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# AI Based Headgear for Military Safety

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**Abstract -** The purpose of this project is to create a helmet for the protection of the military people. This is a self security project which will keep the military person aware about his/her surrounding environment. The basic idea of the project is to detect the motion around the military person. If motion is detected the military person wearing the helmet will get an alarming message on the glass of the helmet. This project is based on Artificial intelligence. A camera is fixed on the helmet which is connected to the projector through Bluetooth. If the camera captures any motion in the surroundings of the military person, a caution message will be displayed on the glass of helmet which will be projected by the projector which if fixed on the helmet. So by this the military person will be aware of any kind of motion near him/her.

***Key Words***: AI, Arduino Nano, PCB, PIR sensor, V380 pro, OLED display

## 1. INTRODUCTION

The purpose of this project is to create a helmet for the protection of the military people. This is a self security project which will keep the military person aware about his/her surrounding environment.

The basic idea of the project is to detect the motion around the military person. If motion is detected the military person wearing the helmet will get an alarming message on the glass of the helmet.

This project is based on Artificial intelligence. A PIR Sensor is fixed on the helmet which is connected Arduino which is further connected to camera and OLED Display.

If the PIR Sensor captures any motion in the surroundings of the military person the camera will start capturing and a caution message will be displayed on the glass of helmet by OLED Display .So by this the military person will be aware.

Our ambitious project was to support our soldier to make them available with a new technology which will be easy to use and which will provide them information instantly on any movement around them self's with the help of PIR Sensor placed in their helmet, which further switches on the camera which will record the movement if any and the OLED display which will give notification instantly on glass screen.

### *A. Artificial Intelligence*:

Artificial intelligence (AI) is an area of computer science which works in the creation of intelligent machines that work and reacts like humans. Some of the activities computers with artificial intelligence include:

- Speech recognition
- Learning
- Planning
- Problem solving

Artificial intelligence is a branch of computer science that aims to create intelligent machine which has become an essential part of the technology industry.

Programming computers for certain traits such as:

- Knowledge
- Reasoning
- Problem solving
- Perception
- Learning
- Planning
- Ability to manipulate and move objects

An artificial intelligence system must have a method to learn new data, storing it in the existing structure internally with minimal or no disturbance to them. It is the study of how to make computers do things which is at the moment people do better. This definition is ephemeral because of its reference to the current state of computer science. Also it fails to include some areas of potentially of very large impacts. that cannot now be solved by either computer or people, but it provide a good outline of what it constitute artificial intelligence, and it avoids the philosophical issues that dominate attempts to define the meaning of either artificial intelligence.

A person who knows how to perform tasks from several of the category learns the necessary skill in standard order.

### *B. AI tasks Domain*

Basically AI cover three types if tasks,

1) Mundane Task
2) Formal Tasks
3) Expert Tasks

Mundane Tasks:-
AI has some mundane tasks like

- Perceptions of vision an speech
- Natural Language Understanding
- Commonsense reasoning
- Robotics

Formal Tasks:
AI formal task includes

- Game playing
- Mathematics

Expert Tasks:
It includes

- Engineering field
- Scientific Analysis
- Medicinal and financial analysis

## 2. RELATED WORK

In 2013, Marcus Weller, an Industrial Psychologist, with his brother, Mitchell Weller, suggested a helmet named as SKULLY HELMET for U.S. Army. They used Heads-up Display (HUD) technology solutions for installing a head protection industry.

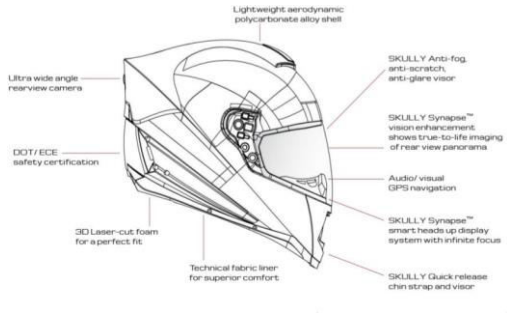


Fig. 1 Skully Helmet

This technology used skully operating system and skully synapse [2].As the cost of the HUD technology was much higher than expected this project was cancelled.

HUD technology is a special technology used to display different application on the helmet. The HUD technology consists of projector unit, combiner and video generation computer [3].

Projection unit is basically used for the projection of application on the screen.

The combiner is basically the screen for projection which redirects the displayed image from the projector.

As the name suggest, the video generation processes works on the video which is to be displayed by the projector.

Another related project is the IOT based smart helmet for accident detection. This helmet was basically designed to detect and report accidents by using censored Wi-Fi and cloud.

As any accident occurs, this helmet immediately sends current location of the user by using cloud service.GPS system has been used for the purpose of detecting the location of the user. This system is stated to be reliable with quick response system

Another smart helmet was designed for speed control purpose. The basic idea of this helmet was to alarm the rider whenever the speed limit exceeds [4].

There are force sensing register and BLDC fan for the purpose of detection of riders head and vehicles speed respectively. A LED is used to when the speed of the vehicle exceeds 100km/hr.

## 3. OBJECTIVE

To design a special helmet for the military people with motion detecting feature.
The purpose of this military helmet is to capture any motion which takes place in their surrounding area.
This motion will be detected by the camera fixed on the helmet and it will be notified on the helmet glass with the help of OLED display.
It will make soldiers more aware of their surroundings.
It will help in tracking suspicious movements of any person or object.
This can help in the protection of precious life of our soldiers.
To record the movement of the soldier and detecting the position of the enemy.

## 4. PROPOSED SHCEME

This paper describes the prototype of the motion detecting helmet. The main idea of this project is to detect the motion of the surrounding area.

This is carried out by the PIR sensor. A PIR sensor detects the infrared rays from the living organism in the nearby area. This sensor sends message to the Arduino Nano.
The Arduino Nano is a device in which the main program is fed for implementation. Once the Arduino receive the message from the PIR sensor it executes. The fed program and sends signal to the OLED display, vibrating pad and camera.

The OLED display is used to display alert message, the vibrating pad starts to vibrate and the camera starts the recording process instantly as soon as it receive signal.

The camera application can be used for checking the surrounding area whenever required.

The whole process is carried out on a PCB which has been customized as per requirement.

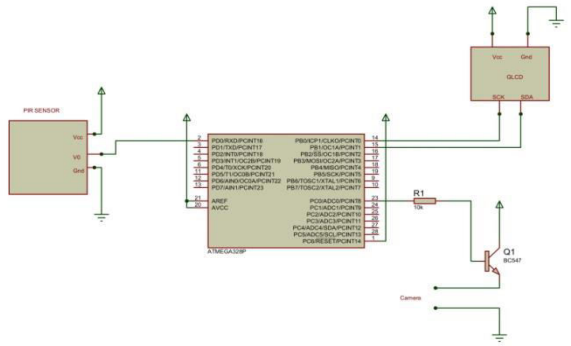

Fig. 2 Wired Circuit Diagram

*Working Principle*

We are creating a prototype model of smart motion detecting helmet. This model consists of a PIR sensor which is connected by Arduino nano.

When the PIR sensor detects any motion it sends signal to the Arduino nano. Once the Arduino receive this signal it sends signal to the OLED display, vibrating pad and camera.

Fig. 3 Working Model

The OLED display on receiving signal from Arduino nano displays alert message to the screen.

The vibrating pad starts to vibrate as soon as it receives the signal from Arduino nano.

The camera also starts to capture the surroundings as soon as it receives the signal from the Arduino nano.

Arduino nano: - A micro-controller board, contains on board power supply, USB port to communicate with PC, and an Atmel microcontroller chip. In our project it is used for sending notification on OLED.

OLED Display: - It is a display technology consisting of OLED panels that emit their own light when an electric current is passed through them. It is required to display notification.

Camera: - It is use to detect the motion that takes place in their surrounding area. We used V380 pro camera.

Battery-: For Power supply to the system. In our project 12 Volt batteries is used.

PIR Sensor-: Passive Infrared sensor is used to measured infrared light radiated by living organism. To detect motion of living thing.

PCB-: Printed Circuit Board. It is used for connecting the devices.

## 5. MODULE DESCRIPTION

**Module 1:** Bread Board connections

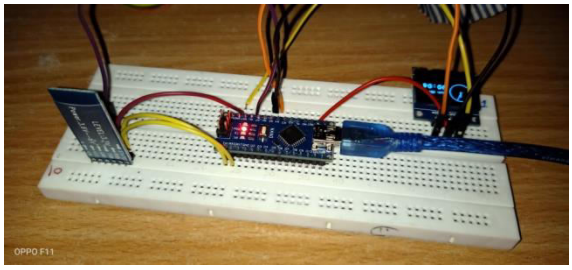

Fig. 4 Bread Board Connection

In the first model the basic connection where done between Arduino Nano and OLED display to check the sending and receiving if the signal between them

**Module 2:** Printed Circuit Board

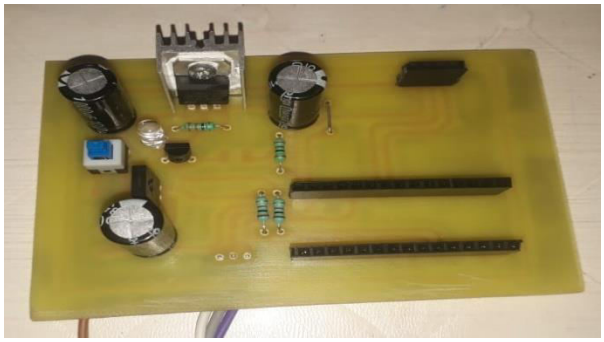

Fig. 5 PCB Connections

PCB is a special type of connecting board .the PCB has one copper side which is used to design customized circuit depending on the requirement.

First the circuit is drawn using 3D printer which is placed on the copper side of the board. Then an insulation element is used to cover the uncovered area of the board. Once the insulated element settles down the drawn circuit is removed.

This keeps only the required area to be conductive making the board into a proper circuit board.

**Module 3:** PIR Sensor connection

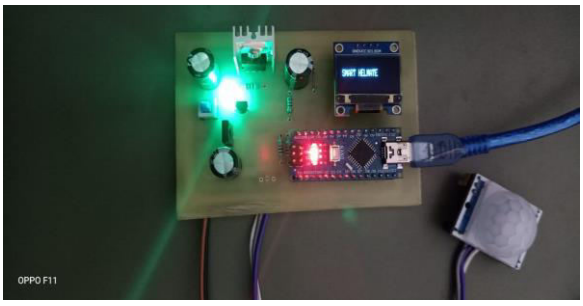

Fig. 6 PCB Connection with PIR Sensor

The PIR sensor detects the living organism in the surrounding area. In this module the PIR sensor is successfully connected to the Arduino nano on the PCB which is further connected to OLED display.

## 6. CONCLUSIONS

This AI based military headgear will be very useful for army people. The motion detection feature can help our solider in dangerous situation. It will make the solider more aware about their surrounding environment. This can also be used to track the location of the enemy in the war condition. So the motion detecting helmet will surely help in saving the life of our precious solider. Being a smart helmet there can be many future scopes, many new features such as location detection, voice activation sensor etc can be added if required.

## REFERENCES

1. Mohd Khairul Afiq Mohd Rasli, Nina Korlina Madzhi, Juliana Johari Faculty of Electrical Engineering University Teknologi MARA 40450 Shah Alam Selangor, MALAYSIA julia893@salam.uitm.edu.my

2. "SKULLY AR-1 the World's Smartest Motorcycle Helmet." Indiegogo. SKULLY Systems, 12 Apr. 2014. Web. 10 Nov. 2016.

3. "The First HEAD-UP DISPLAY for Your Motorcycle Helmet." Kick starter. NUVIZ, 18 Aug. 2013. Web. 15 Oct. 206

4. "BIKEHUD Is the First Augmented Vision Product Developed Specifically for Motorcyclists." Bike-Hud. Motorcycle Information System Technologies Ltd, 1 Jan. 2015. Web. 10 Oct. 2016

5. International Journal of Science and Research (IJSR) ISSN (Online): 23197064 Volume 3 Issue 3, March 2014

6. J. International Journal of Computer Science and Applications Vol. 6, No.2, Apr 2013 ISSN: 0974-1011

7. Sayeed and A.Perrig, Secure Wireless Communications: Secret Keys through Multi-path, Proc. IEEE Intl Conf.Acoustics, Speech Signal Processing, pp. 3013- 3016, Apr.2008

**8.** International Journal of Scientific Engineering Research Volume 2, Issue 12, December-20