lack of sophistication or attention, as well as a breach of traffic laws. As a result, we utilize technology to ensure that traffic regulations are observed, that the difficulties stated above are avoided, and that their impacts are reduced. The smart helmet technology activates automatically when the driver attempts to start the engine because the driver's helmet has an alcohol sensor that detects whether or not the driver is intoxicated. If the system detects the presence of alcohol within the user's range, it will not allow the engine to start and will alert its locked list of persons about its condition as well as his present position. Alternatively, if the driver is still not inebriated, it is safe to continue driving and proceed as usual.



This encourages us to consider developing a system that assures the safety of users by mandating riders to wear helmets to prevent head injuries that may result in instant death, preventing drink and drive scenarios by testing the rider's breath before the trip, and contacting the concerned individual with the location details for cab ride or lift if presence is discovered.

By adopting such safeguards, we may assist to overcome the present accident scenario and minimize the amount of deaths.

2. IMPLEMENTATION PLAN

1. Status of rider wearing helmet
2. Alcohol detection test
3. Accident detection
4. Accident Location

2.1 WORKING

The working of the proposed system can be described with help of above mentioned four points, as the driver

will wear the helmet and lock it the system will start doing its operation.

The alcohol sensor then senses the amount of alcohol mols in breath of the rider using the data to determine whether to pass a signal to the vehicle section of starting it or not.

Then the most important part is accident detection. When the vehicle will face any such situation the sensor in the vehicle section will detect it and a pre-programmed message will be delivered to the specified number.

At the same time the GPS will generate the location data and send it to the same number with the help of a GSM module.

2.2 HARDWARE COMPONENTS

Alcohol Sensor:

Basically, it's of 6 pins, the quilt and also the body. Although you'll be able to use solely four of them. Two of them are for the utility, I.e. pin H, and also the alternative two are for connecting power and ground, they're pinned A and B. Once the rider begins the vehicle then the system checks the alcohol level of the rider, if it's detected then the Vehicle engine isn't started at that point. If it senses nothing then the system permits them to begin the engine. The cost of the device is ₹112/-

GSM Module:

GSM module needs a SIM card similar to mobile phones to activate communication with the network. In our system, we tend to use GSM SIM 900 to inform families concerning the present condition of the bike rider and numerous alternative parameters if needed just in case of emergency. The value of the device is ₹799/-

GPS Module:

We are using the GPS1268 module just in case of an accident or the rider is stuck and if he's drunk then the GPS can offer coordinates of the location of the accident which can be then sent to the families with the assistance of GSM. The price of the device is ₹595/-

Microcontroller Atmega 328:

The superior semiconductor 8-bit AVR RISC-based microcontroller combines 32KB ISP non-volatile storage with read-while-write capabilities, 1KB EEPROM, 2KB SRAM, 23 general-purpose I/O lines, 32 general-purpose operating registers, 3 versatile timer/counters with compare modes, internal and external interrupts, serial programmable USART, a byte-oriented 2-wire serial interface, SPI port, 6-channel 10-bit A/D converter (8-channels in TQFP and QFN/MLF packages), programmable watchdog timer with internal generator, and 5 software system selectable power saving modes. The device operates between 1.8-5.5 volts.

By executing powerful directions in an exceedingly single clock cycle, the device achieves throughputs approaching one unit of measurement per megacycle, equalization power consumption, and process speed. The price of the device is ₹106/-

LCD Display:

LCD is connected to the microcontroller of the system. The primary feature of Liquid Crystal Display (LCD) is to display whether the user is wearing the helmet or not, the second feature is to show whether the alcohol is consumed by the person or not. In short, LCD acts like a tutor to the system's user. The price of the device is ₹199/-

Accelerometer:

An accelerometer sensor could be a tool that measures correct acceleration. Correct acceleration is the acceleration of a system in its own fast rest frame, this is often totally different from the coordinate acceleration, that is acceleration in an exceedingly fastened organization. Here the employment of the element is to find the sudden fall of the auto by its tilt movement and warn the system. the value of this element is ₹150/-

RF Transmitter/Receiver:

A Radio-Frequency transmitter module is a tiny PCB assembly capable of transmission of radio waves and modulating radio waves to carry information. Transmitter modules are typically enforced aboard a microcontroller which can offer information to the module which will be transmitted. RF transmitters are typically subject to regulative necessities that dictate the most allowable transmitter power output, harmonics, and band edge necessities.

Radio-Frequency receiver, receives the modulated RF signal and then again demodulates it. There are 2 modules, such as the super-heterodyne receiver and the super-regenerative receiver. The price of the device is ₹99/-

Buzzer:

A buzzer is an associate degree audio signaling device, which can be a mechanical device, or electrical. Typical uses of buzzers embrace alarm devices, timers, and confirmation of user input like depression or keystroke. The value of the device is ₹99/-

HT12e Encoder IC:

HT12E is an encoder computer circuit of 212 series of encoders. They're paired with 212 series of decoders to be

used in device system applications. It's utilized in interfacing RF and infrared circuits. The encoder/decoder ought to have the same range of addresses and data formatting. HT12E is used to convert the parallel i/p into serial o/p. It encodes the 12-bit parallel data into serial for transmission through an associate degree RF transmitter. These twelve bits are divided into eight address bits and four data bits.

HT12d Decoder IC:

HT12D is a CMOS series 12-bit RF decoder. Largely available device applications have this technology. It interfaces with the third device and helps it to decipher 12-bits information. This decoder is solely 4-bits of information, and the remaining half is the address. The address can describe the placement however 4-bits combination may build sixteen sorts of totally different mixtures. The HT12D decoder cannot work alone. It works with an associate degree, another counterpart known as an encoder. To receive the info between encoder and decoder address bits ought to be matched. The encoder will be with any CMOS technology. Every application uses the encoder for decipherment because of its simplicity and potency.

DC Motor:

It is a direct current series motor to provide energy, nearly continually by the interaction of magnetic fields and current-carrying conductors. We tend to use it as a vehicle engine duplicate for the system. The value of the device is ₹115/-

Push Buttons:

The system desires an electric switch to start out the engine. If the alcohol gets detected by the system, the engine stops immediately. The electric switch is the place to begin the system. Once the user wears the helmet the switch button is on and its operation begins. The value of the device is ₹99/-

3. SYSTEM DESIGN

· An activity diagram visually presents a series of actions or flow of management during a system just like a flow diagram or a knowledge multidimensional language. Activity diagrams are usually utilized in business method modelling. they will conjointly describe the steps during a use case diagram. Activities modelled are often sequent and synchronous . In each cases Associate in Nursing activity diagram can have a starting Associate in Nursing an finish.

· Initial State or Start Point

A small stuffed circle followed by AN arrow represents the initial action state or the beginning purpose for any activity diagram. For activity diagram victimization swim lanes, make certain the beginning purpose is placed in high left corner of the primary column.

· Activity or Action State

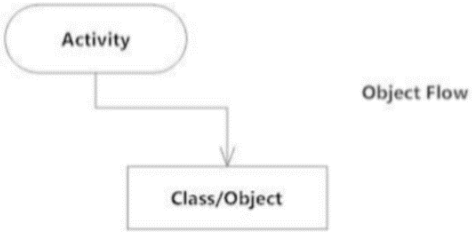
An action state represents the non-interruptible action of objects. you'll be able to draw associate action state employing a parallelogram with rounded corners.

· Action Flow

Action flows, additionally known as edges and ways, illustrate the transitions from one action state to a different. they're sometimes drawn with associate arrowed line.

· Object Flow

Object flow refers to the creation and modification of objects by activities. Associate in Nursing object flow arrow from Associate in Nursing action to Associate in Nursing object implies that the action creates or influences the article. Associate in Nursing object flow arrow from Associate in Nursing object to Associate in Nursing action indicates that the action state uses the article.



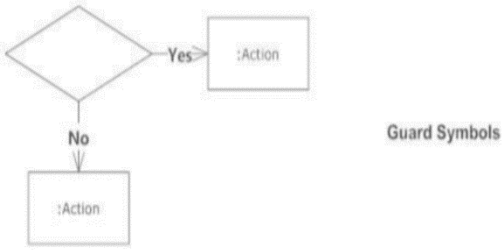
· Decisions and Branching

A diamond represents a call with alternate methods. once associate activity needs a call before moving on to succeeding activity, add a diamond between the 2

activities. The outgoing parts ought to be tagged with a condition or guard expression. you'll conjointly label one among the methods "else".

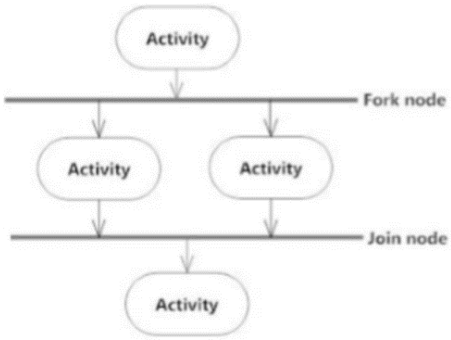
· Guards

In UML, guards square measure an announcement written next to a choice diamond that has got to be true before moving next to following activity. These don't seem to be essential, however square measure helpful once a selected answer, like "Yes, 3 labels square measure written," is required before moving forward.



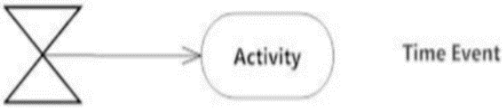
· Synchronization

A fork mode is employed to separate incoming flow into multiple synchronal flows. it's delineated as a straight, slightly thicker line in AN activity diagram. A be part of node joins multiple synchronal flows back to one outgoing flow. A fork and be part of mode used along area unit typically named as synchronization.



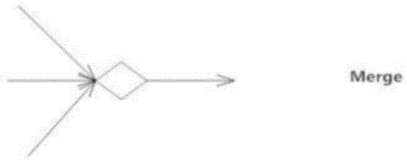
· Time Event

This refers to an event that stops the flow for a time; an hourglass depicts.



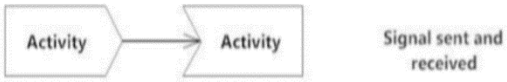
· Merge Event

A merge event gathers multiple flows that are unstable as well as non concurrent



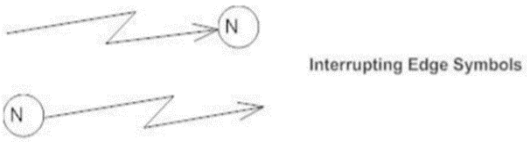
· Sent and Received Signals

Signals represent however activities are often changed from outside the system. they sometimes seem in pairs of sent and received signals, as a result of the state cannot amendment till a response is received, very similar to synchronous messages during a sequence diagram. for instance, associate degree authorization of payment is required before associate degree order are often completed.



· Interrupting Edge

An object that interrupts the flow denoted is rendered as lightning bolt.

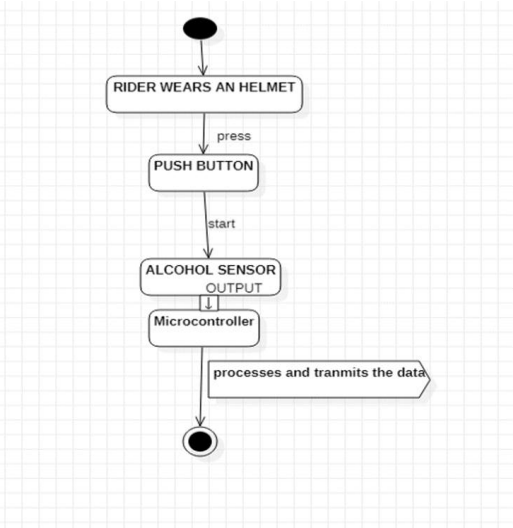


· Final State or End Point

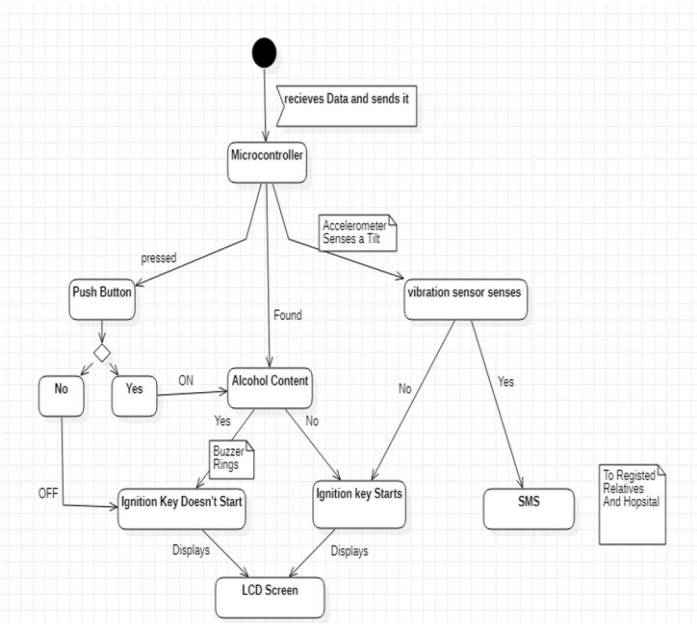
An arrow pointing to a filled circle nested inside another circle represents the final action state.

3.1 ACTIVITY OF A SYSTEM

Helmet section:



Vehicle Section:



3.2 COMPONENT DIAGRAM

- A element DIAGRAM could be a instrumentality OF LOGICAL components AND REPRESENTS THINGS THAT PARTICIPATE within the EXECUTION OF A SYSTEM. IT conjointly USE THE SERVICES OF alternative elements THROUGH one in every of ITS INTERFACES.

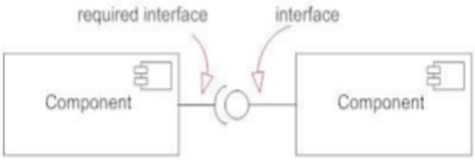
- Components are generally wont to visualize logical packages of ASCII text file (work product components), code (deployment components), or practicable files (execution components).

- A component is painted by a parallelogram with either the keyword "component" or a stereotype within the high right corner: a little parallelogram with 2 even smaller rectangles jutting out on the left.

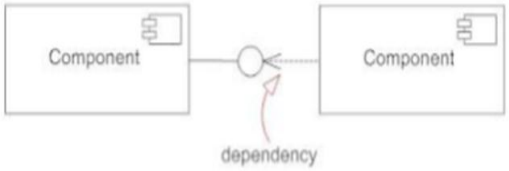
- Components are wired along by victimization AN assembly connection to attach the specified interface of 1 element with the provided interface of another element. This illustrates the service shopper - service supplier relationship between the 2 parts.

- Component:- A part could be a logical unit block of the system, a rather higher abstraction than categories. it's pictured as a with a smaller parallelogram within the higher right corner with tabs or the word written higher than the name of the part to assist distinguish it from a category.

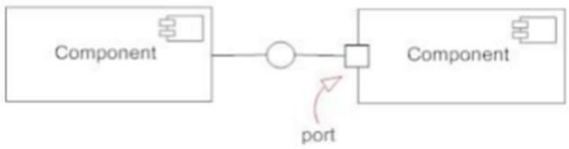
- Interface:- An interface (small circle or semi-circle on a stick) describes a bunch of operations used (required) or created (provided) by parts. A full circle represents Associate in Nursing interface created or provided by the part. A semi-circle represents a needed interface, sort of a person's input.



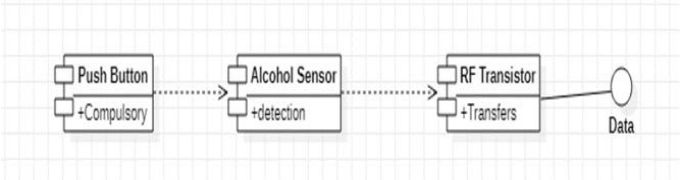
- Dependencies:- Draw dependencies among components using arrows.



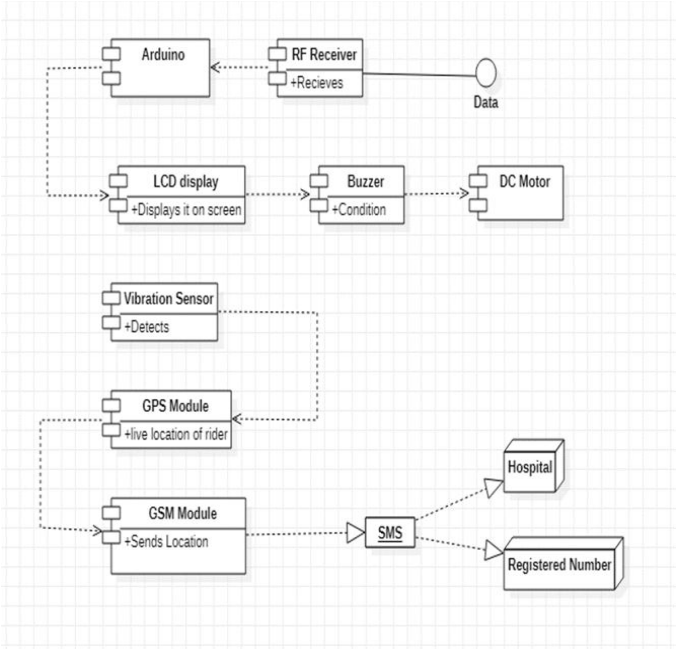
- Port:- Ports square measure drawn employing a sq. on the sting of the system or a element. A port is usually wont to facilitate expose needed and provided interfaces of a element.



A. Helmet Section:



B. Vehicle Section:



4. CONCLUSION

The developed system expeditiously ensures. Rider is carrying a helmet throughout the rider. Riders shouldn't be beneath the influence of alcohol, Accident detection & stealing protection. By implementing this technique a secure 2 wheeler journey is feasible which might decrease the top injuries throughout accidents and additionally cut back the accident rate thanks to driving a motorcycle once overwhelming alcohol. A helmet isn't 100% full-proof however it's undoubtedly the primary line of defense for the rider just in case of associate accident to stop fatal brain injuries. The planned approach makes it obligatory for the ruder to use this protecting guard so as to drive a 2 wheeler vehicle associated ensures the protection of human brain and thus reduces the chance of brain injuries and deaths just in case of an accidents

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