

OLED Based Smart Driving Information System

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Abstract- In today's world automobile technology is increasing by leaps and bounds, which is increasing the performance and speed of vehicle as well. Speed and other driving parameters puts a lot of pressure on the driver while driving at high speed where a single mistake can cause a serious accidents. To avoid this we thought of designing OLED(Organic Light Emitting Diode) based driving information system. Using the same latest technology we can use OLED based advanced display glasses for the driver, which will help him to concentrate on driving the vehicle. It will bring all the required important information right in front of his eyes, so that he will not be distracted as well as he can make an informed decision about driving the vehicle safely especially at a high speed. The goal is to present a design project which pertains to building an information display system in which all information about fuel level, temperature, speed, mobile incoming call details will be easily displayed on the glasses wore by the driver. Hence to accomplish this aim we are designing a system with the help of sensor modules and an interface module like nanoarduino board , android mobile application and OLED display glasses.

I. INTRODUCTION

The main purpose of this project is to design a smart driving information display system for vehicle, it will bring all the required important information right in front of his eyes, so that he will not be distracted as well as he can make an informed decision about driving the vehicle safely especially at a high speed. To accomplish this we must design sensor modules and an interface module like nano arduino board , android mobile application and OLED display glasses.

This innovative glass design will carry an OLED based display controlled via nano Arduino board having Bluetooth connectivity with a Smartphone to exchange information along with onboard accelerometer. We are using a tilt angle sensor for detecting if the driver is feeling drowsy. An alcohol sensor has been used to promote the safe driving habit.

The goal is to present a design project which pertains to building an information display system in which all information about fuel level temperature ,speed ,mobile incoming call details will be easily displayed on the glasses wore by the driver . so that all the distractions during driving will be reduced and the driver can concentrate on the road and he will be informed about driving vehicle safely . this system can create an easy way information display for the driver via a user friendly console. The glasses will be getting latest updates about the current speed of the vehicle, navigation directions, nearby or approaching sign boards or services like petrol pumps. It'll also display information like incoming calls

or received messages. All this information will be obtained through a Smartphone connected via Bluetooth.

II. LITERATURE SURVEY

The AR-1 (AR stands for Augmented Reality) is the first helmet from the team at Skully and features the first HUD system available for a motorcycle helmet. Its two main features are its 180-degree, rear-facing camera, and a little screen placed in the bottom right portion of your field of view. The screen allows you to see everything behind you, no matter which direction your helmet is facing, without any blind spots. Skully has also developed its own interface to bring turn-by-turn directions and a few other basic pieces of information to the screen, all with the purpose of reducing the mental load placed on the rider. Connectivity will come through pairing with your phone via Bluetooth, but that doesn't mean you'll be relying on Siri, necessarily. The Skully guys say they're working on their own voice-recognition software to improve your access to the AR-1's abilities while riding. There are also plenty of extra applications for things like track riding, where Skully is working on bringing things like speed, rpm, and other figures to the little screen.

The liner used in the AR-1 was created by a company called Outlast. Originally created for NASA, the material is designed to either absorb, store, or release heat, depending on the ambient temperature. Outlast is not a sweat-wicking technology, but is meant to help control the temperature to keep you from sweating in the first place. Equally innovative is the new face shield, which uses an electrochromatic liquid crystal technology called e-Tint, originally created by a company called AlphaMicron for the military and now adapted for commercial use. It lets the rider switch the visor between tinted and un-tinted at the push of a button. Skull is still figuring out the final aesthetics of how to integrate the button, but it was fantastic to use. The smoke tint felt dark enough to block the sun, though not too dark to be unsafe on cloudy days. Skully says this shield will come as standard equipment on the AR-1.

As AR-1 skully helmet is designed for motorcycle with aim of safety driving purpose.by taking this as reference we are designing a system for four wheelers.

III. SYSTEM OVERVIEW

In this project we are designing a system which is useful for safety driving of four wheelers. This system consists of two modules out of which one is main block diagram of system and another is Engine Control Unit of system. As we have stated earlier we are designing glasses by using OLED display which will help driver to have important information related to engine right in front of his eyes, Also with engine information we are interfacing our mobile phone via Bluetooth module to OLED display so it can fetch data related to incoming calls and messages on display. This innovative glass design will carry an OLED based display controlled via nanoArduino board having Bluetooth connectivity with a Smartphone to exchange information along with onboard sensors. So it will help driver to concentrate on driving and to have safe driving. The major component of this system is OLED display. OLEDs are a great breakthrough in display technology. Also a new promising technology with high expected profitability on the display market. They show low driving voltages in combination with unrestricted viewing angles, high color-brilliance, light weight, small film-thicknesses and low production costs. Organic light-emitting devices (OLEDs) operate on the principle of converting electrical energy into light, a phenomenon known as electroluminescence.[1]

A. System Block Diagram

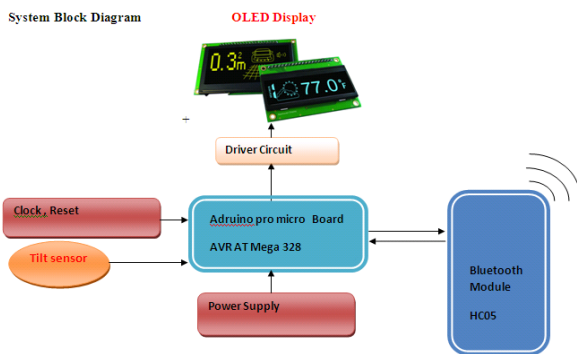


Fig. 1 system block diagram

As shown in the fig. 3.1 system block diagram consists of arduino pro micro board AVR AT MEGA 328 and Bluetooth Module which will be mounted on glasses. Arduino boards is inexpensive rather than all other microcontroller board. Cross platform - The Arduino software runs on all OS like Windows, Linux. Most micro-controller systems are limited to Windows and IDE used for Arduino is work in all OS. Software Programming is required for arduino uno, arduino micro and language used for programming of Arduino is Embedded C and to develop app for Android phone we need software programming. Software used to develop Android app is Basics for Android (B4A).[2]

B. Engine Control Unit

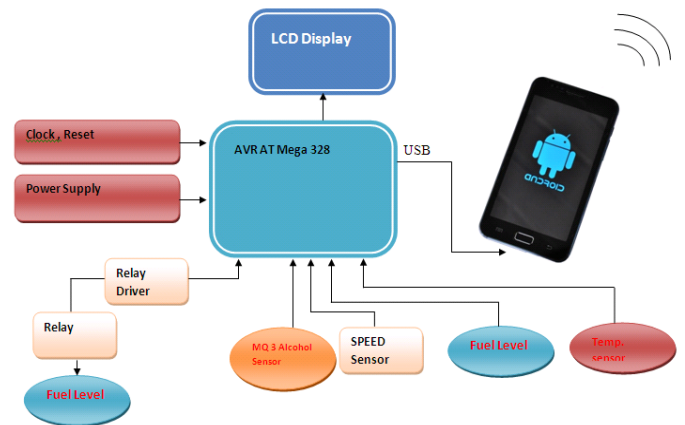


Fig. 2 Engine Control Unit

As shown in fig. 3.2 Engine Control Unit consist of AVR AT MEGA 328 as a controller and other sensors such as tilt sensor, speed sensor, fuel level indicator, temperature sensor etc. A tilt angle sensor(mercury switch) for detecting if the driver is feeling drowsy. A mercury switch (also known as a mercury tilt switch) is a switch which opens and closes an electrical circuit through a small amount of liquid mercury. Mercury switches have one or more sets of electrical contacts in a sealed glass envelope which contains a bead of mercury. The envelope may also contain air, an inert gas, or a vacuum. Gravity is constantly pulling the drop of mercury to the lowest point in the envelope. When the switch is tilted in the appropriate direction, the mercury touches a set of contacts, thus completing the electrical circuit through those contacts. Tilting the switch the opposite direction causes the mercury to move away from that set of contacts, thus breaking that circuit. An alcohol sensor has been used to promote the safe driving habit. Fluid level sensor has been used for fuel level indication. Speed sensor (tacho generator) is used to convert the instantaneous values of the shaft or rotor speed of a machine or mechanism into an electrical signal. This will sense speed the speed and give indication on display. Temperature sensor (thermister) has been used to sense the temperature of engine. Bluetooth module enables you to wireless transmit & receive serial data. It is a drop in replacement for wired serial connections allowing transparent two way data communication. You can simply use it for serial port replacement to establish connection between MCU or embedded project and PC for data transfer. The glasses will be getting latest updates about the current speed of the vehicle.

C. Circuit Diagram And Pcb Layout

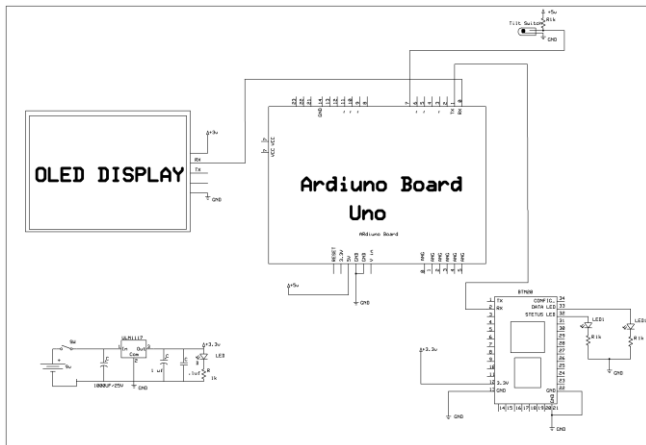


Fig. 3 Circuit Diagram of OLED module

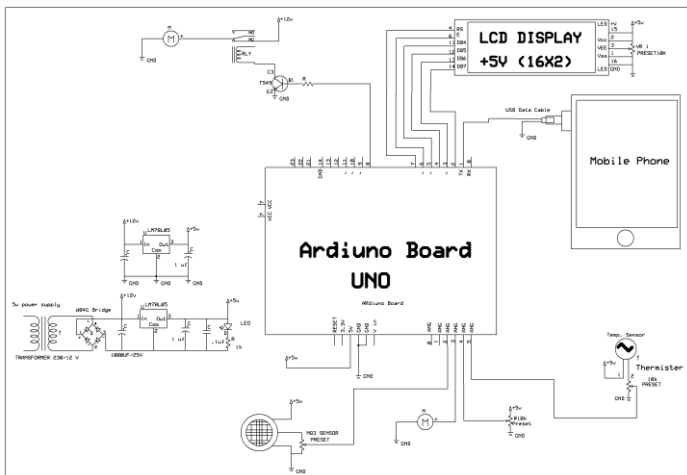


Fig. 4 Circuit Diagram of Engine Control Unit

IV. ADVANTAGES

- Lower cost in the future.
- Better power efficiency
- Low-cost system and graphics user interface solution.
- 96 x 64 resolution, 65K true to life colours, PMOLED screen.
- High speed processor
- Convenient display position
- Bluetooth connectivity

V. CONCLUSION

In this project our aim was to design a system which will reduce distractions and will help driver to concentrate on driving. for completion of this system we had developed two hardware's and three software programming to fulfill our objective. This project is very advantageous for driving and safety purpose .OLED display has wide application area in future as it is more efficient than normal LED display. We are really looking forward for this project.

VI. REFERENCES

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