

IMPLEMENTATION OF SMART HELMET FOR ACCIDENT AVOIDANCE

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ABSTRACT

In recent times helmets have been made compulsory in all over the world. Traffic accidents in India have increased year by year. The impact when a motorcyclist involves in a high speed accident without wearing helmet is very dangerous and can cause fatality. Wearing a helmet can reduce shock from the impact and may save a life. There are many countries enforcing a regulation that requires the motorcycle's rider to wear a helmet when riding on their motorcycle. In India drunken drive case is a criminal offence of The Motor Vehicle act 1939. Which states that the bike rider will get punish. In existence bike rider easily get escaped from law. These are the three main issues which motivates us for developing this project. The first step is to identify the helmet is wear or not. If helmet is wear then ignition will start otherwise it will remains off till helmet is not wear. For these we use RF Transmitter/ Receiver. The second step is alcohol detection. Alcohol sensor is use as breath analyzer which detect the presence of alcohol in rider breathe if it is exceeds permissible range ignition cannot start.

I. INTRODUCTION

In recent times helmets have been made compulsory in all over the world. Traffic accidents in India have increased year by year. The impact when a motorcyclist involves in a high speed accident without wearing a helmet is very dangerous and can cause fatality. Wearing a helmet can reduce shock from the impact and may save a life. There are many countries enforcing a regulation that requires the motorcycle's rider to wear a helmet when riding on their motorcycle. In India drunken drive case is a criminal offence of The Motor Vehicle act 1939. Which states that the

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These are the three main issues which motivates us for developing this project. The first step is to identify the helmet is wear or not. If helmet is wear then ignition will start otherwise it will remains off till helmet is not wear. For these we use FSR sensor. The second step is alcohol detection. Alcohol sensor is use as breath analyzer which detect the presence of alcohol in rider breathe if it is exceeds permissible range ignition cannot start. It will send the message to register number. MQ-3 sensor is used for these. When these two conditions are satisfied then ignition will start. The third main

issue is accident and late medical help. If the rider met accident with him he cannot receive medical help instantly, its big reason for deaths. Around every second people die due to late medical help or the accident place is unmanned. In fall detection, we place accelerometer at the bike unit. Due to these mechanism we detect the accident occurs or not. The aim of this project isto make a protection system in a helmet for a good safety of bike rider. The smart helmet that we made is fixed with sensors which act as to detect wear helmet or not. There are two different microcontroller is used in this project. Each unit has used a separate microcontroller, for bike unit uses microcontroller. Signal transmission between the helmet unit and bike unit is using a RF concept

II. SYSTEM DESIGN

1. The functions of each component are described as follows:

Alcohol Sensor

A alcohol is a device which detects the presence of various gases within an area, usually as part of a system to warn about gases which might be harmful to humans or animals. Alcohol can be used to detect combustible, toxic, and oxygen and CO₂ gases. Ideal sensor for use to detect the presence of a dangerous LPG leak in your car or in a service station, storage tank environment.

ARDUINO UNO

Arduino Uno is a microcontroller based on ATmega328. It has 14 digital I/O pins (of which 6 can be used as PWM outputs), 6 analog inputs, a 16MHz crystal oscillator, a USB connection, a power jack, an ICSP header and a reset button. It contains everything needed to support the microcontroller; simply connect it to a

computer with a USB cable or power it with AC-DC adapter or battery to get started. UNO means one in Italian and is named to mark the upcoming release of Arduino 1.0.

Rectifier unit

The Rectifier circuit is used to convert the AC voltage into its corresponding DC voltage. The most important and simple device used in rectifier circuit is the diode. The simple function of the diode is to conduct when forward biased and not to conduct in reverse bias.

Relay

A relay is an electrically operated switch. A relay is classified into many types, a standard and generally used relay is made up of electromagnets which in general used as a switch. Dictionary says that relay means *the act of passing something from one thing to another*, the same meaning can be applied to this device because the signal received from one side of the device controls the switching operation on the other side. So relay is a switch which controls (open and close) circuits electromechanically

Power Supply

This power supply block consists of a step-down transformer, a bridge rectifier, a capacitor and a voltage regulator. Single-phase active current power supply from the mains is step down to a lower voltage range which is again rectified to direct current by using a bridge rectifier. This led direct current is filtered and regulated to the whole circuit operating range with a capacitor and voltage regulator IC respectively.

Filtering Unit

Filter circuits which are usually capacitors acting as a surge arrester always follow the rectifier unit. This capacitor is also called as a decoupling capacitor or a bypassing capacitor, is used not only to 'short' the ripple with frequency of 120Hz to ground but also to leave the frequency of the DC to appear at the

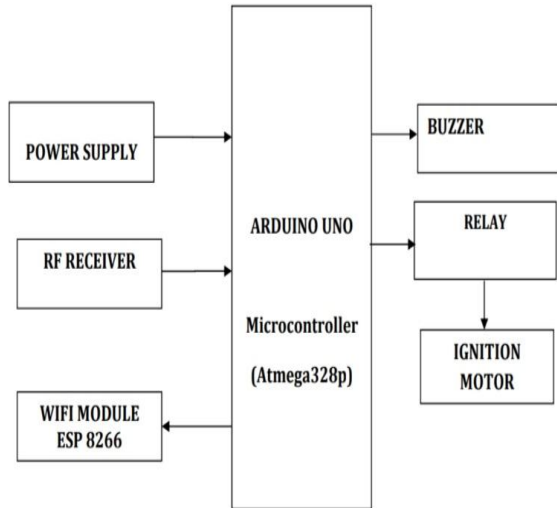
output. A loadresistor R1 is connected so that a reference to the ground is maintained. C1R1 is for bypassing ripples.C2R2, is used as a low pass filter, it passes only low frequency signals and bypasseshigh frequency signals. The load resistor should be 1% to 2.5% of the load.

Microcontroller

Microcontroller is a general purpose device, which integrates a number of the components of a microprocessor system on to single chip. It has inbuilt CPU,memory and peripherals to make it as a mini computer. A microcontroller combines on to the same microchip.

- The CPU core
- Memory
- Some parallel digital input output

III.BLOCK DIAGRAM



Block Diagram of Bike Section

Architecture of ATmega328

The complete architecture of ATmega328 is shown in the figure gives details about the specifications of ATmega328.The main function of the CPU core is to ensure correct program execution.The CPU must therefore be able to access memories, perform

calculations, control peripherals, and handle interrupts. In order to maximize performance and parallelism, the AVR uses Harvard architecture-with separate memories and buses for program and data. Instruction inthe program memory are executed with a single level pipelining. While one instruction is being executed, the next instruction to be executed, the next instruction pre-fetched from the program memory. This concept enables instructions to be executed in every clock cycle. The program memory is In-system Reprogrammable Flash memory.

The fast-access Register File contains 32 x 8-bit general purpose working register with a single clock cycle access time. This allows single-cycle Arithmetic Logic Unit (ALU) operation. In a typical ALU operation, two operands are output from the Register File, the operation is executed, and the result is stored back in the Register File – in one clock cycle. Program Flash memory space is divided in two sections, the Boost Program section and the Application Program section

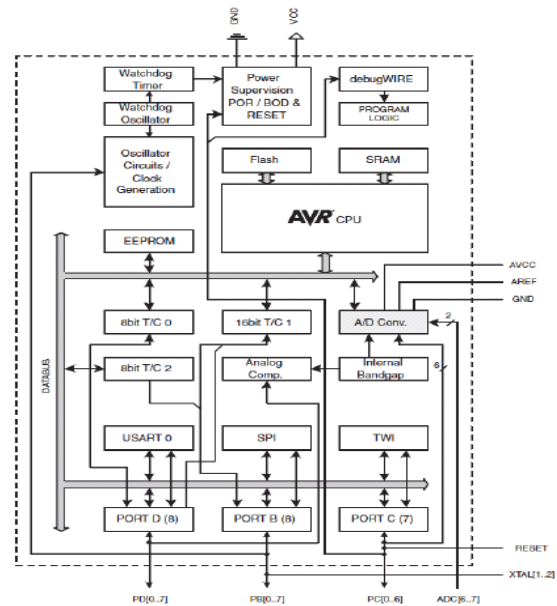


Fig : Architecture of ATmega328

Program is provided by conditional and unconditional jump and call instructions, able to directly address the whole address space.

LCD Display

LCD stands for liquid crystal display; this is an output device with a limited viewing angle. The choice of LCD as an output device was because of its cost of use and is better with alphabet when compared with a 7-segment LED display.

There are many kinds of LCD today and application requires a LCD with 2 lines and 16 characters per line, this gets data from the microcontroller and displays the same. It has 8 data lines, 3 control line, a supply voltage VCC (+5V and a GND). In recent years the LCD is finding widespread use replacing LED's. This is due to the following reasons:

- The declining prices of LCD's,
- The ability to display numbers, characters and graphics. This is in contrast to LED', which are limited numbers and few characters.
- Incorporation of a refreshing controller into the LCD, there by relieving the CPU of the task of refreshing the LCD in contrast, the Led must be refreshed by the CPU to keep displaying the data.
- Ease of programming for characters and graphics.

LCD Pin Description

• VCC, VSS and VEE

While VCC and VSS provides +5V and ground respectively, VEE is used for controlling LCD contrast.

• RS, Register Select

There are two very important registers inside the LCD. The RS pin used for their selection as follows. If RS=0, the instruction command register is selected, allowing the user to send a command such as clear display, cursor at home,

etc. If RS=1 the data register is selected, allowing the user to send data to be displayed on the LCD.

• R/W Read/Write

R/W input allows the user to write information to the LCD or read information from it. R/W-1 when reading: R/W-0 when writing.

• E, ENABLE

The enable pin is used by the LCD to latch information present to its data pins. When data is supplied to data pins, a high to low pulse must be applied to this pin in order for the LCD to latch in the data present at the data pins. This pulse must be a minimum of 450ns wide.

• DO-D7

The 8-bit data pins, D0-D7, are used to send information to LCD or read the contents of the LCD's internal registers. The LCD commands codes are as shown in table.4. To display letters and numbers, we send ASCII codes for the letters A-Z, a-z, and numbers 0-9 to these pins while making RS=1.

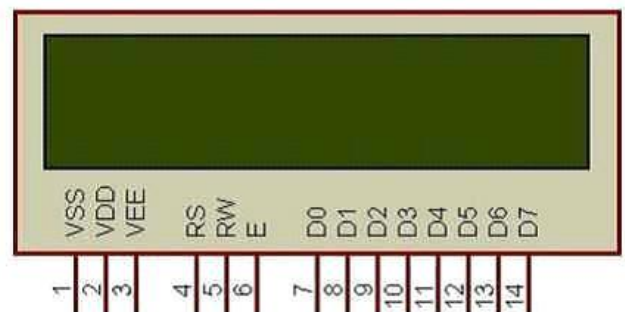


Fig : LCD Display

IV. CONCLUSION

The designed Smart helmet ensures the safety of the rider by making it necessary to wear helmet, and also ensures that the rider hasn't consumed alcohol more than the permissible limit. The outcomes of the project have showed that the bike ignition will start if the helmet is worn. So, it will automatically decrease the effect from accident and

it can avoid bike from being stolen. If any of these prime safety rules are violated, the proposed system will prevent the biker from starting the bike.

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