**Project report**

On

# AUTOMATIC SUN VISOR FOR TWO WHEELERS

Submitted in the partial fulfilment of the requirement for the award of degree of

**BACHELORS OF TECHNOLOGY**

In

**Electronics & Communication Engineering**


**UNDER THE GUIDANCE OF:**

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# CERTIFICATE

Certified that this project entitled **"Automatic Sun Visors for two wheelers"** submitted by **Shahid Gulzar (11505201), Sobachandra (11507325), Neekita Rai (11505527),** students of Electronics & Communication Engineering Department, Lovely Professional University, Phagwara Punjab in the partial fulfilment of the requirement for the award of Bachelors of Technology (Electronics & Communication Engineering) Degree of LPU, is a record of student's own study carried under my supervision & guidance.

This report has not been submitted to any other University or Institution for the award of any degree.

Mr Gurjot Singh
**Name of Project Coordinator**
Asst. Professor
**Designation**

# ACKNOWLEDGEMENT

We want to acknowledge those people, who have helped us in our project. Firstly, we want to pay our special gratitude to our Project Mentor **Mr GURJOT SINGH** who has given us this opportunity to work on capstone project, to bring out our creative abilities. We would also thank our University and all faculty members without whom this project would have been a distant reality. We extend our heartfelt thanks to our family and friends for their valuable support.

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**Shahid Gulzar**
**Sobachandra**
**Neekita**

# DECLARATION

We hereby declare that the project work entitled “Automatic Sun Visors for two wheelers” is an authentic record of our own teamwork carried out as requirements of Capstone Project for the award of the degree of B.Tech in Electronics and Communication (B.Tech-ECE) from Lovely Professional University, Phagwara, under the guidance of Mr. Gurjot Singh, during January to May, 2019.

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# ABSTRACT

Automation is the backbone of major tasks which require human intervention. Repeated processes are in dire need of automation. Our project also has some repeated process which can be cumbersome if operated manually. Main purpose is to provide a luxurious facility of 'automatic sun visor system' in two wheelers. The mechanism used is appealing because of its innovative approach. We have devised a system which takes feedback from sensors like rain sensor, sunlight sensor, FSR etc. and thus opens automatically when the vehicle is parked in sunlight/rain to protect the shine and avoid heating, damaging and other problems associated. This automated sun visor system can make the journey of rider and pillion comfortable. We have used servo motors with higher torque such that motors can lift as per the requirement. We have designed a foldable structure with water proof cloth. The structure protects the two wheeler from rain/sunlight and thus avoids the harmful effects like heating of seat, color fading etc. Arduino UNO is the process and control unit of the system which receive and processes the data from sensors. The sensors of the system provide open/close signal to Arduino and Arduino further opens/closes the sun visor when all the conditions are met. It's an electro-mechanical system which continuously monitors the sunlight and automatically opens the sun visor to protect bike from the harmful effects of sun light. The system proposed was completed only after some successful as well as other unsuccessful trials. As the work on the project began, all the research and experiments revolved the objective and one step led to another until the final implementation was successfully achieved. This design is really pocket friendly and attractive for common people and thus can be installed to any two wheeler as an add-on.

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# ABBREVATIONS USED

| | |
|---|---|
| **LED** | LIGHT EMITTING DIODE |
| **FSR** | FORCE SENSITIVE RESISTOR |
| **RAM** | RAMDOM ACCESS MEMORY |
| **GND** | GROUND |
| **UV** | ULTRAVOILET |
| **RF** | RADIO FREQUENCY |
| **PWM** | PULSE WIDTH MODULATION |
| **USB** | UNIVERSAL SERIAL BUS |
| **PCB** | PRINTED CIRCUIT BOARD |
| **Tx** | TRANSMITTER |
| **Rx** | RECIEVER |

# CHAPTER 1

# INTRODUCTION

The natural phenomenon such as sunlight, rain, and high temperature etc. cannot be controlled by human beings but some intelligent measures can be adopted to prevent their impact on daily life activities. Parking, being the main issue during the summers, as all the vehicle cannot be parked under the shade due to unavailability of shed. We all know that keeping the vehicle in the sunlight for long duration has lot of adverse effects such paint fades away, plastic parts becomes brittle, seat cracking, engine gets overheated etc. Scorching heat from sun makes the vehicle seat hot and uncomfortable to sit. The rider and the pillion feel helpless as they have no other means to cool down the seat before seating upon. Some of the measures are taken against this environmental problem but they are being performed manually. Here comes the need of automation. Is automation more innovative and effortless? Yes, it will look more attractive and accurate. Automation greatly decreases the need for human sensory, mental and physical requirements. This system proposes a smart sun visors system which works automatically based upon various interrupts such as UV-Infrared-Visible light detector through Grove sensor, rain through rain sensor and ignition status through switch etc.

The automation system consists of a connection between hardware and software. In this process, Arduino Uno is the processing and controlling unit of the system which receives and processes the data from the sensors. The processor of the system opens the sun visor when all the conditions are met. It is an electro-mechanical system which continuously monitors the sunlight/rain and automatically opens/closes the sun visor to protect bike (synonym – two wheelers, motor bikes, vehicle) from sun light/rain. Based on the fact that automatic sun visors represent a main interface between customer and vehicle, visor development state an important field in automotive engineering

So, we have proposed a system that detects sunlight and rain. This report mainly explains the system that will help the vehicle users to view the problem facing from sunlight and rain and get precautionary measure which is fully automated system that cover the vehicles seat.

## 1.1 Manual sun visors:

We all know that keeping the vehicle in the sunlight for long duration has lot of adverse effects such paint fades away, seat cracking, engine gets overheated etc. The UV rays are harmful and damage the paintwork. So a bike cover will not only protect you from

a hot seat, but also protect your plastic from getting brittle. The bike cover is water proof and reliable, as rain water might harm your paintwork too. It is already existing in market and people have been used to it less, due to manual operation. Manual system impacts a pressure on the people to be correct in all details of their work, the problem being that people aren't perfect always. With manual system the level of service is dependent on individuals and this puts a requirement of management. The response speed of the manual system is slow compared to the automated system. For motorcycle riders in India who commute daily, we created a helpful and new accessory to provide cover from rain, sunlight and excess of heat. According to biology sun is good for our skin as it boosts the level of Vitamin D but sadly the same cannot be said about your bike. By keeping your bike exposed to the sun for prolonged period of time causes a lot of issues. Excessive sun light can also cause discoloration and damage to your seat. It prevents excessive heat and discomfort, wetting from rain with this manual sun visor.

***Fig.1.1*** *Manual sun visor*

**Application:**

The manual sun visor can be used to avoid harmful effects of sunlight and heavy rain as shown in the following structure but in all the cases these are manual in operation and thus make it hectic to carry and use.


***Fig.1.2*** *Manual sun visors protecting from sun and rain*

## 1.2. PRESENT DAY – UNRELIABLE AND MANUAL METHODS

Market do not have any solution to the problem and owners of two wheelers are forced to adopt such manual and unreliable method in 21st Century which is famous for bringing change in lives through technology. Either bicycle or bike both are affected due to heating component of sunlight. (Temporary, weird looking and unreliable solution)

***Fig.1.3*** *Manual method for bicycle*

Different form of seat covers available in the market to keep the seat cool. (It is subjected to torn out and moreover does not protect body of the bike). This system will cover only bike seat and not reliable at all.

***Fig.1.4****. Manual foil for two wheeler*

Another method to prevent butts from sweat and hot seat during peak summer. Again mechanical solution, no intelligence, no protection to the body.

***Fig.1.5*** *Designer seat cover*

## 1.3. Need of sun visor:

Sun visor can drastically reduce the harmful effects of sunlight. The effects of UV and infrared rays can result in a number of problems on the body of two wheelers. Color fading, seat heating, plastic crackling and reduction in performance of bike are few major effects of continuous exposure to direct sunlight. Moreover, rain also destroys the shine of leather over time due to acidic content present in it nowadays and in the long run leather deteriorates. It seems normal to sit on a hot seat but it can have serious health issues especially to male riders as it can effect spermatogenesis due to harsh heat. It also protects both rider as well as pillion if both want to take a shade while parking. Images captured on the next page onwards are best example to show need of the sun visor in two wheelers and harmful effects of continuous exposure to sunlight/rain.

***Fig.1.6(a,b)*** *Scorching sunlight*


***Fig.1.7*** *Bikes parked in open sunlight*


***Fig.1.8(a,b)*** *Open parking system at LPU.*

***Fig.1.9(a,b)*** *Color fading of body.*


***Fig.1.10(a,b)*** *Damage due to continuous exposure to sun/rain.*


***Fig.1.11(a,b)*** *Damage due to continuous exposure to sun/rain.*


***Fig.1.12*** *How a bike rider feels while sitting on a hot seat.*

Above all the images give us an idea that how much damage can cause to two wheelers due to continuous exposure to sunlight or rain. We can clearly see that paint is faded away, seats are torn, plastic has become brittle and overall the two wheeler has lost its charm.

## 1.4. Our motivation towards the Project:

Lot of work has been done for Four Wheelers but no emphasis is laid down for two wheelers. Few of the examples are provided below:

In all the methods shown below, it is tried to protect the seat of the cars from getting heated so that the passengers can sit comfortably while driving again. All the solutions are meant

***Fig.1.13*** *Methods to protect interior of four wheelers*

Our solution is completely different even if compared with the technologies used by car sun visor manufacturing companies.

# CHAPTER 2

# LITERATURE REVIEW

Natural phenomenon i.e. weather change is out of human control but we can find better ways to protect our assets from harmful impacts of sunlight as well as rain. Our approach is simple but its importance is felt when rider and pillion are badly discomforted by the scorching heat. On the other hand, body paint of two wheelers fades away due to continuous exposure to sunlight which also deteriorates the performance of vehicle.

## 2.1 Existing solutions relevant to our work.

### 2.1.1 Method of protecting a planetary rover vehicle, US5897156.

Method of protecting a planetary rover vehicle, that travels in a manner that is at least partially autonomous, against an exterior environment that has become hostile where in the vehicle takes shelter and emerges from shelter against the exterior environment of its own accord, respectively in response to first and second events delimiting a period in which the exterior environment is hostile. The vehicle is therefore isolated from the exterior environment during this period.

### 2.1.2 Canopy with an automatic bicycle, CN208007168U.

The present invention discloses a kind of canopy with an automatic bicycle, comprising a body, and a canopy automatic control device; is the umbrella canopy comprises a canopy structure, the support frame, and a plurality of umbrella canopy support rib link carrier. Said automatic control means includes a controller, an illumination sensor for detecting light intensity in real time for real-time detection of rainfall raindrop sensor size, so that the moving rod for driving umbrella frame driving distraction or collapse motor and power source for supplying power, the light sensor, the raindrop sensor signal output terminal respectively connected to the signal input of the controller, the motor driving signal output terminal and the signal input is connected to the controller; the present invention may be. The light intensity and size of rainfall automatically or folding canopy, easy to use.

### 2.1.3 Automatic sun-shading rain-proof device for seat cushion of motorcycle-CN2326503Y.

The utility model relates to an automatic sun proof and rainproof device for seat cushions of motorcycles, which is a novel protective device for seat cushions of motorcycles. The utility model is composed of a servomechanism, a swing rod, and a carrier for cover cloth. The servomechanism is arranged on the edge of a seat cushion. The servomechanism can drive the swing rod to spread out or to retract the cover cloth according to the variance of weather and air temperature. The utility model can automatically protect a seat cushion, which suffers from solarisation and the showering

of rain. The utility model solves the inconvenience and the worry of users of motorcycles brought by a seat cushion which is solarized intensely to become scalding to be sat with difficulty or is showered by rain when the motorcycles are parked outdoors and casually in summer. The utility model has ripe and reasonable structure and convenient installation. The utility model cannot generate any bad effects on the seat cushion and cannot affect sitting. The utility model can enhance the modern feel of a motorcycle and combines the performance of practicality, beautiful appearance, and novelty into integration.

### 2.1.4 Automatic rain and snow protective cover used for handlebar and saddle of sharing bicycle, -CN107745769A.

Detection Cum Analysis of Air Pollution and Issuance of Precautionary Measures to Pollution Control Board and People An automatic rain and snow protective cover used for a handlebar and a saddle of a sharing bicycle comprises a rain and snow sensing system, a mechanical operation system, a protective cover system, a power system, a guaranteeing system, a controller and a support. The automatic rain and snow protective cover used for the handlebar and the saddle can accurately judge rainy and snowy weather in time and can automatically protect the handlebar and the saddle of the sharing bicycle on rainy and snowy days. The automatic rain and snow protective cover used for the handlebar and the saddle can effectively solve the problem that rain and snow remain on the surfaces of the handlebar and the saddle of the sharing bicycle after the rainy and snowy days, the surfaces of the handlebar and the saddle of the sharing bicycle are prevented from being stained by muddy water generated by rain and snow, normal use of the sharing bicycle is achieved, development of a green travel habit is further facilitated, and environment protection is facilitated.

### 2.1.5 Automatic sun visor and solar shade system for vehicles, US6666493B1.

An automatic sun visor system for a vehicle includes a light detecting apparatus for detecting sunlight incident upon the face of an occupant of the vehicle. A microcontroller receives a control signal from the light detecting apparatus, and an adjustable sun visor receives a darkening control signal from the microcontroller. The darkening control signal activates the adjustable sun visor in response to the degree of sunlight detected.

### 2.1.6 Expanding roof rack, GB2416747B.

The expanding roof rack has a matchbox type mechanism of an inner frame running on rollers within an outer frame and is powered by a top solar panel 1. The supported frame is topped by divisional, layered boxes, [the number is determined by the model] which house rolled, or folded plastic concertina, joined, venetian or louver type blinds 11 that roll out and extend to form a solid protective covering. It comes in an [elementary model], car port; [standard model] lockable, partial covering; [deluxe model] lockable, full covering /garage/container; or [prestige model] moulded /contoured / designer full covering. It is an adaptable covering for any type of transport or free standing structure. The deluxe model forms a container to provide protection and security whilst in use or simply a roof rack plastic box when closed.

## 2.2 Comparison with existing state of art work:

## US5897156:

*A table is constructed to show case the difference of proposed invention in comparison to the existing invention*:

| SOTA | Proposed |
|---|---|
| **Structure of Shelter:** The technique requires additional space for covering the whole rover. It is possible for the rover due to deployed in non-congested areas but for two wheelers parked in messy locations, it is not. | **Structure of Visor:** Does not require additional space. |
| **Components Used**: Temperature sensor, image processing, heater etc. | **Components Used**: Sunlight detector, force sensitive resistor, ignition sensor |

| | |
|---|---|
| **Working**: It opens the shelter when it is cold outside or either controlled by the remote station. | **Working:** It evaluates the ignition (1), followed by detecting (2) presence of sunlight. If true, the check seat occupancy by the rider and pillion, if all is true then open the sun visor. It closes the visor automatically when condition (1) or (2) fails. |
| **Algorithm:**<br>1. Temperature drop below the threshold<br>2. Putting moving vehicle on Standby<br>3. Cover the complete rover.<br>4. Turn off the shelter when the temperature increases than the threshold. | **Algorithm:**<br>Technique for parked two wheelers only<br>1. Check ignition to know the parked status<br>2. Check the seat occupancy to open the visor only when it is parked.<br>3. Check the sunlight presence<br>4.Open the visor automatically<br>5. Closes automatically when the sunlight disappears or driver ignitions the vehicle ON.<br>6. It can be operated manually through RF module to open and close the visor for protecting two wheelers from rain. |
| **Application**: especially designed for Rovers, not suitable for two wheelers.<br>**Purpose**: To protect rover from deterioration due to cold weather | **Application**: especially designed for two wheelers.<br>**Purpose**: To protect two wheeler from deterioration due to sun and rain. |
| **Cost:** Costly due to Solar panels, heater and image processing. | **Cost:** Less Costly as it makes use of few components and can be embedded easily in new and existing two wheelers. |
| **Autonomous:** Yes | **Autonomous:** Yes |
| **How US5897156 is different from the Proposed one?**<br>1. US5897156 is not suitable for two wheelers as it does not take it account that whether the rider and pillion are still seated on the vehicle. In other words, it does not have mechanism to find out the seat occupancy. If it is applied as such to the two wheeler, it will open the shelter based upon temperature irrespective of conditions like mode of vehicle – driving or parked. In that case, there is likelihood of mishap. (US5897156 may be fit for unmanned vehicles but not for manned).<br>2. If US5897156 is applied on two wheelers, it may suffocate the people as well.<br>3. Moreover, the technique US5897156 can only be implied on driverless and processor operated vehicles. It cannot put the two wheelers on standby for opening of shelter as it is manually operated and not electronically. | |

## CN208007168U:

*A table is constructed to show case the difference of proposed invention in comparison to the existing invention*:

| SOTA | Proposed |
|---|---|
| **Structure of Shelter:** No image is provided | **Structure of Visor:** Does not require additional space. |
| **Components Used**: Illumination sensor, rain detector, motor, umbrella to open and close | **Components Used**: Sunlight detector, force sensitive resistor, ignition sensor |

| | |
|---|---|
| **Working**: Opens the visor based upon rainfall and light detection | **Working:** It evaluates the ignition (1), followed by detecting (2) presence of sunlight. If true, the check seat occupancy by the rider and pillion, if all is true then open the sun visor. It closes the visor automatically when condition (1) or (2) fails. |
| **Algorithm:**<br>1. Check the input from illumination sensor and rainfall sensor.<br>2. If yes, open the visor, else don't open. | **Algorithm:**<br>Technique for parked two wheelers only<br>1. Check ignition to know the parked status<br>2. Check the seat occupancy to open the visor only when it is parked.<br>3. Check the sunlight presence<br>4.Open the visor automatically<br>5. Closes automatically when the sunlight disappears or driver ignitions the vehicle ON.<br>6. It can be operated manually through RF module to open and close the visor for protecting two wheelers from rain. |
| **Application**: Bicycles<br>**Purpose**: To protect deterioration due to sun and rain. | **Application**: especially designed for two wheelers.<br>**Purpose**: To protect two wheeler from deterioration due to sun and rain. |
| **Autonomous:** Yes. | **Autonomous:** yes |
| **How CN208007168U is different from the Proposed one?**<br>1. This is a very basic model as suitable for bicycles. It is not suitable for two wheelers as it does not take it account that whether the rider and pillion are still seated on the vehicle. In other words, it does not have mechanism to find out the seat occupancy. If it is applied as such to the two wheeler, it will open the shelter based upon temperature irrespective of conditions like mode of vehicle – driving or parked. In that case, there is likelihood of mishap. | |

## CN2326503Y

*A table is constructed to show case the difference of proposed invention in comparison to the existing invention*:

| | |
|---|---|
| **Structure of Shelter:** | **Structure of Visor:** Does not require additional space. |
| **Components Used**: Motor, heat absorption sensor | **Components Used**: Sunlight detector, force sensitive resistor, ignition sensor, motor |
| **Working**: Opens the sun visor when the seat gets heated to a certain temperature level.<br>It also takes into account the ignition status of the bike in order to prevent the opening of visor during travelling. | **Working:** It evaluates the ignition (1), followed by detecting (2) presence of sunlight. If true, the check seat occupancy by the rider and pillion, if all is true then open the sun visor. It closes the visor automatically when condition (1) or (2) fails. |

| | |
|---|---|
| **Algorithm:**<br>1.Read temperature level of seat continuously<br>2. Check the ignition status.<br>3. Open the visor if the vehicle is powered off and temperature of the seat reaches above the certain level. | **Algorithm:**<br>Technique for parked two wheelers only<br>1. Check ignition to know the parked status<br>2. Check the seat occupancy to open the visor only when it is parked.<br>3. Check the sunlight presence<br>4.Open the visor automatically<br>5. Closes automatically when the sunlight disappears or driver ignitions the vehicle ON.<br>6.It can be operated manually through RF module to open and close the visor for protecting two wheelers from rain. |
| **Application**: For motorcycle<br>**Purpose**: To protect two wheeler from deterioration due to sun and rain. | **Application**: especially designed for two wheelers.<br>**Purpose**: To protect two wheeler from deterioration due to sun and rain. |
| **Cost:** NA | **Cost:** Less Costly as it makes use of few components and can be embedded easily in new and existing two wheelers. |
| **Autonomous:** Yes | **Autonomous:** Yes |

**How CN2326503Y is different from the Proposed one? QUITE SIMILAR YET Different**

1. Protection from UV rays begins only when the seat gets heated to a certain level. Some damage may still be there due to delay in opening the visor.
2. Secondly it provides shelter to seat cover and not to the body portions. (e.g., tank, handle etc.)
3. The past system does not check seat occupancy. Therefore, according to the present invention, the shelter may get opened even if the person is sitting on the bike.
   *For example* – The rider drove the bike alone without pillion and the now the rear seat is already heated to the level. The rider may stop the bike on the red lights and switch off the ignition to save fuel. However as per the concept, the system will open the visor due to OFF status of ignition and heated output from sensor. Though he has not parked the bike anywhere still there is a huge probability that visor will be opened in this case.
4. The present invention does not have timer by which the above problem could have been resolved to some extent. Moreover, there is no provision given the user to set the sensitivity of the heat absorption sensor. In other words, the system does not have timer, therefore the shelter may get opened immediately even if the person is sitting or have stopped for a while.
5. The system does not have a switch to complete shut down the system when not in use or required or doing any malfunctioning etc.
6. The system does not have any sort of module which can operate the device wirelessly. Other additions that the proposed system have is:
   1. Height adjusted visor to work in seat non occupancy and occupancy mode. (if works based upon sensor, it completely covers the body of the vehicle. Other instance, if the person is sitting on the vehicle and wants to protect itself from rain and sun, then the person can open the visor through remote bypassing all the sensor interrupts, therefore visor does not completely open the shelter rather it opens to the extent of protecting the rider). 2. Lighted sun visor for tracing in darkness using remote control.

## CN107745769A:

*A table is constructed to show case the difference of proposed invention in comparison to the existing invention*:

| | |
|---|---|
| **Structure of Shelter:** telescopic unit is used for sheltering. | **Structure of Visor:** Does not require additional space. |
| **Components Used**: Rain and snow sensing system, controller, mechanical system, power unit | **Components Used**: Sunlight detector, force sensitive resistor, ignition sensor |
| **Working**: It evaluates the snow and rain through humidity sensor and opens the shelter to protect handle grip and saddle. The signal is sent by the sensor to the controller which opens the visor. | **Working:** It evaluates the ignition (1), followed by detecting (2) presence of sunlight. If true, the check seat occupancy by the rider and pillion, if all is true then open the sun visor. It closes the visor automatically when condition (1) or (2) fails. |
| **Algorithm:**<br>1. Humidity sensor generates the output<br>2. Based upon that, shelter is opened.<br>3. They also check the seat pressure for not opening the shelter when the person is seated. | **Algorithm:**<br>Technique for parked two wheelers only<br>1. Check ignition to know the parked status<br>2. Check the seat occupancy to open the visor only when it is parked.<br>3. Check the sunlight presence<br>4.Open the visor automatically<br>5.Closes automatically when the sunlight disappears or driver ignitions the vehicle ON.<br>6. It can be operated manually through RF module to open and close the visor for protecting two wheelers from rain. |
| **Application**: Bicycle<br>**Purpose**: to protect from rain and snow. | **Application**: especially designed for two wheelers.<br>**Purpose**: To protect two wheeler from deterioration due to sun and rain. |
| **Cost:** NA | **Cost:** Less Costly as it makes use of few components and can be embedded easily in new and existing two wheelers. |
| **Autonomous:** Yes | **Autonomous:** Yes |
| **How CN107745769A is different from the Proposed one?**<br>1. The system does not evaluate ignition status, hence suitable for bicycles but not for motor vehicles.<br>2. The system does not protect from sunrays.<br>3. Cannot be operated wirelessly.<br>4. Does not have a timer to adjust the opening time when all the conditions are true. | |

## US6666493B1:

*A table is constructed to show case the difference of proposed invention in comparison to the existing invention*:

| | |
|---|---|
| **Structure of Shelter:** Vertical (for cars) | **Structure of Visor:** Does not require additional space. |
| **Components Used**: Digital Camera, electro chromic visor and a controller etc. | **Components Used**: Sunlight detector, force sensitive resistor, ignition sensor |
| **Working**: It takes an input from light detecting sensor and generates a darkening control signal and sends it to microcontroller which then adjusts the sun visor according to the degree of sunlight detected. It also uses a digital camera to figure out the shadow on the face of the person. | **Working:** It evaluates the ignition (1), followed by detecting (2) presence of sunlight. If true, the check seat occupancy by the rider and pillion, if all is true then open the sun visor. It closes the visor automatically when condition (1) or (2) fails. |
| **Algorithm:**<br>1. Detects the degree of light incident on the face<br>2. Adjust the sun visor accordingly in segments. | **Algorithm:**<br>Technique for parked two wheelers only<br>1. Check ignition to know the parked status<br>2. Check the seat occupancy to open the visor only when it is parked.<br>3. Check the sunlight presence<br>4.Open the visor automatically<br>5. Closes automatically when the sunlight disappears or driver ignitions the vehicle ON.<br>6. It can be operated manually through RF module to open and close the visor for protecting two wheelers from rain. |
| **Application**: Cars<br>**Purpose**: To protect from sunrays | **Application**: Especially designed for two wheelers.<br>**Purpose**: To protect two wheeler from deterioration due to sun and rain. |
| **Cost:** Costly as image processing is involved. | **Cost:** Less Costly as it makes use of few components and can be embedded easily in new and existing two wheelers. |
| **Autonomous:** Opening is not, adjustment is autonomous | **Autonomous:** Yes |
| **How US6666493B1 is different from the Proposed one?**<br>1. This project deals with darkening and adjusting the degree of sun visor based upon incident light. More suitable for cars instead of two wheelers.<br>2. This project does not deal with automatic opening and closing of visors.<br>3. Moreover, it is for moving vehicles and not for parked vehicles i.e. application is different. | |

## GB2416747B:

*A table is constructed to show case the difference of proposed invention in comparison to the existing invention*:

| | |
|---|---|
| **Structure of Shelter:** Matchbox type. | **Structure of Visor:** Does not require additional space. |

| | |
|---|---|
| **Components Used**: switch, solar panels, battery, roof rack | **Components Used**: Sunlight detector, force sensitive resistor, ignition sensor |
| **Working**: The roof can be opened manually by a switch which is wired internally or with the remote attached to the key. The system is powered by the solar panels installed on the sun visor or with an external back up. | **Working:** It evaluates the ignition (1), followed by detecting (2) presence of sunlight. If true, the check seat occupancy by the rider and pillion, if all is true then open the sun visor. It closes the visor automatically when condition (1) or (2) fails. |
| **Algorithm:**<br>1. The sun visor can be manually opened when required.<br>2. The user can use it through wired switch or any type of remote switch. | **Algorithm:**<br>Technique for parked two wheelers only<br>1. Check ignition to know the parked status<br>2. Check the seat occupancy to open the visor only when it is parked.<br>3. Check the sunlight presence<br>4.Open the visor automatically<br>5. Closes automatically when the sunlight disappears or driver ignitions the vehicle ON.<br>6. It can be operated manually through RF module to open and close the visor for protecting two wheelers from rain. |
| **Application**: especially designed for two wheelers.<br>**Purpose**: To protect two wheeler from deterioration due to sun and rain. | **Application**: especially designed for two wheelers.<br>**Purpose**: To protect two wheeler from deterioration due to sun and rain. |
| **Cost:** NA | **Cost:** Less Costly as it makes use of few components and can be embedded easily in new and existing two wheelers. |
| **Autonomous:** No | **Autonomous:** Yes |
| **How GB2416747B is different from the Proposed one?**<br>1. Purely mechanical structure. It does not have any automation to reduce the human efforts.<br>2. The application does not take into account parking and riding status of vehicle. Hence the purpose of protecting the vehicle automatically from sunrays and rain cannot be achieved from this patent. | |

# CHAPTER 3

# PROBLEM FORMULATION

This project is a system that protects the vehicle from sunlight and rain. It is harmful for a bike to be kept in sunlight for longer duration. By this project, people will come to know the problem which are being faced and they can also decide the measures to be taken for the rectification and thus vehicle life span would increase. But at present there many problems because of heavy sunlight and rain which are needed to sorted out as soon as possible. The current problems which are being faced are mainly the problem without sun visors and drawbacks of the sun visor already there in there in the market.

## 3.1 Problem without sun visor:

1. Heavy sunlight and rain can cause adverse effect on seat of the vehicle and metal portion. The paint will fade away and cracking of different parts made up of plastic as well as metal will occur. When the sunlight is incident on the paint, it breaks up the bond which is formed between the paint molecules resulting in fading of the paint. Plastic parts on the bike become brittle and may get broken due to excessive sunlight. The seat cover will also be destroyed. If the bike is kept in sunlight for prolonged period, then the fuel might also evaporate and deteriorate.

***Fig. 3.1*** *Color fading of seat and rusting of metal portion.*

2. Scorching heat from sun makes the vehicle seat feel like '***lava from volcano***'. The rider and the pillion feel helpless as they have no other means to cool down the seat before seating upon. Hence, they bare the beat at their butts which is very uncomfortable for all age group and may change body cell
3. Engine oil damage also a problem that bikers using mineral oil in their bikes as engine oil, they are more prone to the oil damage in case one has to park their bike in the sun for a long time. The engine oil gets heated up really quick and this in turn damages the life of the oil.

## 3.2Drawbacks/Limitations of existing state of ark work:

### 3.2.1 US5897156

- US5897156 is not suitable for two wheelers as it does not take it account that whether the rider and pillion are still seated on the vehicle. In other words, it does not have mechanism to find out the seat occupancy. If it is applied as such to the two wheeler, it will open the shelter based upon temperature irrespective of conditions like mode of vehicle – driving or parked. In that case, there is likelihood of mishap.
- If US5897156 is applied on two wheelers, it may suffocate the people as well.
- Moreover, the technique US5897156 can only be implied on driverless and processor operated vehicles. It cannot put the two wheelers on standby for opening of shelter as it is manually operated and not electronically.

### 3.2.2 CN208007168U

- This is a very basic model as suitable for bicycles. It is not suitable for two wheelers as it does not take it account that whether the rider and pillion are still seated on the vehicle. In other words, it does not have mechanism to find out the seat occupancy. If it is applied as such to the two wheeler, it will open the shelter based upon temperature irrespective of conditions like mode of vehicle – driving or parked. In that case, there is likelihood of mishap.

### 3.2.3 CN2326503Y

- Protection from UV rays begins only when the seat gets heated to a certain level. Some damage may still be there due to delay in opening the visor.
- The past system does not check seat occupancy. Therefore, according to the present invention, the shelter may get opened even if the person is sitting on the bike. For example – The rider drove the bike alone without pillion and the now the rear seat is already heated to the level. The rider may stop the bike on the red lights and switch off the ignition to save fuel. However as per the concept, the system will open the visor due to OFF status of ignition and heated output from sensor. Though he has not parked the bike anywhere still there is a huge probability that visor will be opened in this case.

### 3.2.4 CN107745769A

- The system does not evaluate ignition status, hence suitable for bicycles but not for motor vehicles.
- The system does not protect from sunrays.

- Cannot be operated wirelessly.
- Does not have a timer to adjust the opening time when all the conditions are true.

Sun visors which is already there in the market are unreliable and manual method. Market does not have any solution to the problem and owners of two wheelers are forced to adopt such manual and unreliable method. Innovative idea but not at all useful as it would be difficult to drive bikes. Different form of seat covers available in the market to keep the seat cool, but this way of system cannot prevent the body of the bike from adverse effects of sunlight.

***Fig.3.2*** *Manual covers*


***Fig.3.3*** *Anti-heat system.*

# CHAPTER 4

# OBJECTIVE

Smart automation with greater reliability is backbone of any innovation. This project tries to focus on various problems arising in two wheelers. From sensing of phenomenon like sunlight, rain etc. to reaction by microcontroller, all are automatic in nature. We have tried to consider all the cases which can arise and devised feasible solutions. As a whole we have tried to make it minimalistic human intervened structure.

The objectives of our project as listed below.

1) To design a multi-featured automatic sun visor for two wheelers.
2) To design a product with smart anti-collision feature while driving.
3) To design a product which avoids collision with rider or pillion by sensing their presence.
4) To provide a sun visor which is equipped with robust sensors for accurate closing and opening of visor.
5) To propose a system which gives flexibility to configure the opening time of sun visor.
6) To design a visor with remotely operated LED tracking system during darkness.
7) To provide a visor with adjustable height and length as per user requirement.
8) To provide the facility to remove the cloth for washing or replacing.

9) To propose a system with built-in health monitoring system in order to avoid malfunctioning of sensors under any improper circumstances.

10) To provide a built-in weather monitoring system which is prompted remotely and provides details like sunlight or rain on respective assigned LEDs.

11) To design and implement a system with an installed solar panel for charging system battery.

12) To provide a cell phone charging unit with variety of pins/jacks.

13) To provide a shutdown button for completely turning off the all electronic components.

14) To design a visor which has dual weather condition sensing feature i.e. sunlight as well as rain.

15) To formulate a system which is eco-friendly and saves energy.

16) To prepare a code which relies on mechanical support system rather than electronic which needs continuous current supply for holding.

17) To design a system which can protect the visor structure during storms or high speed winds.

# CHAPTER 5

# SOLUTION METHODOLOGY

Our project consists of four units which make the structure working. The first unit is the sensing unit which detects the various information e.g. sunlight, rain, ignition and pressure acting on seat. All the sensors are reliable and robust. The second unit is electromechanical unit which mainly comprises of the whole frame and motors attached it. We have used high torque metal gear servo motors for smooth and accurate movement. All motors are externally powered by 12v battery along with 7.2v adjustable buck-convertor. Motors provide a high torque of 11 kg-cm at ideal conditions. Third unit is analysing and processing unit and it consists of seediuno (a type Arduino from seed studios). All the components are interfaced to this unit and it processes the sensed data thus, finally opens or closes the visor. Forth and the last unit is RF unit. It comprises of RF transmitter and receiver. We can remotely control our visor using this unit. LED strip glowing can also be done with this unit. We can also get weather information by pressing a single button and respective LED will glow according to the weather condition. We have divided whole project into four main units for better troubleshooting and management

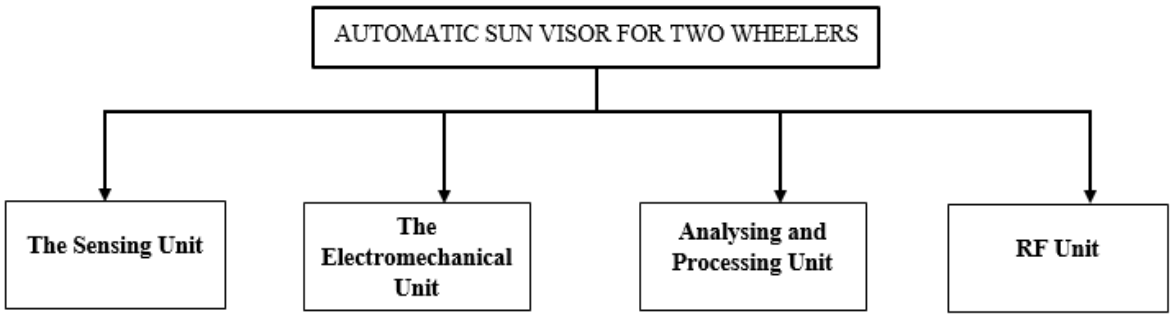



***Fig.5.1*** *All units of sun visor*

## 5.1 The Sensing Unit

The sensing unit comprises of different sensors which are used to perceive/sense different phenomenon and transfer the information to Arduino. Below are the sensors used:

### 5.1.1 Grove Sunlight Sensor

Grove - Sunlight Sensor is a multi-channel digital light sensor, which has the ability to detect UV-light, visible light and infrared light. This device offers excellent performance under a wide dynamic range and a variety of light sources including direct sunlight. Grove - Sunlight Sensor include an on-bard Grove connector, which help you to connect it your Arduino easily. You can use this device for making some project which need to detect the light, such as a simple UV detector.

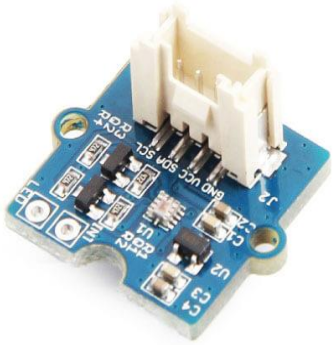


***Fig.5.2*** *Grove Sunlight sensor*

**Features**

- ❖ Digital light sensor
- ❖ Wide spectrum detection range to improve accuracy.
- ❖ Programmable configuration which make it versatile for various applications.
- ❖ Detects sunlight directly
- ❖ Grove compatible on seediuno board.

**Specifications**

- ❖ Operating Voltage - 3.0-5.5V
- ❖ Working current - 3.5mA
- ❖ Wave length - 280-950nm
- ❖ Operating Temperature - 45-85℃

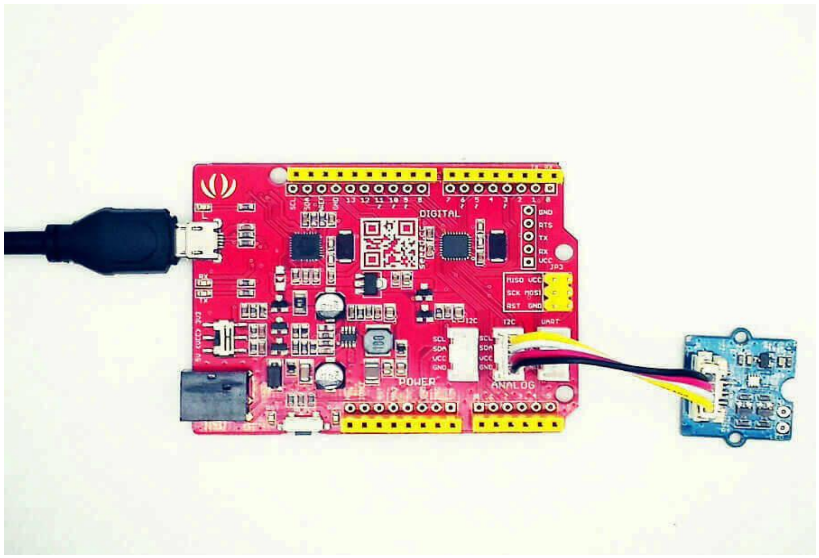


***Fig.5.3*** *Interfacing of Grove Sunlight Sensor with Arduino*

### 5.1.2 Rain sensor

The Raindrops Detection sensor module is used for rain detection. It is also for measuring rainfall intensity. Rain sensor can be used for all kinds of weather monitoring and translated into output signals and analog output. It can be used to monitor a variety of weather conditions and turned into several fixed output signal and Analog output. It includes a printed circuit board (control board) that "collects" the raindrops. As raindrops are collected on the circuit board, they create paths of parallel resistance that are measured via the op-amp. The lower the resistance (or the more water), the lower the voltage output. Conversely, the less water, the greater the output voltage on the analog pin. A completely dry board, for example, will cause the module to output 5V. The module includes a rain board and a control board that is separate for more convenience. It has a power indicator LED and an adjustable sensitivity through a potentiometer

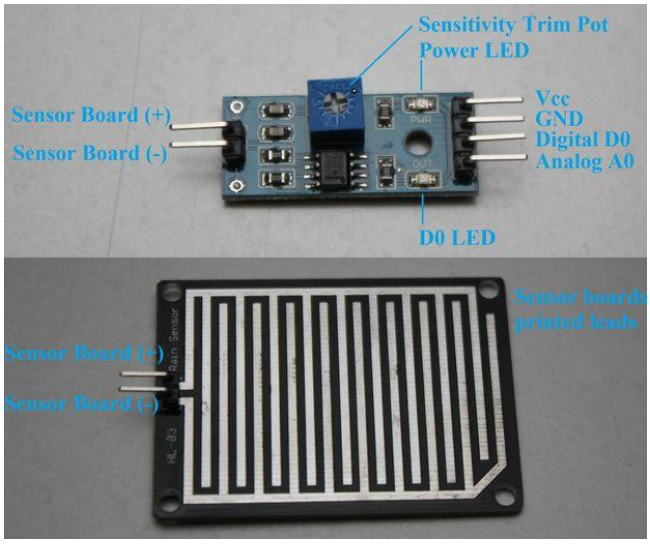



***Fig.5.4*** *Rain Sensor*

**Features**

- Provide both digital and analog output.
- Output LED indicator.
- Compatible with Arduino.
- Treatment of nickel plating and surface, have fight oxidation, electrical conductivity, and life has more superior performance.
- The output format: digital switch output (0 and 1) and analog voltage output.
- Low cost.

**Specifications**

- Power supply voltage: 3.3-5V.
- Digital switch output and analog voltage output.
- Adjustable sensitivity.
- Output LED indicator.

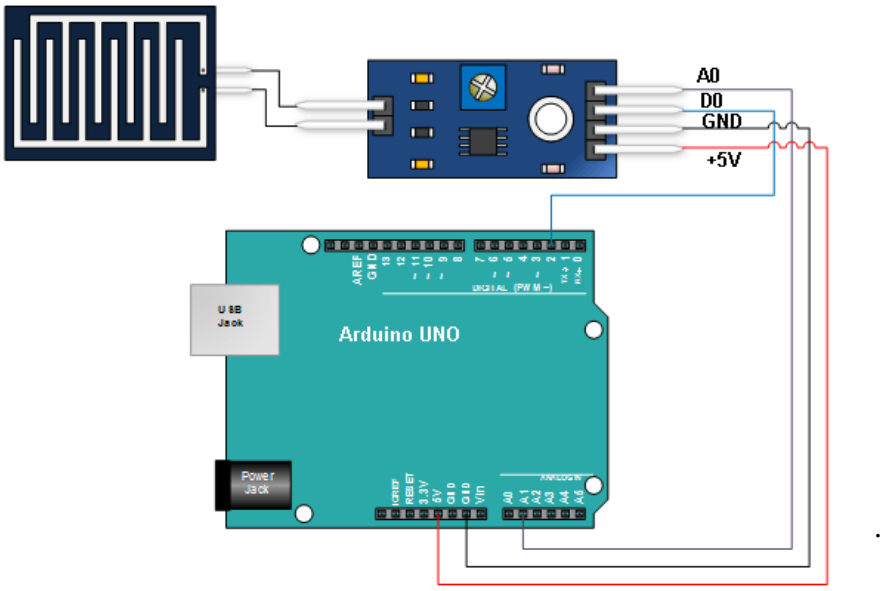



**Fig 5.5** Rain sensor interfacing with Arduino

### 5.1.3 Force sensitive Resistor (FSR) sensor:

FSRs are sensors that allow you to detect physical pressure, squeezing and weight. They are simple to use and low cost. The FSR is made of 2 layers separated by a spacer. FSRs are basically a resistor that changes its resistive value (in ohms Ω) depending on how much it is pressed. These sensors are fairly low cost, and easy to use but they are rarely accurate. They also vary some from sensor to sensor perhaps 10%. So basically when you use FSRs you should only expect to get ranges of response. While FSRs can detect weight, they are a bad choice for detecting exactly how many pounds of weight are on them. However, for most touch-sensitive applications like has this been squeezed or pushed and about how much they are a good deal for the money.

***Fig.5.6** FSR sensor*

**Features**

- Range: up to 150 Kg (depend on the type)
- Response Time: <1.2ms
- Consumption: ~0.4mA
- Thin film technology
- Pre-conditioned analog output
- High signal-to-noise ratio

**Interfacing with Arduino**

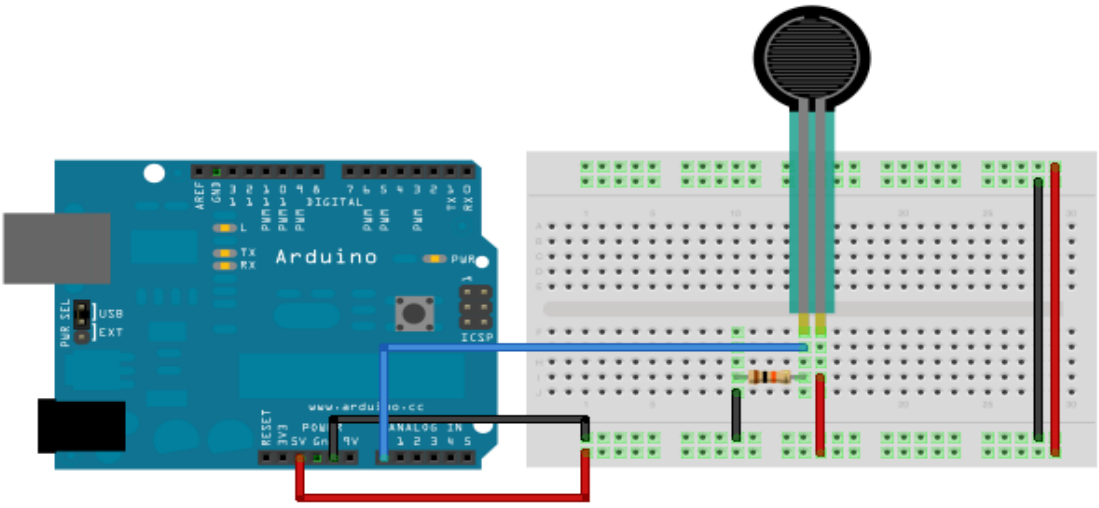



***Fig.5.7*** *FSR interfacing with Arduino*

## 5.2 The Electromechanical Unit

### 5.2.1 Servo Motors

This is essentially an upgraded version of the famous MG995 servo. It now has a redesigned PCB and IC control system which makes it far more accurate. Its internal gearing and motor are also upgraded to improve dead bandwidth and centring. All specifications are the same as the previous model MG995, however this servo is far more accurate, and safe to use in aircraft which require precise servo movements and perfect centring.

***Fig.5.8*** *Servo Motor*

**Features**

- Operating voltage is -- +5V typically
- Current: -- 2.5A(6V)
- Stall Torque: -- 9.4kg/cm (at 4.8V)
- Maximum stall Torque: -- 11kg/cm (6V)
- Gear type: -- Metal
- Rotation: -- 0-180
- Weight of motor: -- 55gm

## 5.3 Analysing and processing Unit

### 5.3.1.Seediuno

The Seediuno is an open source Microcontroller board based on the Microchip Atmega 328P microcontroller. There are so many Arduinos and Arduino compatible board in the world, and we think that Seediuno V4.2 is one of the best Arduinos. Seediuno V4.2 is much more stable, easy to use and even good looking. Seediu no V4.2 is based the Arduino UNO bootloader.

***Fig.5.9*** *Seediuno*

**Features**

- ATmega328 microcontroller
- Arduino UNO bootloader
- 14 Digital I/O Pins (6 PWM outputs)
- 6 Analog Inputs
- ISP Header
- Arduino UNO-R3 Shield Compatible
- Micro USB programming and power supply
- 3 on-board Grove connectors
- 3.3/5V system operation power switch

**Specification**

- 3 on-board Grove connectors
- DC Current per I/O Pin: 40 mA
- DC Jack Input: 7v-12v
- Flash Memory: 32 KB
- RAM: 2 KB
- EEPROM: 1 KB
- Clock Speed:16 MHz

## 5.4 Radio Frequency (RF) Unit:

An RF module (radio frequency module) is a (usually) small electronic device used to transmit and/or receive radio signals between two devices. In an embedded system it is often desirable to communicate with another device wirelessly. This wireless communication may be accomplished through optical communication or through radio frequency (RF) communication. For many applications the medium of choice is RF since it does not require line of sight. RF communications incorporate a transmitter and a receiver. They are of various types and ranges. Some can transmit up to 500 feet.

### 5.4.1 Transmitter :

An RF transmitter module is a small PCB sub-assembly capable of transmitting a radio wave and modulating that wave to carry data. Transmitter modules are usually implemented alongside a micro controller which will provide data to the module which can be transmitted. RF transmitters are usually subject to regulatory requirements which dictate the maximum allowable transmitter power output, harmonics, and band edge requirements.

***Fig.5.10*** *RF Transmitter*

### Features

- Range in open space(Standard Conditions) : 100 Meters
- TX Frequency Range : 433.92 MHz
- TX Supply Voltage : 3V ~ 6V
- TX Out Put Power : 4 ~ 12 Dbm
- Low Power Consumption
- Complete Radio Transmitter
- Transmit Range Up To 50m
- Very Stable Operating Frequency
- Low Current Consumption (Typ 11mA)
- Wide Operating Voltage

### 5.4.2 Receiver

RF modules are widely used for wireless data transfers and remote control applications. These days, cost of RF modules are very low and are compact in size. Most of these RF modules are operating around 433MHz. Amplitude Shift Keying (ASK) or Frequency Shift Keying (FSK) are mainly used for wireless data transfers.

***Fig.5.11****. RF Receiver*

**Features**

- ❖ Operating mode: AM
- ❖ Operating voltage: DC5V
- ❖ Quiescent Current: 4mA
- ❖ Receiver sensitivity:-105DB
- ❖ Receivieng frequency: 433M
- ❖ Size: 30 * 14 * 7mm

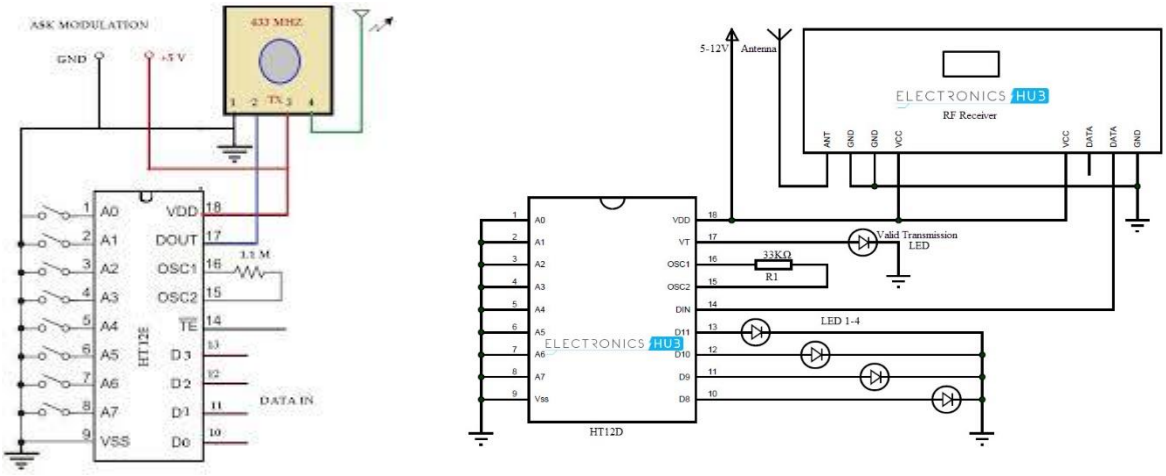



***Fig. 5.12.*** *Interfacing of Tx. And Rx.with Ecoder and Decoder ICs*

All of the above units work together and thus we are able to achieve the following claims:

1. A multi-featured automatic sun visor for two wheelers is proposed.

2. As the product is prepared for parked two wheelers, therefore it has a smart feature which resists it to open in driving mode, thus preventing from accidents etc.

3. The design and operation is so advanced that the product senses the presence of rider and pillion on the two wheeler and hence does not open the visor to avoid collision of product with pillion/rider.

4. The proposed sun visor is equipped with sensors to make the complete functionality automatic. When the two wheeler is parked, has no rider/pillion on it and is exposed to sunlight/rain/snow, then the electronic system sends a command to open the sun visor but after the lapse of the timer.

5. The proposed sun visor is the only sun visor in comparison to state of the art sun visors which gives flexibility to configure the opening time of sun visor. This is very important to save the power of the battery and wear and tear of the product when the rider has parked the bike for very few minutes.

6. Sun visor is equipped with light to track the location of two wheeler when parked in dark.This feature can be used through a wireless remote.

7. This feature is very novel as the user of sun visor can adjust the height and length based upon requirement. For instance, if the rider is waiting for someone in parking and is exposed to sunlight/rain, then he could extend the sun visor height and open the sun visor through wireless remote thus protecting his body, clothes and useful gadgets with him like atm cards, mobile phone, cash etc. In normal case, the height of the visor is kept low as the purpose is to protect the two wheeler body.

8. Cloth of sun visor is easily replaceable for washing and changing purposes.

9. The mechanical design and motion of closing and opening of sun visor is very novel, smooth and reliable.

10. The sun visor is having built in doctor and thus monitors the health of the electronic sun visor continuously. It indicates when the sun visor needs service and maintenance. If the sun visor malfunctions, then it alarms the user by glowing the light mounted on the panel.

11. One of the novel features is that the proposed sun visor can also be used for knowing the weather information such as bright sunlight and rain. User can request for weather update

through wireless remote. This feature makes use of sensors deployed for opening and closing of sensor and has not added any cost to the product.

12. Solar panels are empaneled on the sun visor roof to charge the battery.

13. The sun visor assembly also has in built Mobile charging unit to facilitate the users. This feature is usually provided in cars and not in bikes. Further the power to the mobile charging unit is being provisioned by the solar panels itself. Hence, making use of natural resources.

14. There is no need to dismount the assembly of sun visor if not required temporarily. It has power off Button to shut down the visor when not required.

15. It has an Anti-collision feature to protect harm to pillion/rider and product. As the sun visor is at normal height and if prompted to open at that height despite seat being occupied then it could collide with passenger. Hence it has a smart sensor which only allows opening of the sun visor in seat occupancy when the height of the sun visor is extended. Below images show the final assembly with primary/master unit mounted on a bike.

***Fig. 5.13*** *Visor installation on a two wheeler*


***Fig. 5.14*** *Side view of the mounted structure*

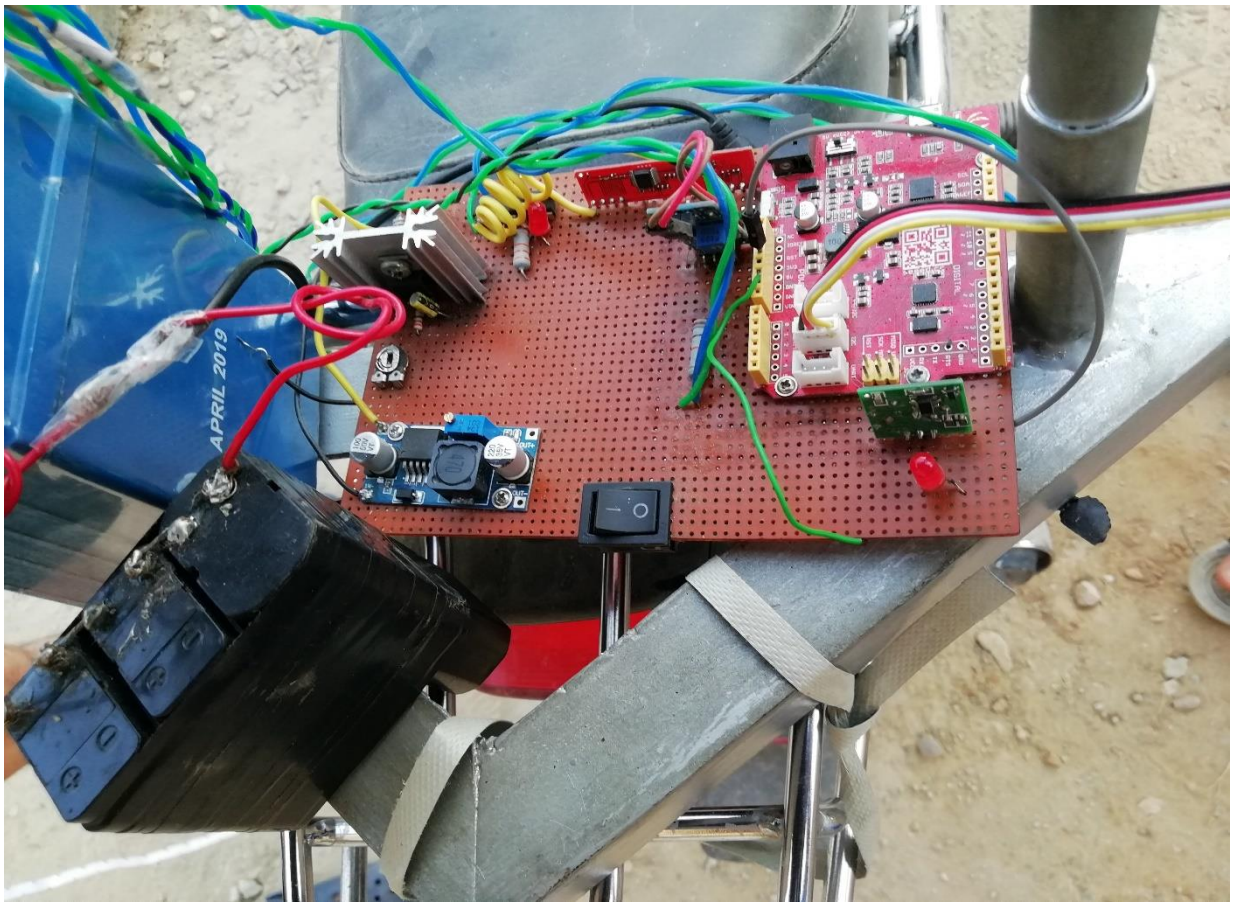



***Fig. 5.15*** *Primary/Master unit with all embedded electronic components*

## 5.5 Block diagram

Block diagram section is divided into two major section i.e. i) Control without remote control. ii) Control with remote control. Let's discuss according to the given block diagrams below.

## Operation without remote control:

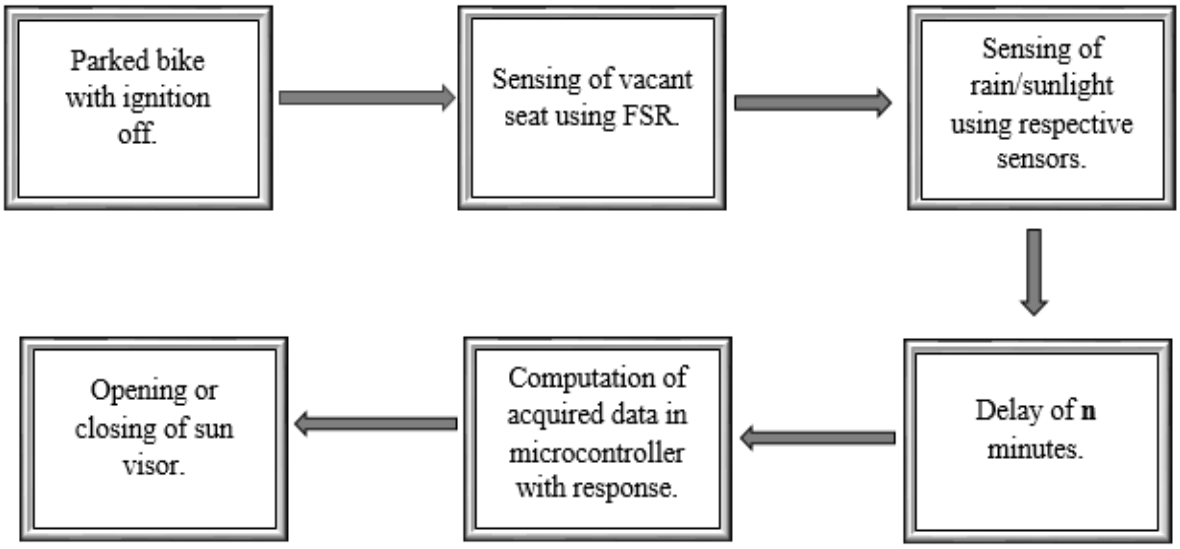



***Fig.5.16*** *Operation when no remote control is used (fully automatic).*

## Operation with remote control:

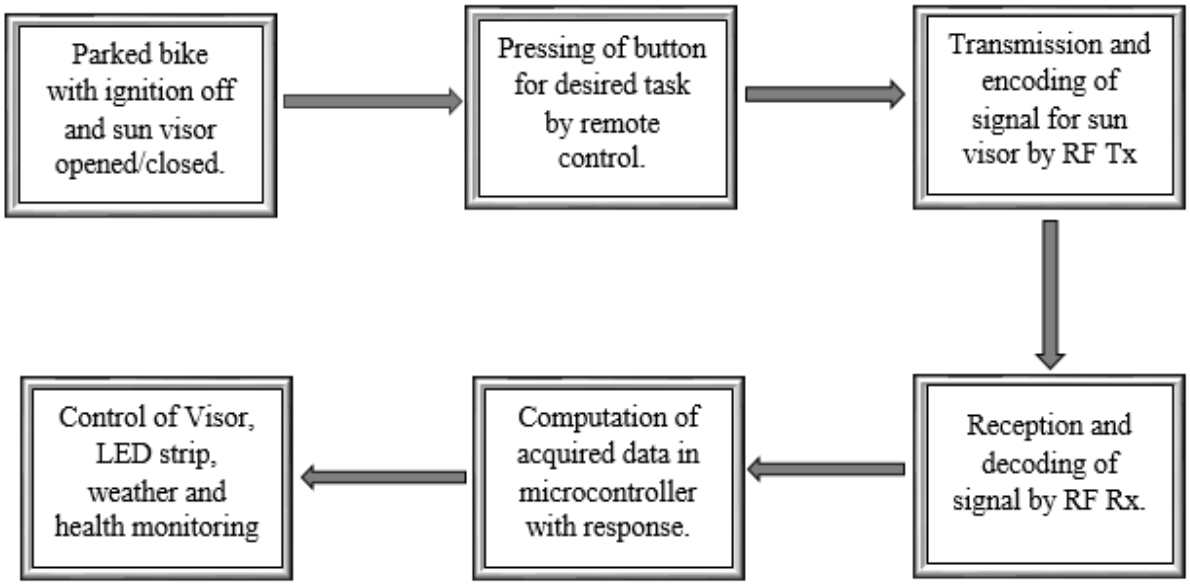



***Fig.5.17*** *Operation when remote control is used.*

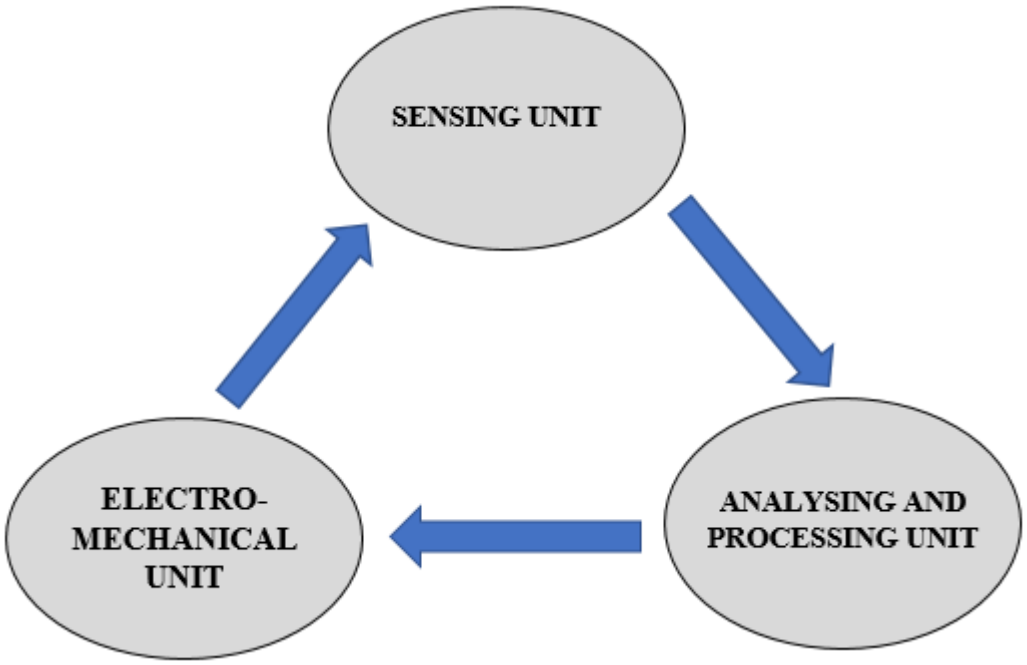



***Fig.5.18*** *General cycle of operation.*

## 5.6 Different sections of hardware:

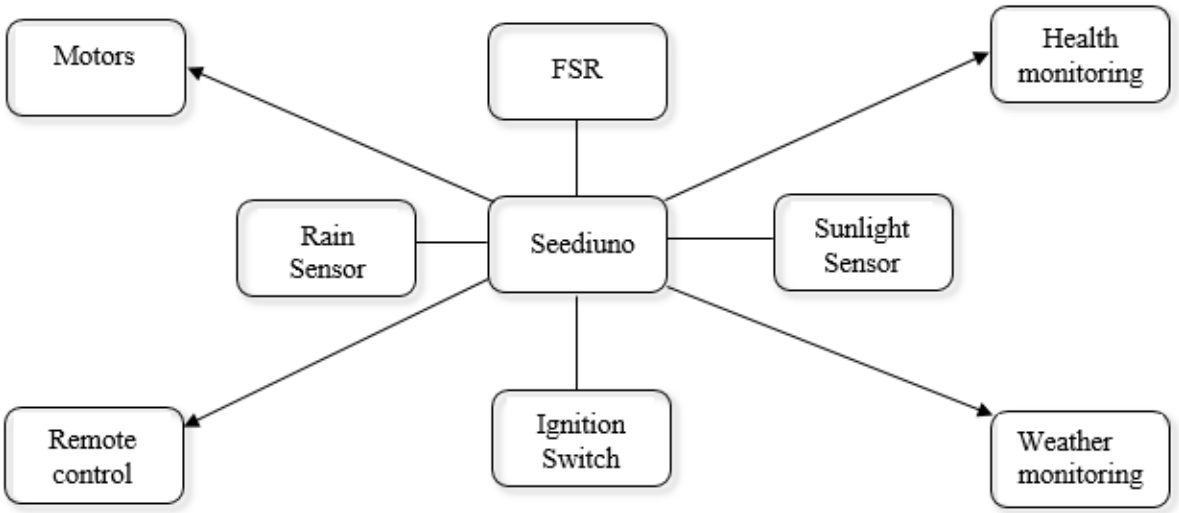



***Fig.5.19*** *Final block diagram of hardware sections*

## 5.7 Circuit diagram of primary/master unit:

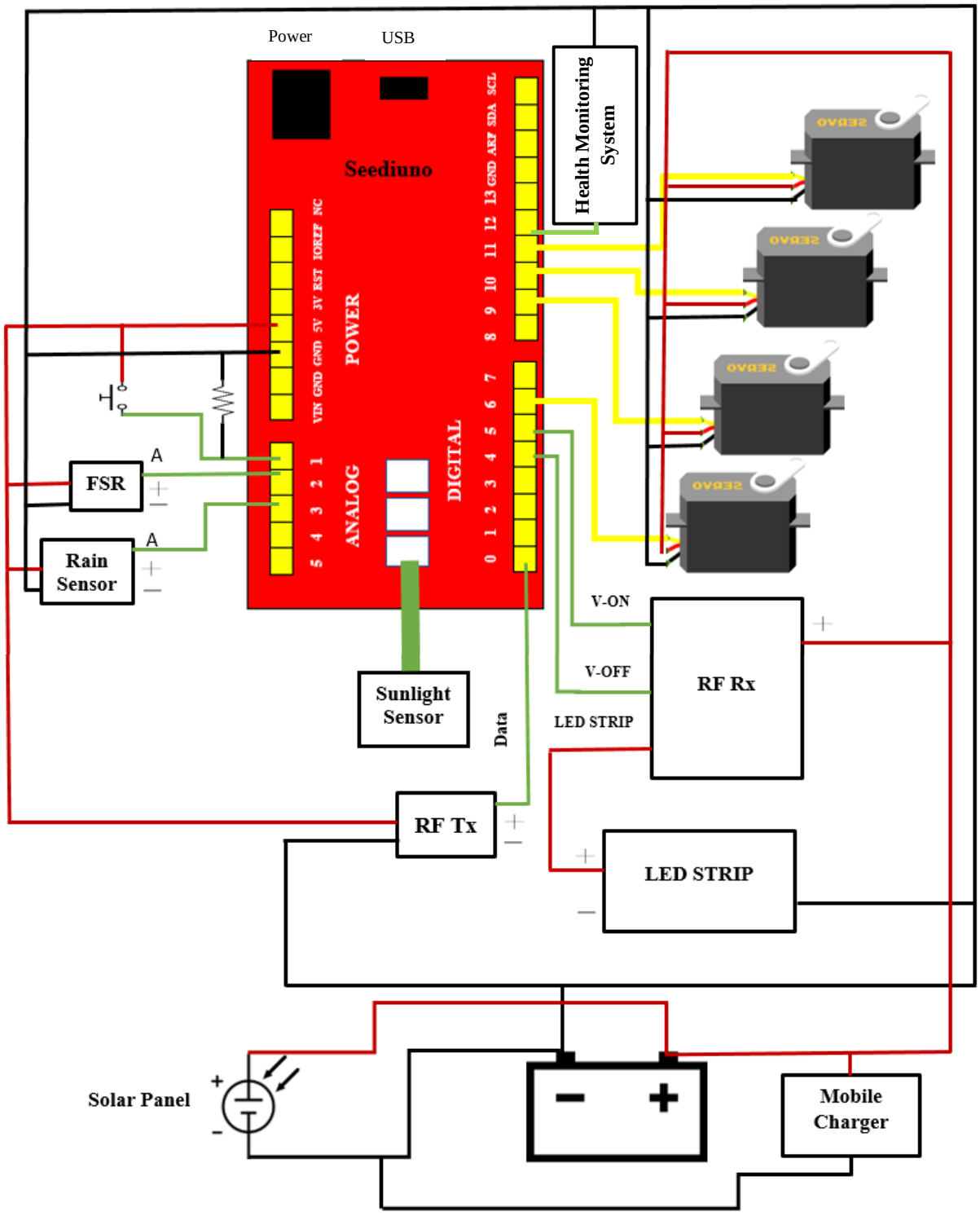



***Fig.5.20*** *Circuit Diagram of primary/master unit*

## 5.7.1 Circuit diagram of remote control:

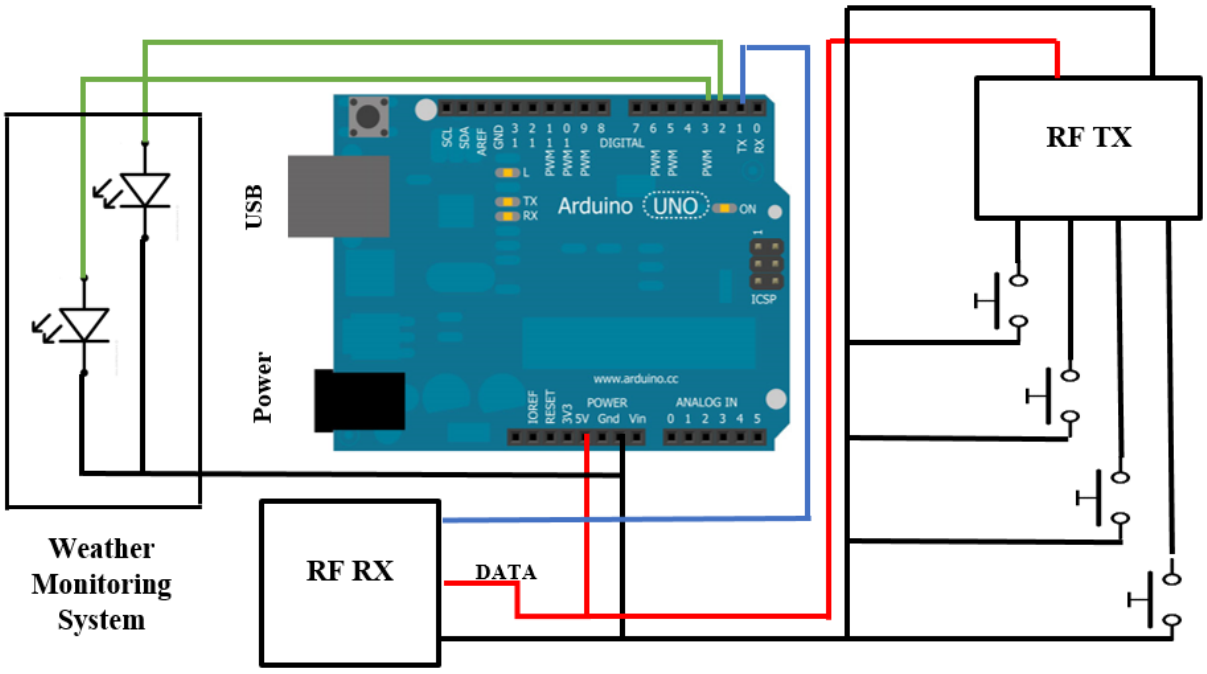



***Fig.5.21*** *Circuit Diagram of Remote Control*

### 5.7.2 Pin details

| Pin | Function |
|---|---|
| TX | Used for transmitting signal |
| RX | Used for receiving signal |
| A0 to A5 | Analog input, max 3.3V input |
| D3 | Pulse width modulation (PWM) signal .Their main use is for controlling servo motors. |
| D5 | |
| D6 | |
| D9 | |
| D10 | |
| D11 | |
| D0 | Digital pins<br><br>The digital pins on an Arduino board can be used for general purpose input and output via the pinMode(), digitalRead(), and digitalWrite() commands. |
| D1 | |
| D2 | |
| D7 | |
| D8 | |
| D12 | |
| D13 | |
| 5V | Output Voltage |
| 3V3 | Output Voltage for analog signal |
| RST | Used for reset |
| GND | Used for grounding purposed |
| ADC | Analog to digital convertor pin |
| USB 2 UART | These pins can be used to interact with other UART devices by putting the on-board ATmega328 in reset mode |
| ICSP | This is the ICSP connection for the ATmega328P, it is located in the standard ICSP/SPI position for Arduino Uno. The SPI pins in this port: MISO, SCK, and MOSI, are also connected to digital pins. |
| Grove sunlight connector | Seediuno has a sensors that can detect the temperature. |
| DC power | DC power supply jack in which we can give external upto 12 v. |

**Table 5.6** Pin details of Seediuno(Arduino)

### 5.7.3 Full Structure of Sun visor.

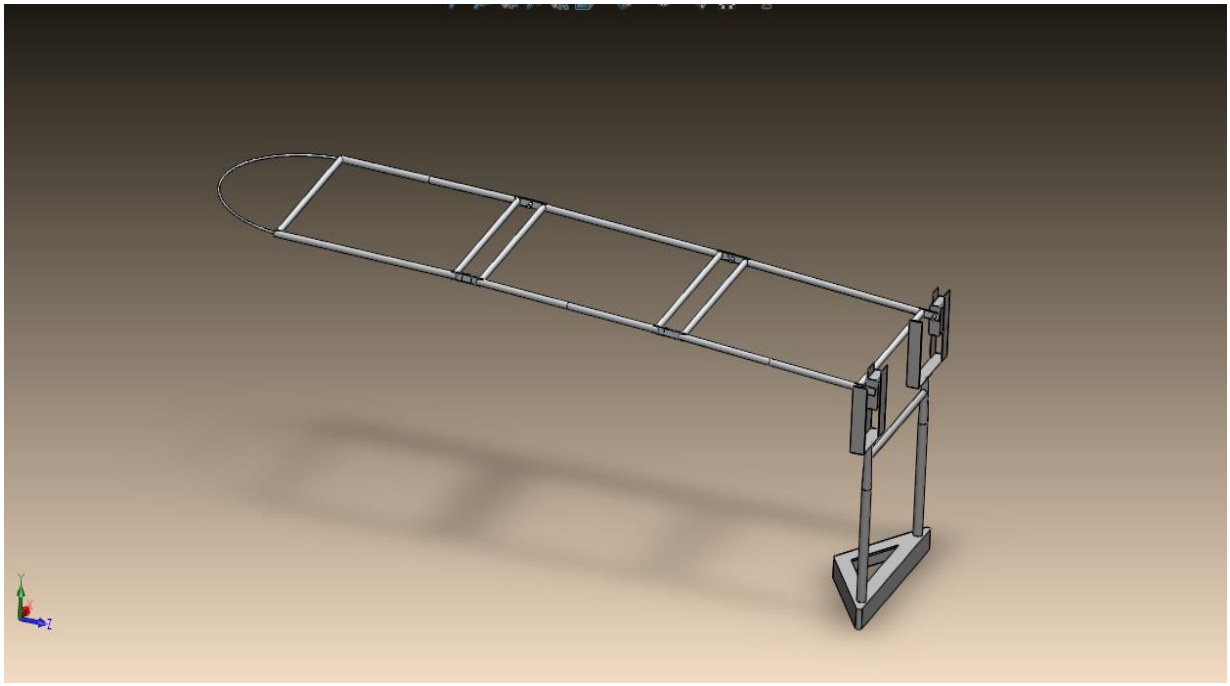


***Fig.5.22*** *Opening topology of sun visor*

***Fig 5.23.*** *Initial folding state of sun visor*

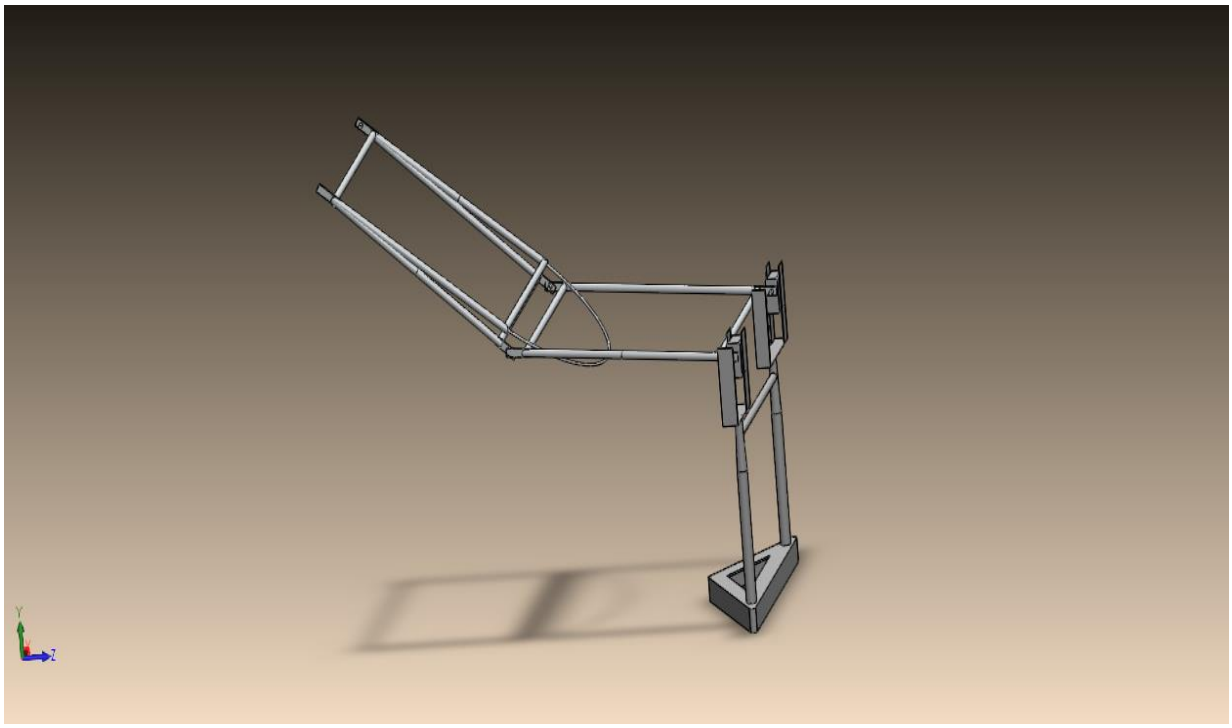


***Fig.5.24.*** *Second state folding of sun visor*

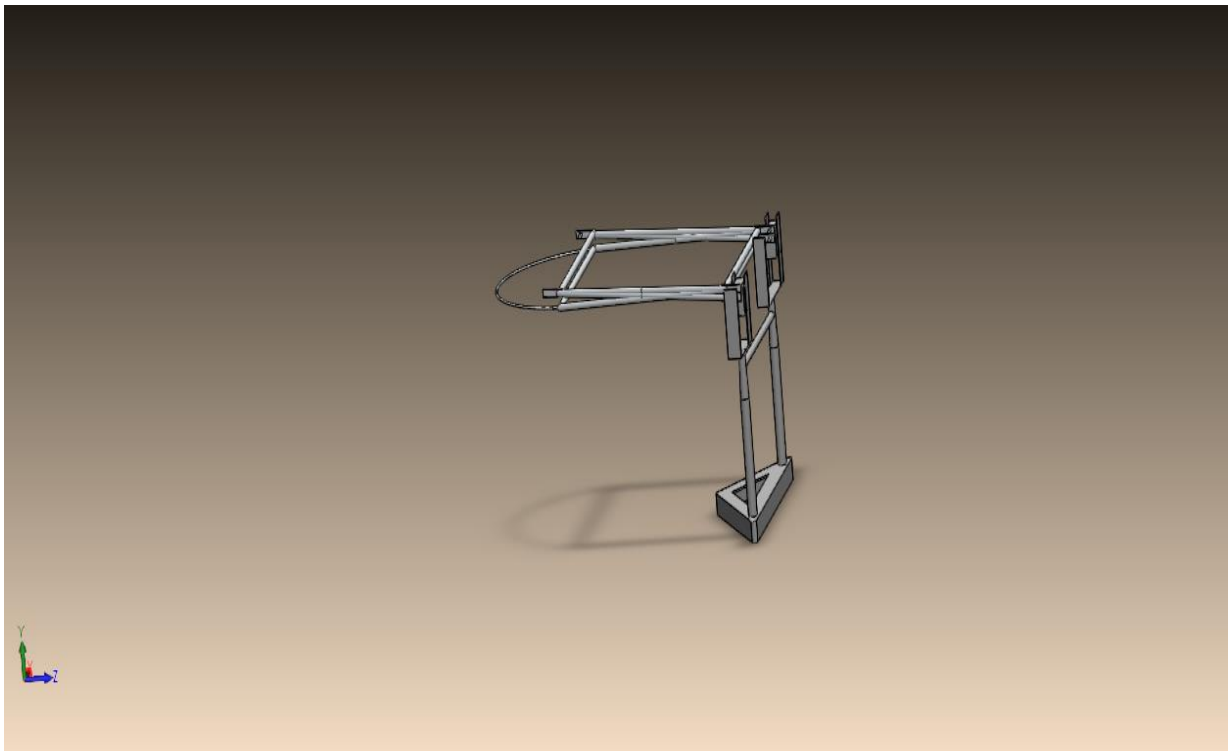


***Fig.5.25.*** *Closed state of sun visor*

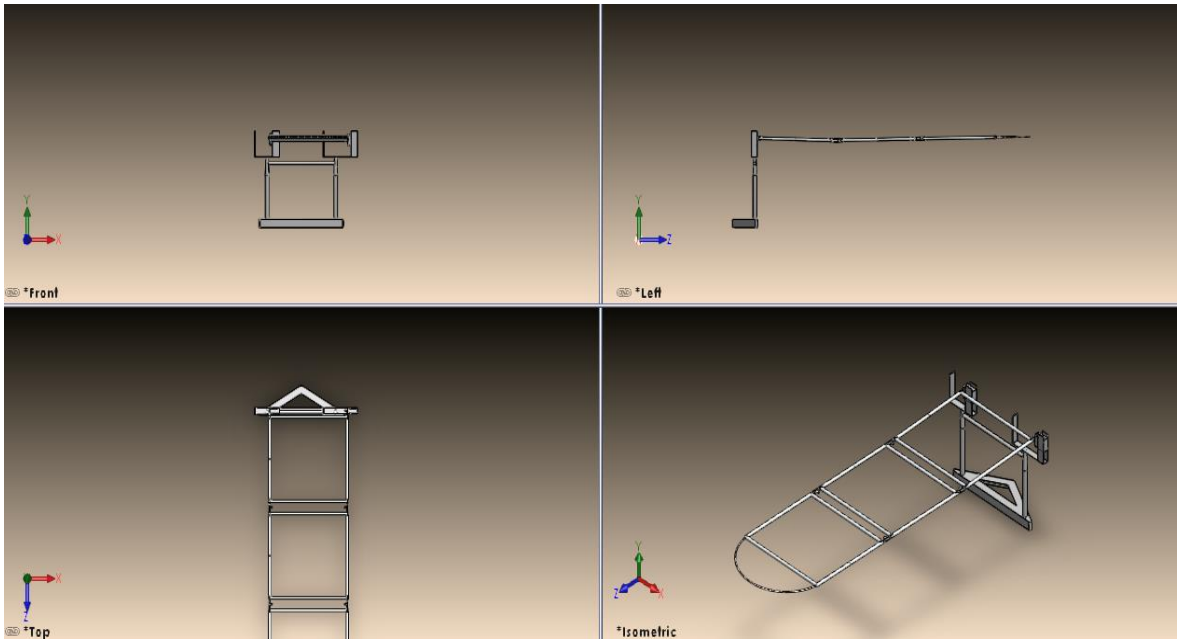



**Fig.5.26**. *Orthogonal projection of 3D views of sun visor.*

## 5.8 Flow charts of the project:

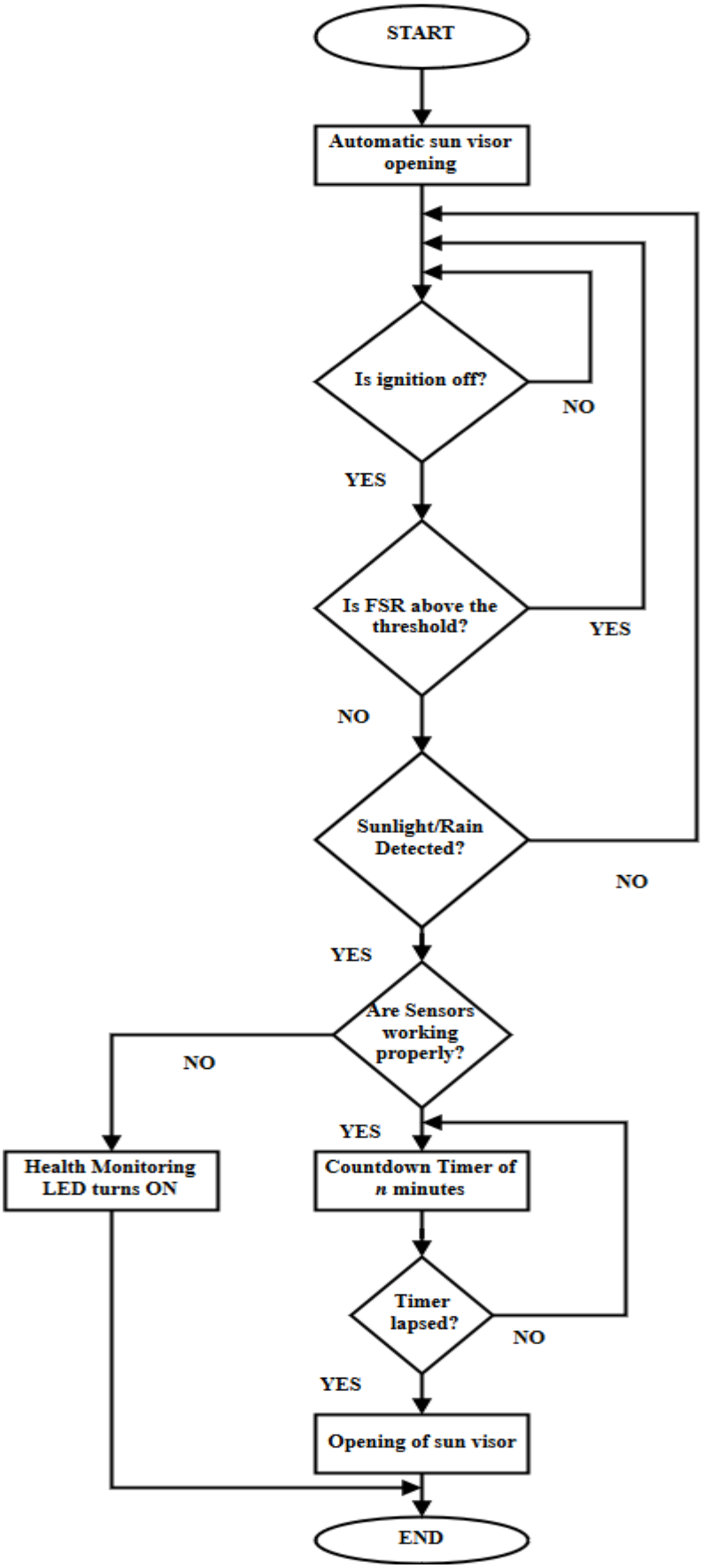



**Fig.5.27** *Flow chart of automatic opening of sun visor*

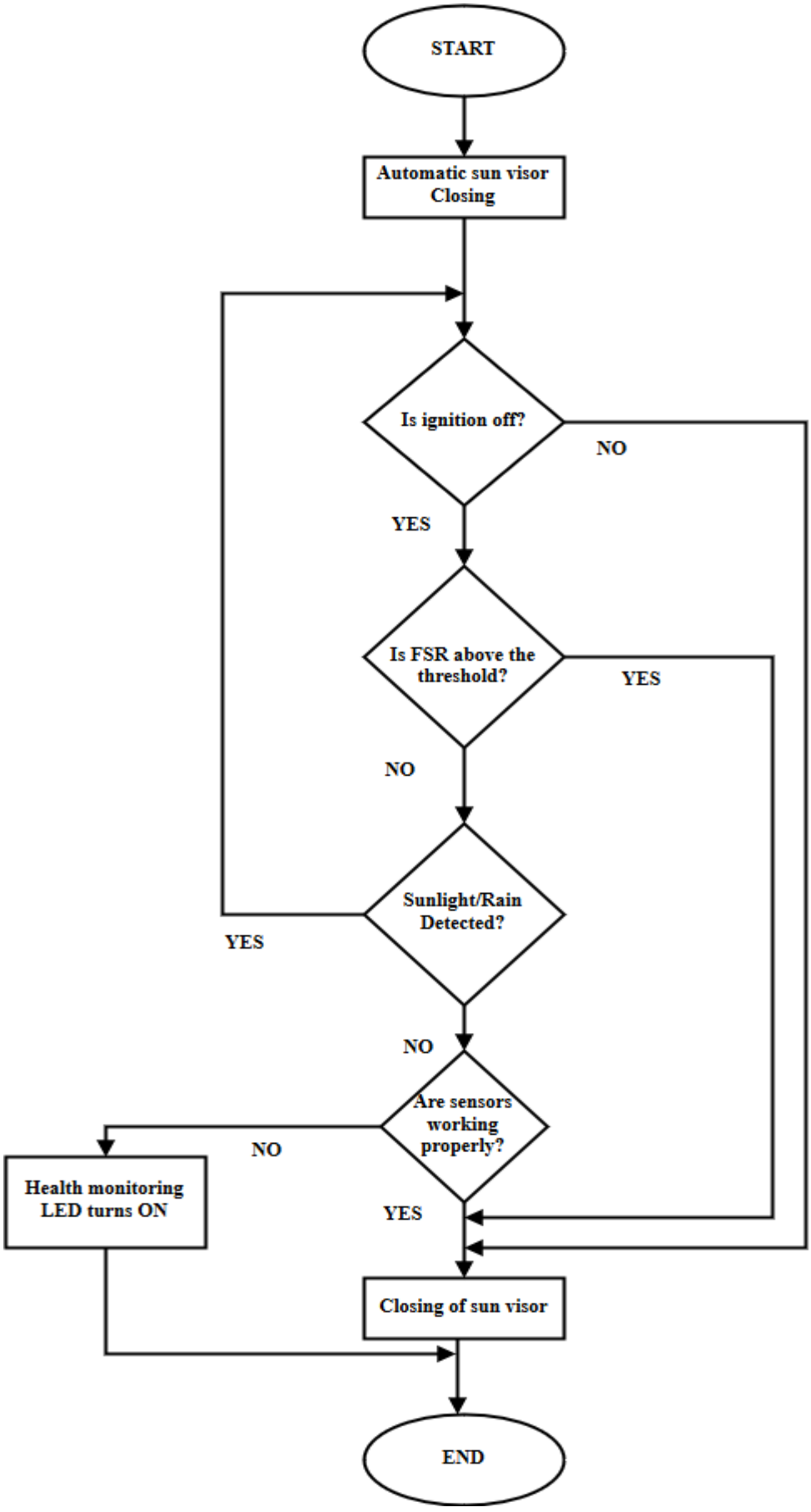



**Fig.5.28** *Flow chart of automatic closing of sun visor*

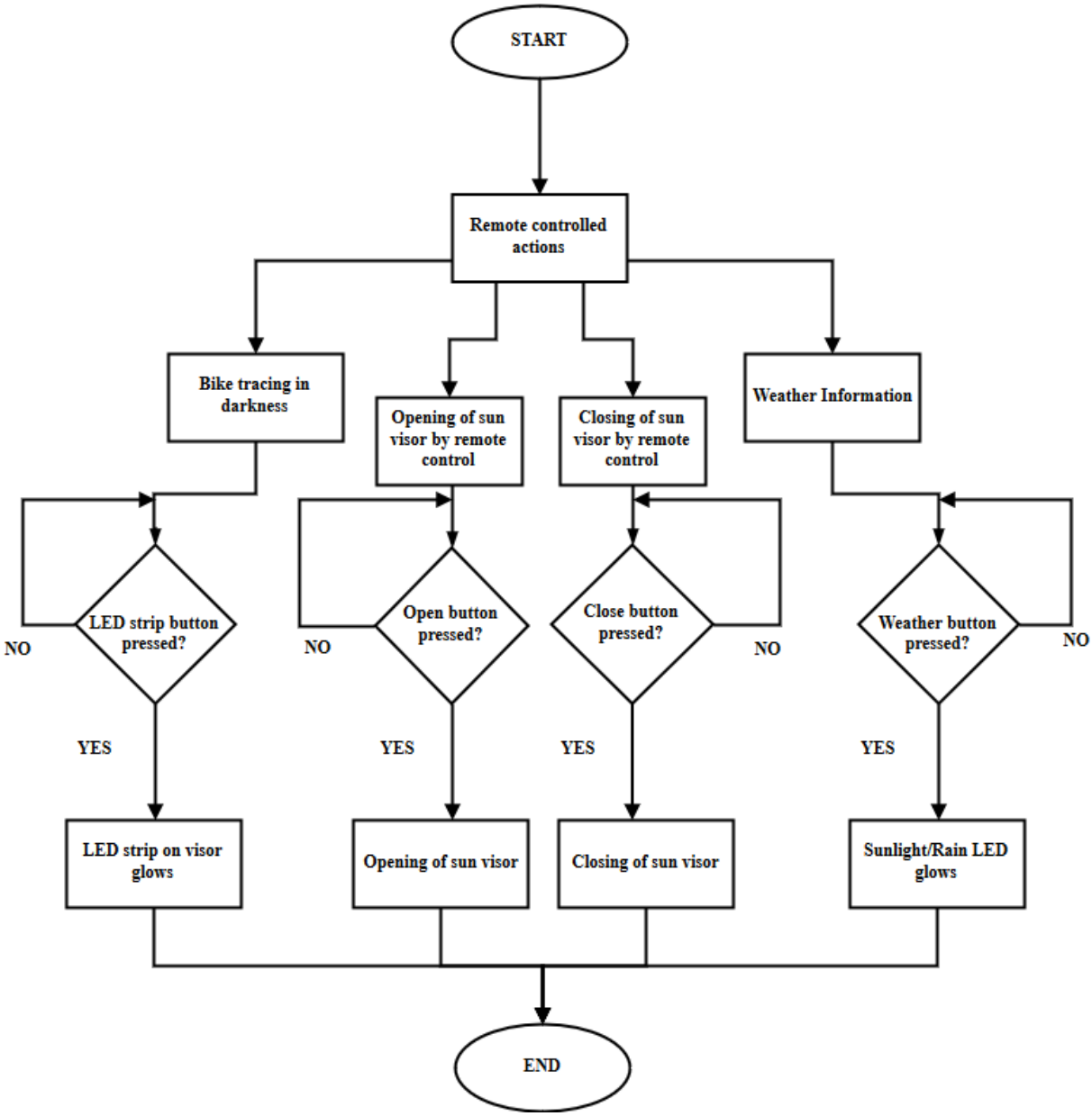
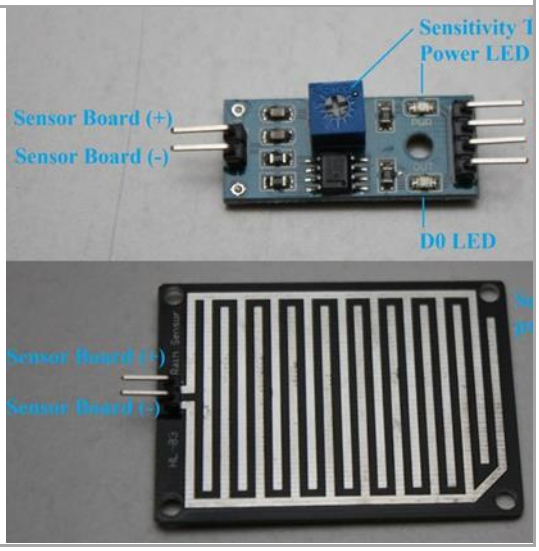
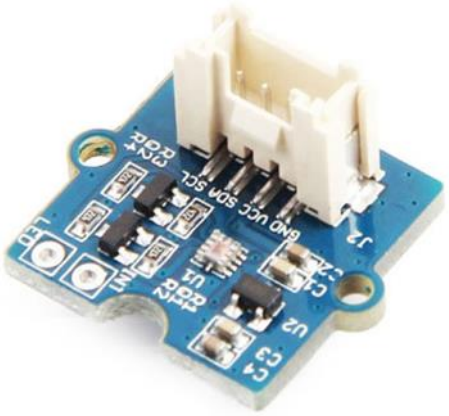
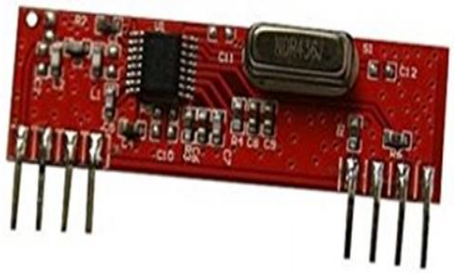



**Fig.5.29** *Flow chart of remote controlled features*

## 5.9 Total components used:

| S. No. | COMPONENTS | USE | APPEARANCE |
|---|---|---|---|
| 1) | SEEDIUNO | The Seediuno is an open source Microcontroller board based on the Microchip Atmega 328P microco-ntroller. Seediuno V4.2 is much more stable,easy and one best of the arduino. and with an ATMEGA 16U2 as a UART to- USB convertor, which means that the board can basically work like a FTDI chip. |  |
| 2) | FSR SENSOR | From reaction time measurement to load distribution in shoe insoles, our thin film force sensors offer uncompromised performance in the most demanding applications. Multiple sensing area dimensions and measurement ranges are available, enabling forces up to 150Kg. |  |
| 3) | RAIN SENSOR | This rain sensor is used to detect rain when the rains falls, this sensor will detect and gives signal as a interrupts to open the sun visors |  |

| | | | |
|---|---|---|---|
| 4) | GROVE SUNLIGHT SENSOR | Grove - Sunlight Sensor is a multi-channel digital light sensor, which has the ability to detect UV-light, visible light and infrared light. This device offers excellent performance under a wide dynamic range and a variety of light sources including direct sunlight. It can be used to detect UV-ray and send signal to the seediuno as a interrupts to open the sun visor |  |
| 5) | SERVO MOTOR-MG996R | MG996r is a high quality, high torque for all your robotics and RC needs. This servo is specially made for use in RC airplanes, robotics, mini robot, mini manipulator, etc. Libraries available make is easy to use this servo motor in you project. This motor generates a massive 15kg.cm torque. We have carefully selected this servo motor for the best quality and performance among the numerous similar motors available in the market. |  |
| 6) | RF-TRANSMITTER | An RF transmitter module is a small PCB sub-assembly capable of transmitting a radio wave and modulating that wave to carry data. Transmitter modules are usually implemented alongside a micro controller which will provide data to the module which can be transmitted. |  |

| | | | |
|---|---|---|---|
| 7) | RF-RECIEVER | RF modules are widely used for wireless data transfers and remote control applications. Most of these RF modules are operating around 433MHz. An RF transmitter receives serial data and transmits it wirelessly through RF through its antenna connected at pin4. |  |

# CHAPTER 6

# RESULT AND DISCUSSION

In this project, we are trying to protect the seat of two wheeler vehicle from hot temperature and the problems associated with it. So, for this we have used many sensors such as Grove sunlight sensor, rain sensor and force sensitive sensor(FSR) for detecting UV-radiation(sunlight), rain(weather information), physical pressure & weight respectively. The whole process will be monitored and controlled by the Seediuno (Arduino-UNO) and the details of weather information like sunlight, rain and physical pressure will be shared via various sensors to the Board and the system which will open automatically and cover the seat in such a way that it will be comfortable to rider and pillion when they climb on the seat after parking. It will protect them from adverse effects of sunlight/rain. We also added some specific features such as rider's mobile phone can charge from battery which is powered by solar panel. According to our analysis this project will give more benefit to the two wheeler vehicles by enhancing life span and makes the rider/pillion comfortable for ride. Images on the next page show the working of our project and it various features.

Below images depict real-time working of the visor when there is sunlight. We have provided a delay of 5 minutes for opening the visor in order to avoid frequent openings.


***Fig. 6.1*** *Opening of Sun visor.*

***Fig. 6.2*** *Visor protecting rider as well as pillion with height adjustment.*

***Fig. 6.3*** *Closing of Sun visor.*

Above all the images describe height adjustment feature of visor for single as well as two people. We can clearly see that no hindrance is there for rider or pillion. On the other hand, its automatic closing due to absence of sunlight is shown.

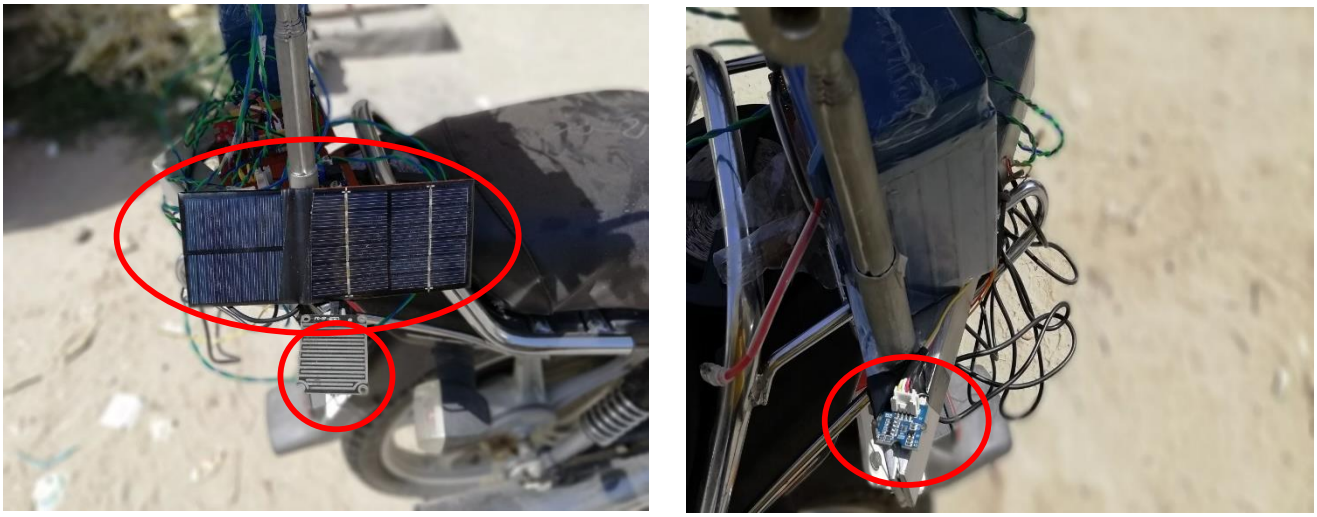


***Fig. 6.4(a,b)*** *Solar panel, Rain sensor and Sunlight sensor.*

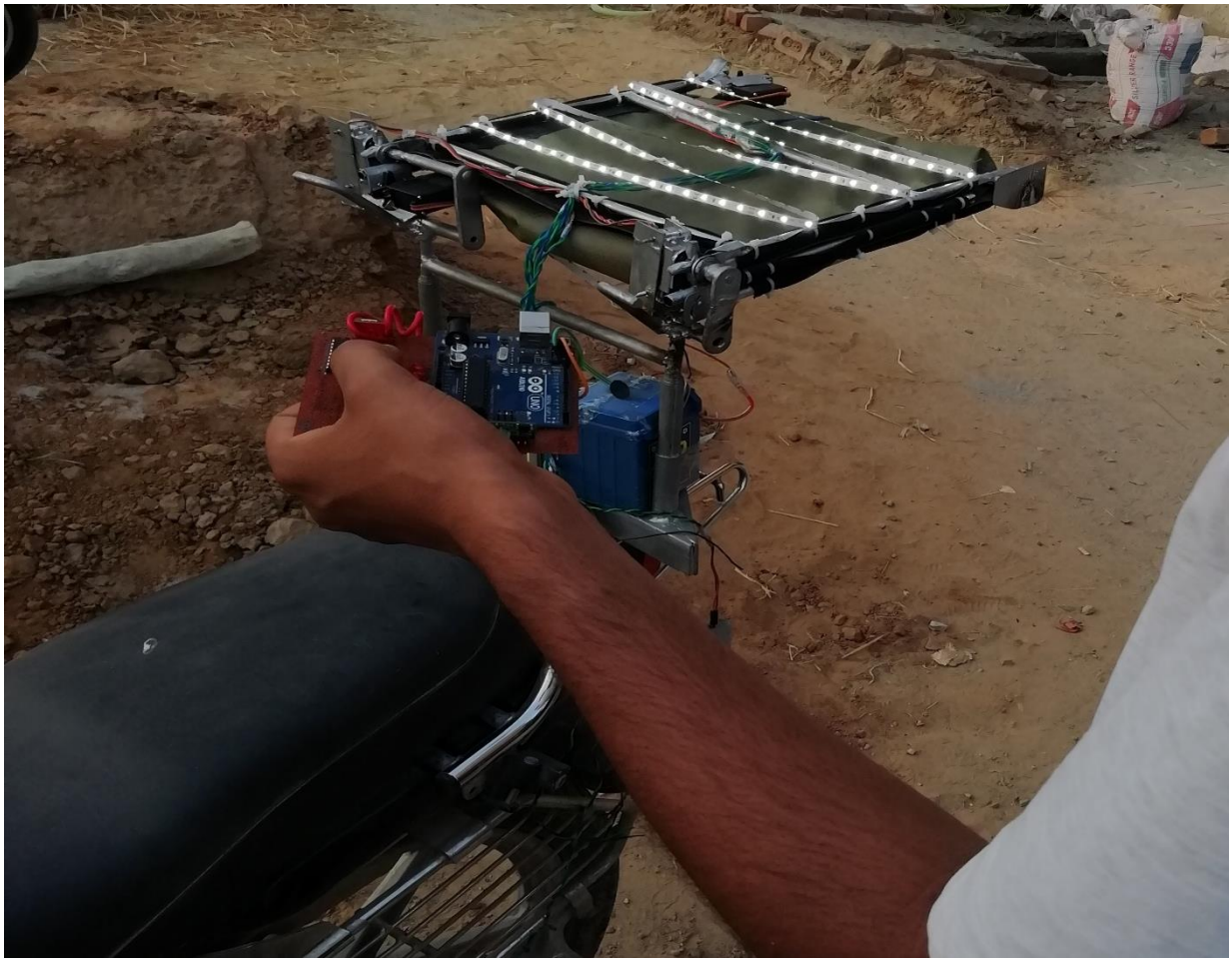


***Fig. 6.5*** *LED Strip for tracing bike in darkness.*

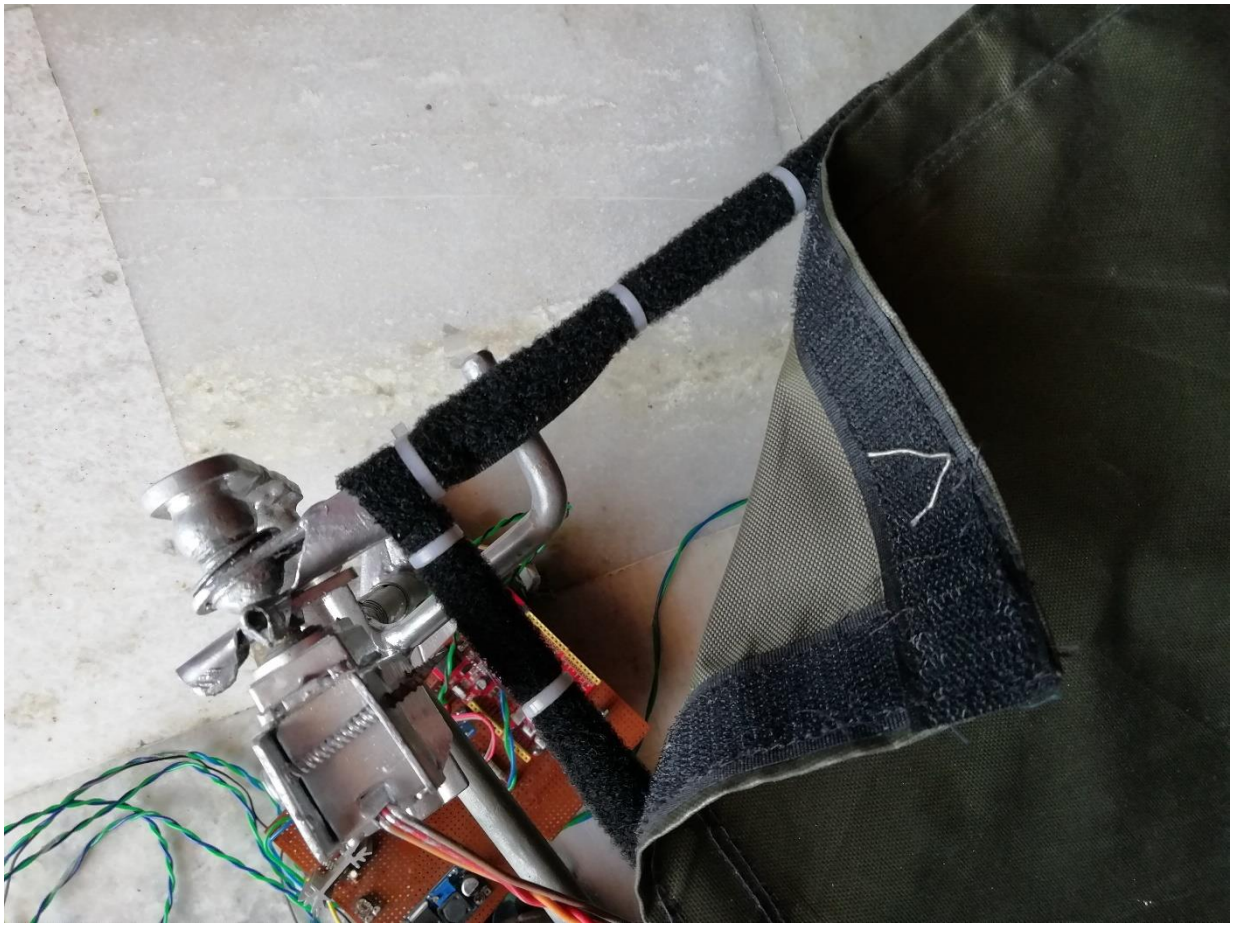


***Fig. 6.6*** *Easily removable cloth with burr-velcro..*


***Fig. 6.7*** *Cell-phone charging point.*

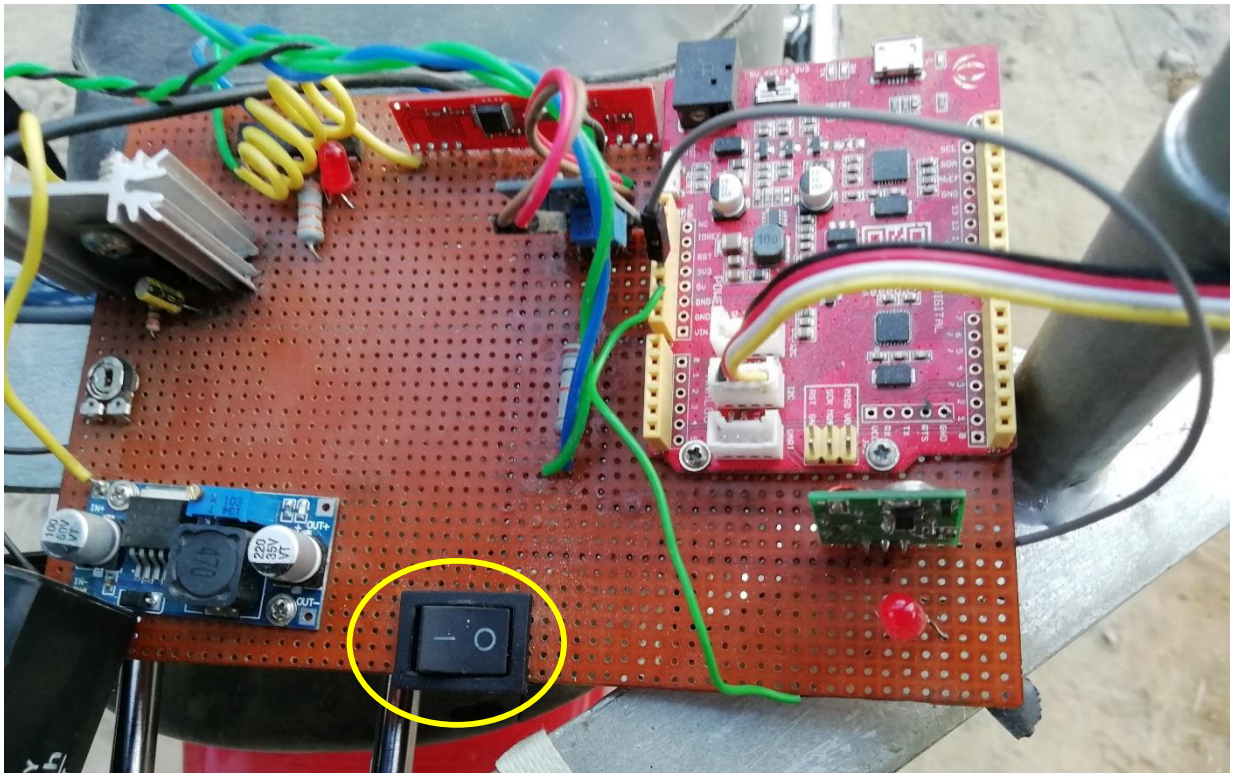


***Fig. 6.8*** *Primary/Master unit with 'all shutdown button'.*

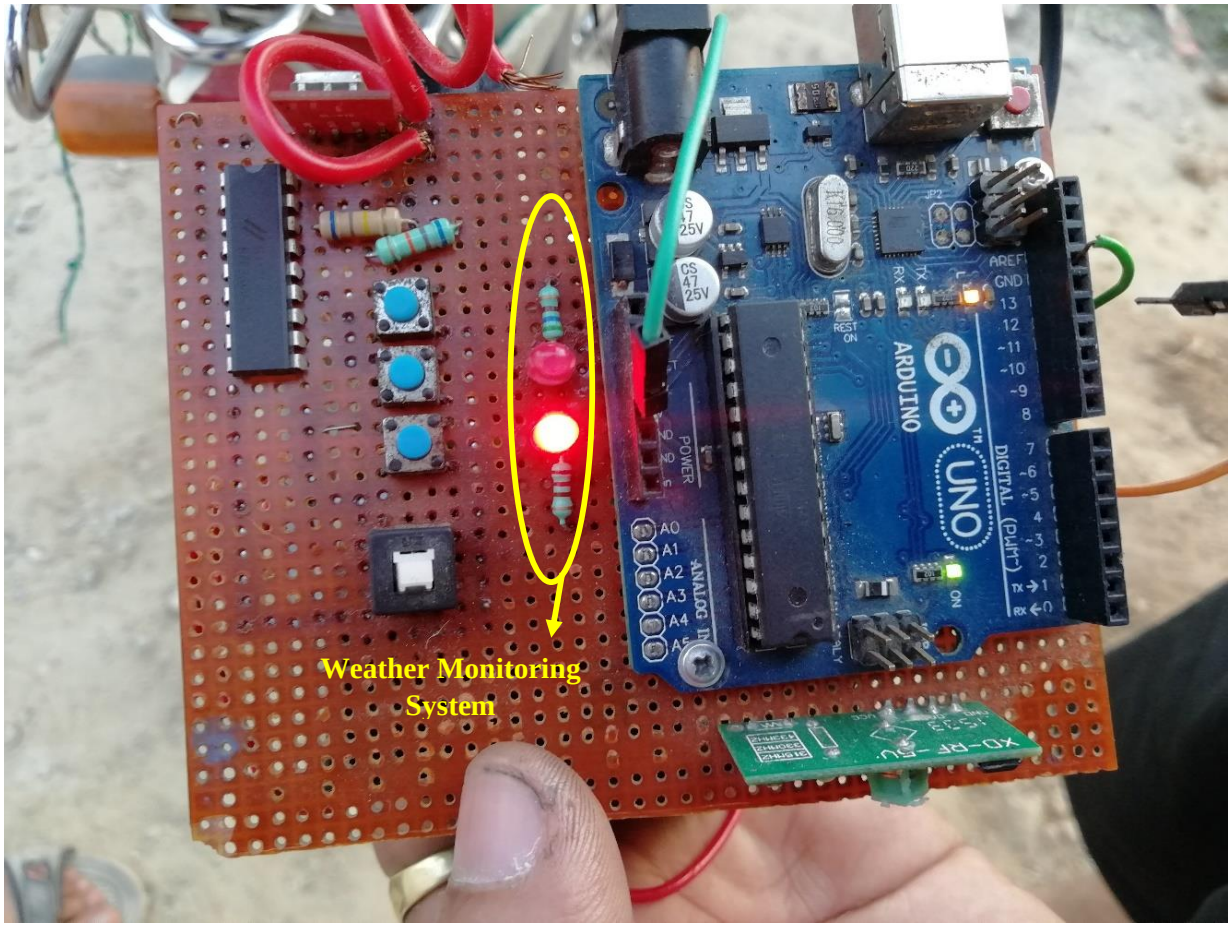



***Fig. 6.9*** *Remote control unit with built-in weather monitoring system.*

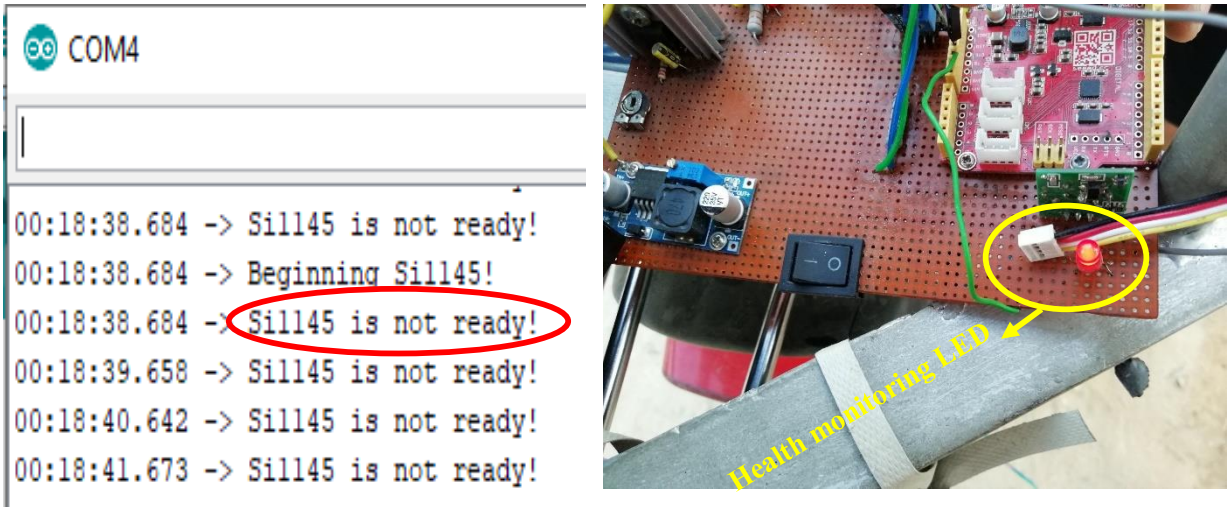



***Fig. 6.10(a,b)*** *Health monitoring system glows LED because sensor is unplugged.*

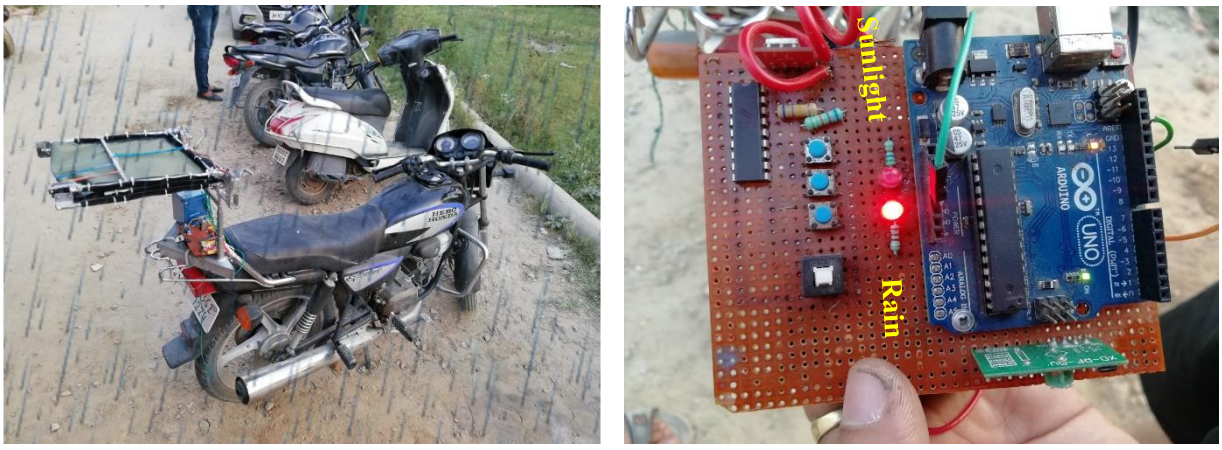



***Fig. 6.11(a,b)*** *Weather monitoring system during rain outside.*

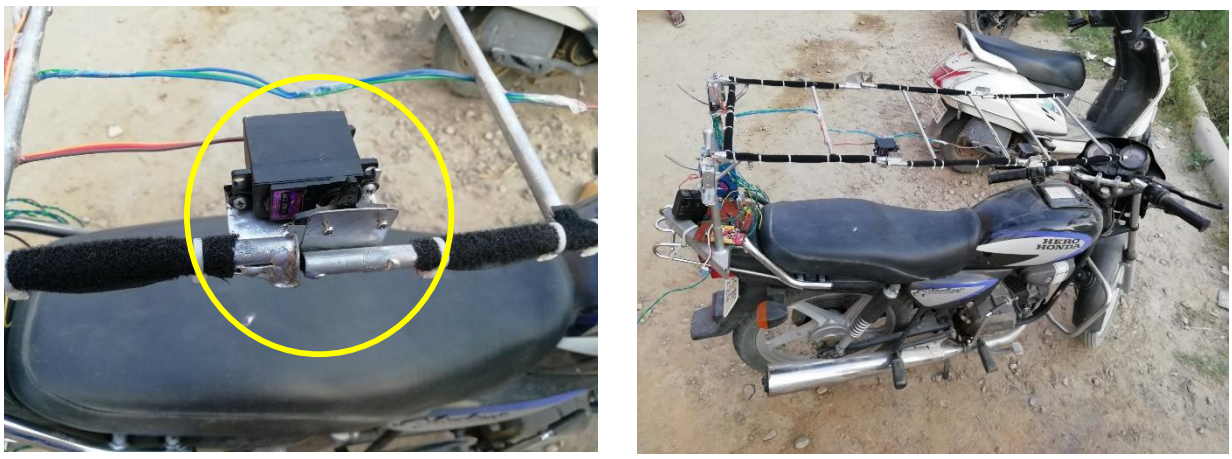


***Fig. 6.12(a,b)*** *Motion of novel mechanical structure by servo motors.*

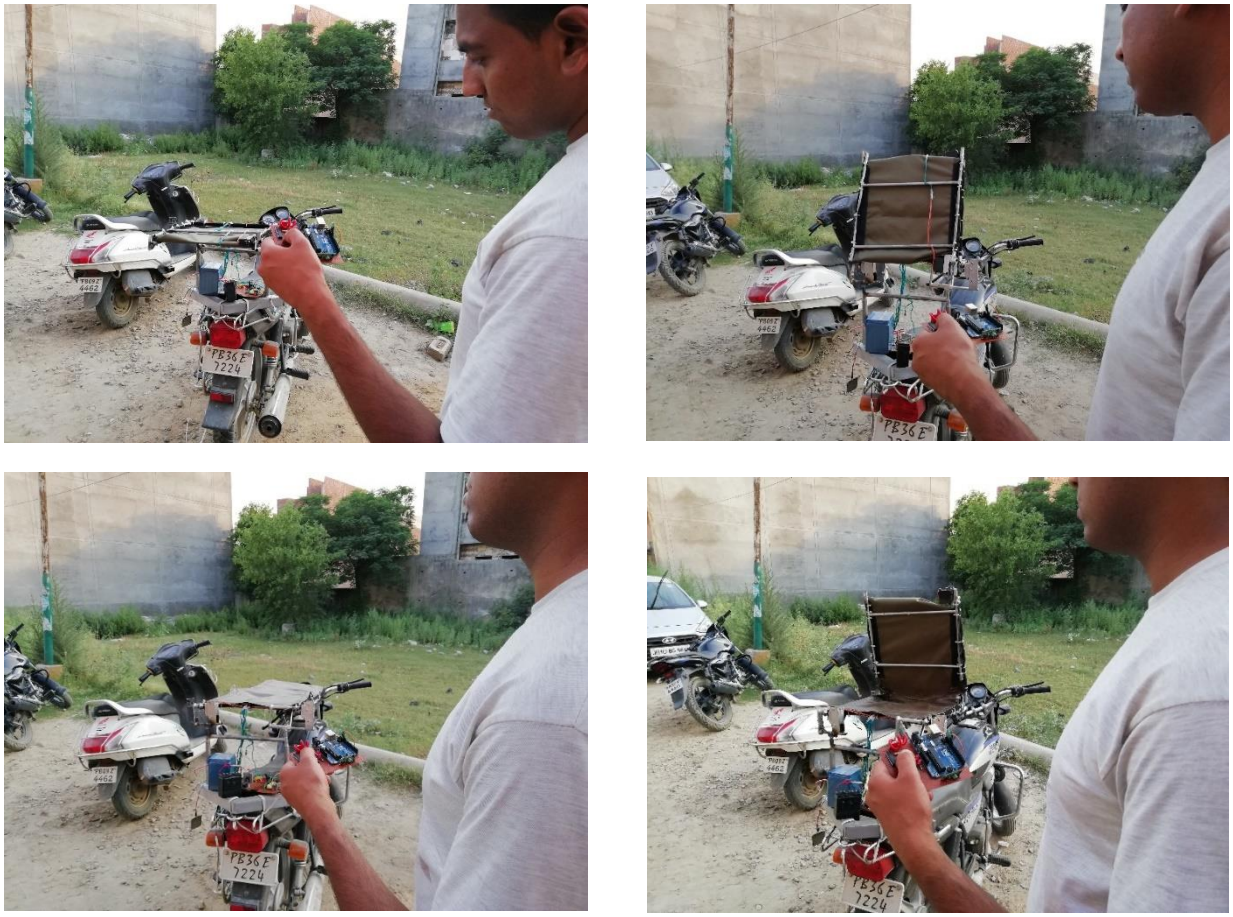


***Fig. 6.13*** *Opening and closing of visor through remote control.*

All the images show the various features of the project. We have tried to provide every facility to the rider in a compact and efficient design. We can clearly notice all the features from mobile charging to weather monitoring. From the above images we can clearly infer that it is a combo of multiple facilities. In Fig. 1… and Fig. 1… we have shown the weather monitoring and health monitoring concept respectively. Seediuno transfers the information through a RF transmitter as per the acquired state of weather and on remote control we have installed a RF receiver which decodes the message and thus respective LED for rain/sunlight glows. On the other hand, if any sensor misbehaves or is unplugged, we have developed health monitoring system for that.

# CHAPTER 7

# CONCLUSION AND FUTURE SCOPE

## 7.1 Conclusion

Innovation is the only thing which keeps the whole globe going on. Our primary focus is on the problems faced by the bike riders during various seasons. It is obvious fact that luxurious vehicles have all the features embedded in them but what about common man in countries like India. We have tried to bring luxurious feeling at a small cost. Working of our project is really attractive and this attractiveness we want to inculcate in every common vehicle out there. It is not easy to change the whole scenario of the two wheeler industry but the struggle and efforts during this project inspired us to revolutionize the new era of two wheeler vehicles. Our design seems normal to any person but it really has the engineering efforts and calculation within it. We tried to make it as efficient as possible. If we take a simple example of *'attach()'* and *'detach()'* function that we have used inside the code, it really proves that how efficient and energy saving our project is. We have explored all the interdisciplinary knowledge and put into all of it in our project. From ball and socket joint to stoppers we have tried to make it mechanically sound structure. In short words it is an effort of hundreds of hours just to make it simpler, robust and efficient structure.

## 7.2 Future Scope

For the future work of the project we will try to consider more instances and try to make it more foldable. We will try to add more sensors for the protection of the visor. We can also integrate it to android and iOS through an app via Bluetooth or Wi-Fi. By this we can use our cell phones as the remote control. We know that it feels awkward that how it will look on two wheelers but we are humans and we get used to things like this. A simple example from mobile phones is notch which was first disliked but with time its need was felt by people and was widely accepted. Moreover, we wanted to increase its folding state and make it as compact as possible but due to lower torque servo motors available in India at much higher costs it was impossible to achieve. But we will try to find out the alternatives that we can use to make our structure more robust and energy friendly.

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# APPENDIX I

## Gant Chart (Aug-Dec, 2018)

| Month | Week | Work |
|---|---|---|
| **August** | 1st | Choosing of capstone mentor. |
| | 2nd | Discussion with mentor regarding innovative ideas. |
| | 3rd | Finalizing title and project to work upon. |
| **September** | 4th | Preparation of a brief report with basic drawings. |
| | 5th | Research on similar concepts already available in market. |
| | 6th | Report submission to R & D Department LPU for novelty check. |
| | 7th | Interfacing of components on 'Proteus' simulator before purchasing basic components. |
| **October** | 8th | Purchasing of basic components and their interfacing with Arduino. |
| | 9th | Literature review of similar ideas. |
| | 10th | Research for robust and reliable sensors. |
| | 11th | Purchasing and interfacing of all sensors with Arduino. |
| **November** | 12th | Review from R & D department and preparation of contrasting points. |
| | 13th | Purchasing of seediuno and grove sunlight sensor from China and their interfacing . |
| | 14th | Provisional patent filing. |

# Gant Chart (Jan-May, 2019)

| Month | Week | Work |
|---|---|---|
| **January** | 1st | Literature review and electronic components purchase |
| | 2nd | Testing of sensors with Arduino and basic formulation of project was figured |
| | 3rd | Circuit designing was finished. |
| **February** | 4th | Purchasing of all the steel items and cloth |
| | 5th | Mechanical work started and also the drawings related to it were prepared. |
| | 6th | Fabrication of 12v Power supply for charging and testing of battery. |
| | 7th | Appropriate servo motors were purchased after a thorough research. |
| **March** | 8th | Circuit integration started as well as mechanical work continued. |
| | 9th | Solar Panels, LED strip and DC mobile phones charger successfully integrated with main circuit. |
| | 10th | Designing and testing of weather monitoring system through RF transmitter and receiver. |
| | 11th | Working on report was started and mechanical work continued. |
| **April** | 12th | Completion of mechanical portion and report work continued. |
| | 13th | Paint job, PCB soldering of components and testing of mechanical structure in LPU labs. |
| | 14th | Completion and troubleshooting of whole project. |