



# SMART 2-WHEELER MONITORING SYSTEM

Set the wheel of change in

# MOTION

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ARTIFICIAL INTELLIGENCE  
ENGINEERING CASE STUDY

HCC Season 5 to  
be telecasted on



-By Subhasish Das

Team Name

TEAM RS

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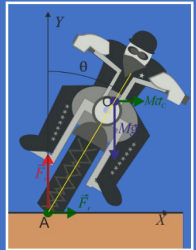
## Concept / Scope of solution

The concept and scope of the project is:-

- ✓ Our aim is to make the 2-wheelers SMART with the help of Artificial Intelligence(AI) and Machine Learning.
- ✓ Here we have focused on safety and maintenance of Two-wheelers.
- ✓ The whole system is divided into 3 parts Skid prevention System, tyre pressure Check System, Anti theft and Emergency System.
- ✓ In Skid Prevention system rider is provided with safe leaning angles for efficient driving experience.
- ✓ Tyre pressure check system check the pressure of tyres and help in maintenance of tyre health.
- ✓ The third System Anti-theft and Emergency system helps in tracking the vehicle.
- ✓ Emergency button is also provided in the vehicle dashboard that would help the rider in case of accident or mishap and inform the registered mobile nos.



## 2-Wheelers Smart Modifications



## Skid Prevention System



## tyre Pressure Check System



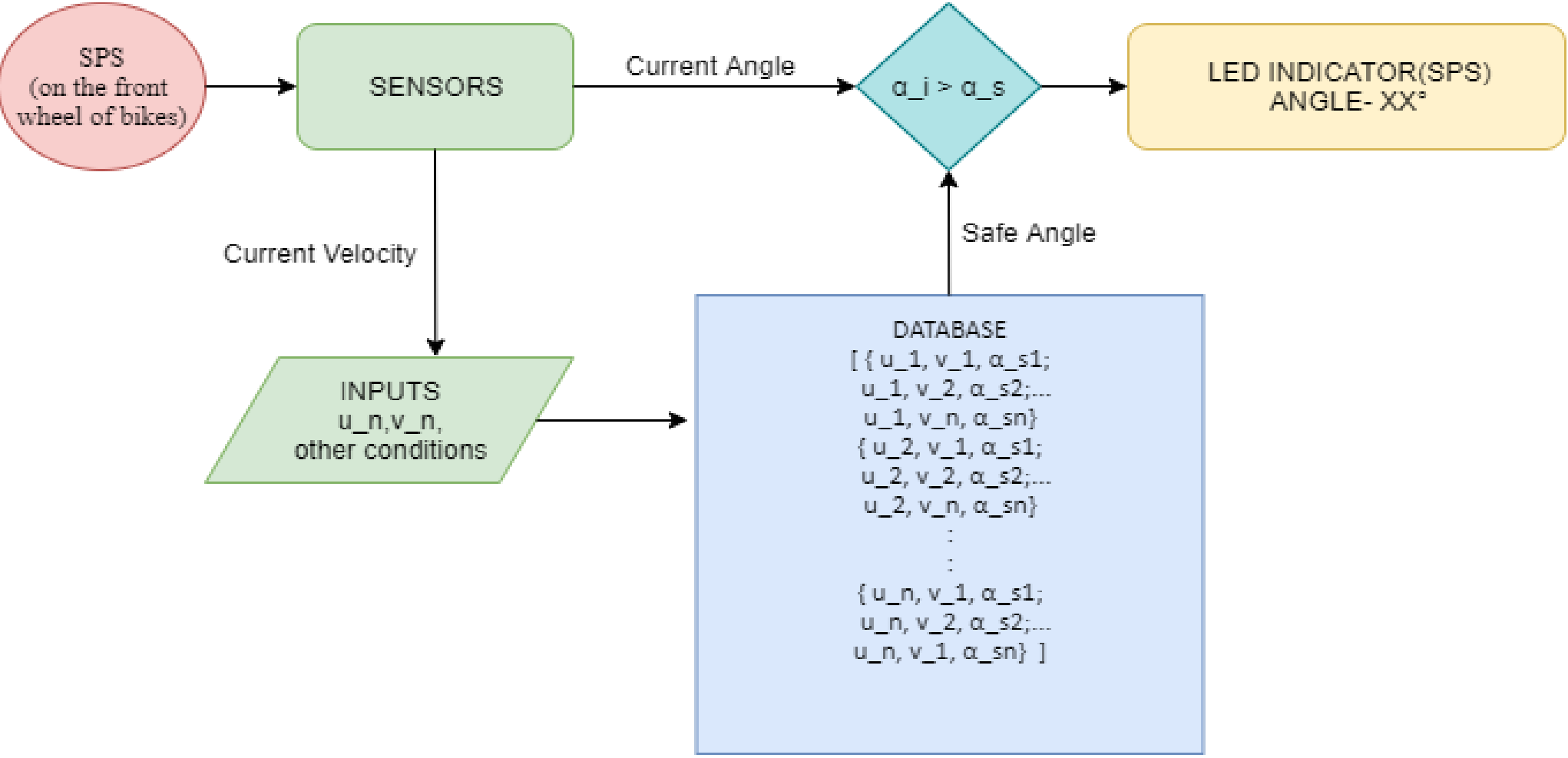
## Anti-Theft And Emergency System



# Need Statement

- As we know that a lot of accidents happen due to carelessness and improper driving. There are a lot of reasons of a accident and skidding is one of them.
- Skidding happens due to excessive leaning/bending while driving, improper way of applying of brakes, while turning at the road banks, etc.

Here we have the system that would detect the lean angle while diving and also provide safe lean angle to avoid skidding.

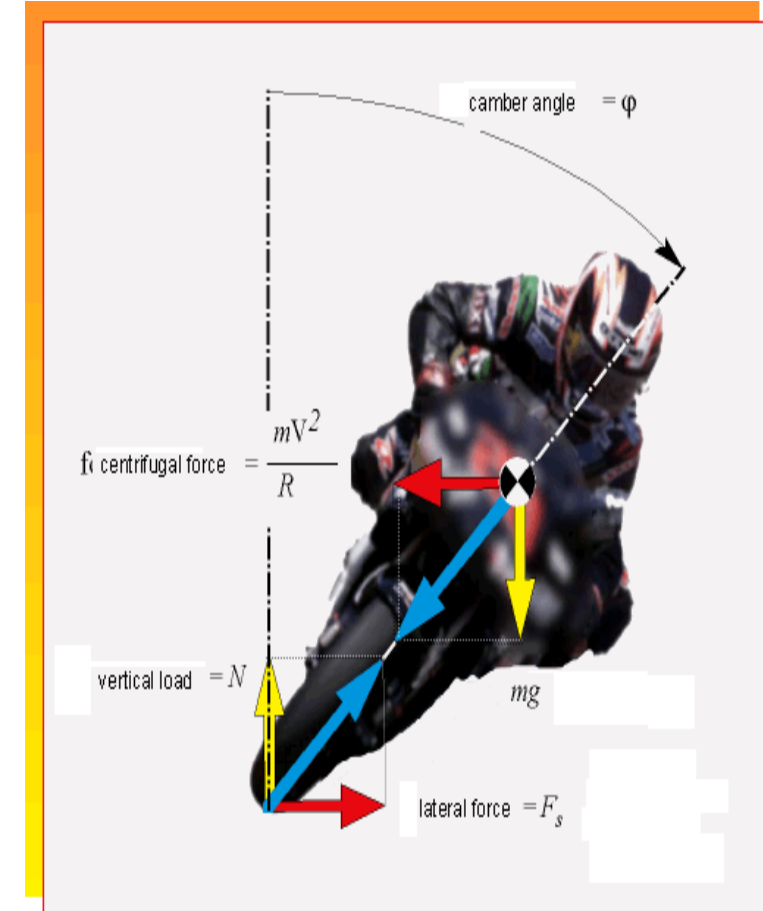


# SKID PREVENTION SYSTEM



# Working

- There will be a Device mounted on the front wheel of the 2 wheeler that would calculate the current angle. The calculated angle shall be compared with the safe angle with respect to the speed of the vehicle.
- The safe angle shall be predefined for various inputs from the user depending on the road and environmental condition from the database.
- Environmental Conditions- the value of friction at different surfaces, the road condition, weather condition, acceleration due to gravity, weight of bike etc.
- DATABASE: The database would find the value of safe w.r.t to the environmental condition, instantaneous velocity of vehicle, etc.
- And it would provide a SAFE ANGLE accordingly to the system in order to compare it with instantaneous leaning angle.
- If the inclination of the current angle is greater than the safe angle then an LED indicator will glow in order to caution the rider to slow down. Thus preventing a catastrophic accident.





# PROS AND CONS

## PROS:-

- low cost and life saving.
- Efficient driving and Safe turnings
- Reduce skidding of vehicle and reduce chances of accidents.
- Easy installation in existing vehicles.
- Great addition in the safety feature chain of the vehicle.

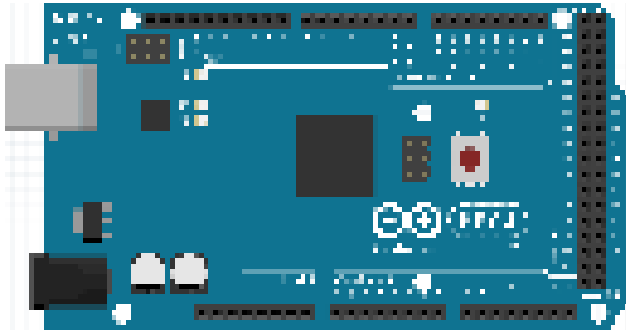
## CONS:-

- This can't prevent the rider from accident but act as a prevention measure for smooth riding.
- Error may occur due to some environmental conditions. But we can train the system to improve its efficiency.
- The sensor may not give the accurate data but we make a rough analysis taking errors under consideration.





# Detailed Description



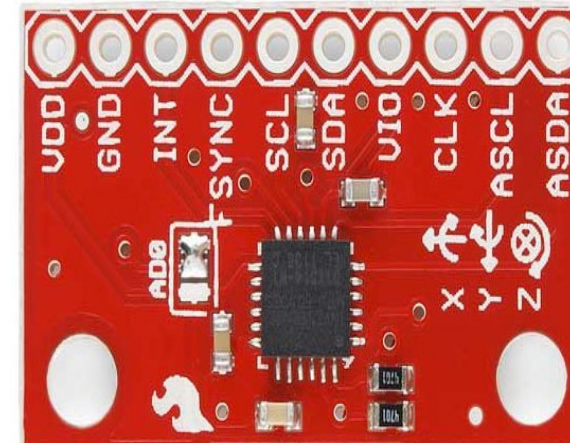
*Arduino Mega  
microcontroller  
board based on  
Atmega2560*



*LED  
placed on  
vehicle  
Dashboard*



*16 x 2 bit  
display provided  
On dashboard  
to show angle*

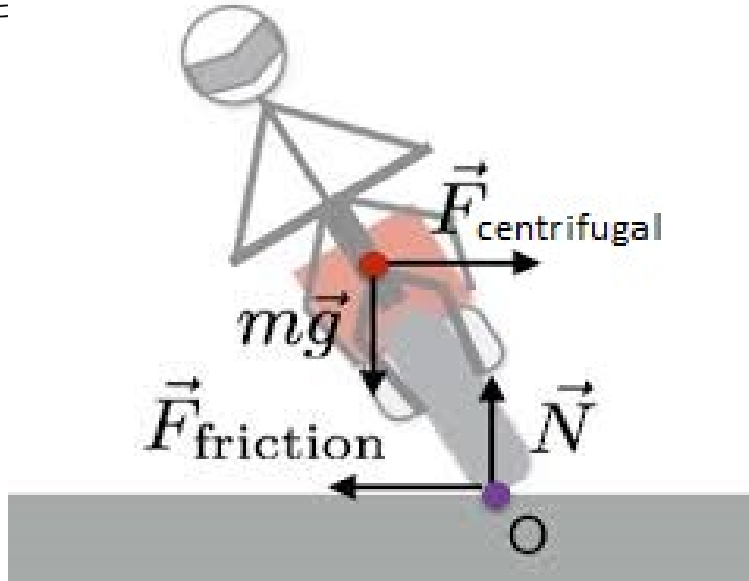


*Gyroscope  
MPU-6050*

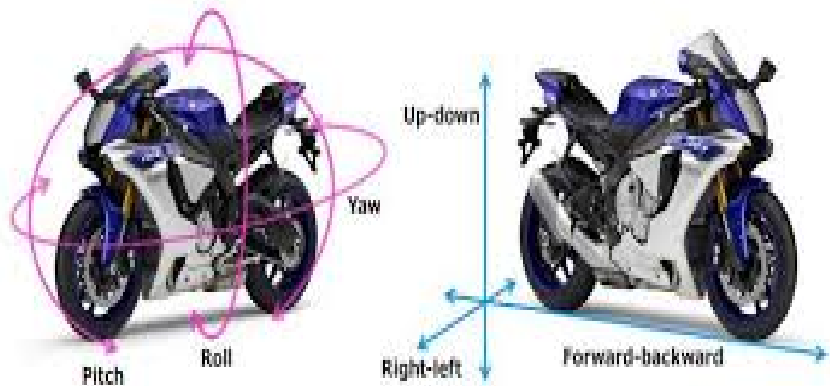




# VALIDATION/ ANALYSIS



SPS System  
on front  
wheel



GRAPHICAL ANALYSIS OF ANGLE



# tyre PRESSURE CHECK SYSTEM



# NEED STATEMENT

- for smooth riding of vehicle an average tyre pressure should be maintained.
- Average tyre pressure of  
Bikes: Front tyre- 30psi and Rear tyre-40psi  
As per recommended by the manufacturer.
- Currently we use manual method to check the air pressure of the tyre.
- Our aim is to acknowledge the user about the tyre pressure so that he/she can take proper maintenance of vehicle.
- Low pressure in tyre can cause decrease in the fuel efficiency, vehicle pickup , etc.
- Minor leakages and small punctures can be determined.





# WORKING MECHANISM

- The nozzle of the tyres are modified so that pressure of the tyre can be monitored and a low pressure or a minor puncture in the vehicle can be detected and displayed on the dashboard via an indicator light.
- This is done by taking pressure input and comparing it with a threshold.
- The modified valve would contain a Led light. If the tyre pressure is below threshold then it would glow indicating low pressure.
- FUTURE ASPECTS:  
According to the usage of the vehicle an AI system can also display the average repressuring time of the tyres of the vehicle according to the usage of vehicle.



# PROS AND CONS

## PROS

- By helping in maintaining proper tyre pressure ,device can increase the safety on roads by improving vehicle handling, decreasing tyre wear, reducing braking distance and bettering fuel economy.
- Minor leakages and small punctures can be determined.
- Easy installation on existing vehicle.
- Low cost

## CONS

- Some times may fail due to external factors. But while manufacturing utmost care will taken for its durability.



# Anti Theft and Emergency Detection System







# Need for anti-theft system in bikes

- The need for an antitheft device in bikes is indispensable in a country like India with such geographical diversity. We not only need to protect our bikes from the various ill elements present in our society but also see to it that if such a mishap occurs, our bike can be tracked with ease.

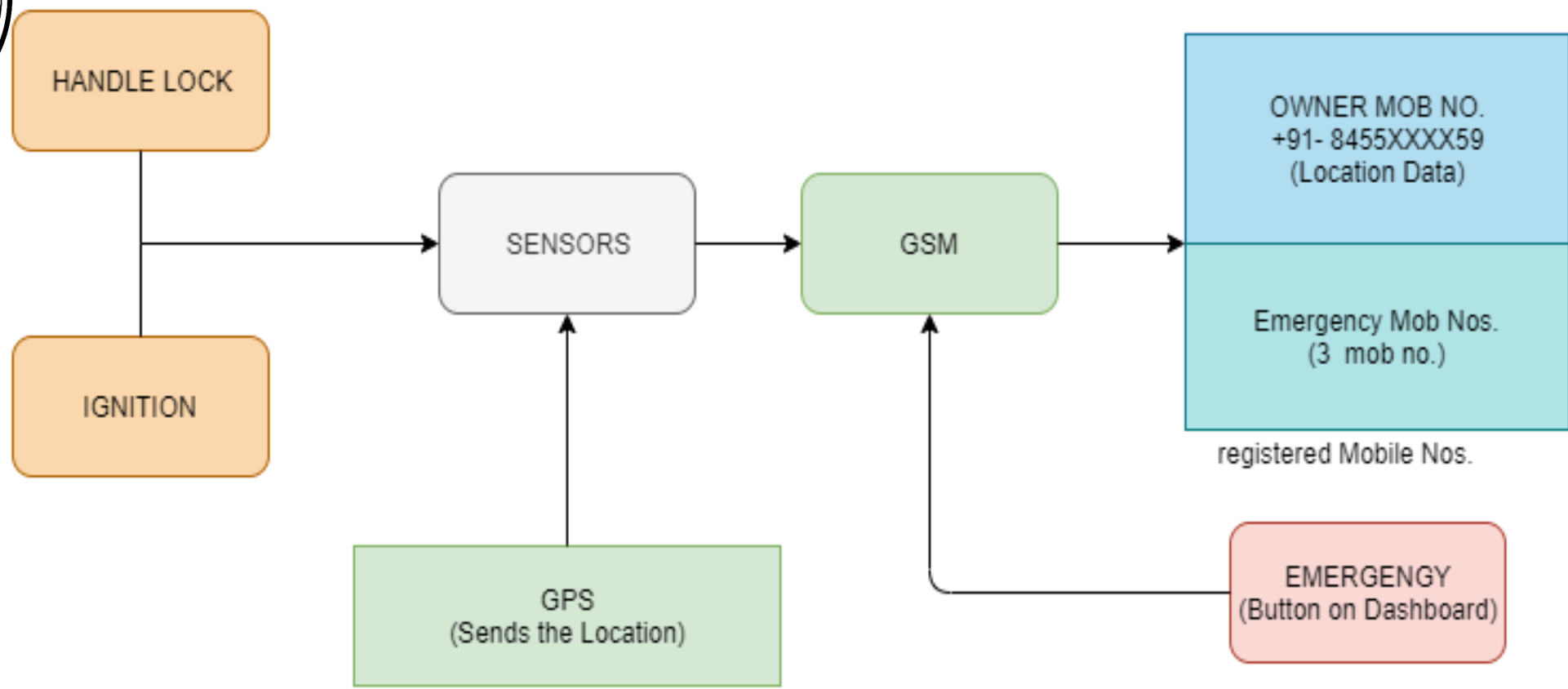
So a full fledged anti-theft device is of utmost necessity. So that not only can the vehicle be protected but also tracked.

- Emergency detection device would help the rider in case of emergency, accident, etc. This system can help the rider to inform his friends or relatives in case of any mishap. The system helps to inform the rider's friends and relatives.



## WORKING OF THE SYSTEM

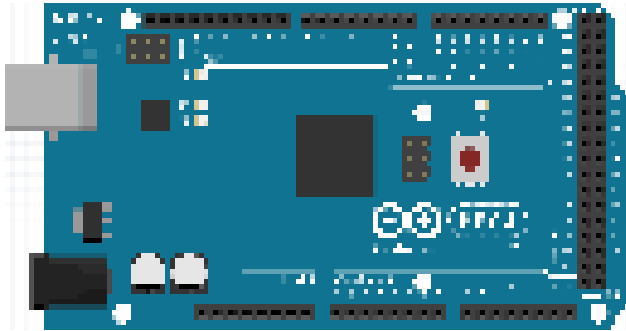
- The anti theft and emergency detection system  
Let us assume three cases what a thief might do while stealing a bike  
First, he will try to unlock the handle  
Next, he will put on ignition  
And lastly he will ride the bike i.e. Change the location of vehicle.
- Now covering all the three cases the antitheft and emergency system is designed.
- Whenever the handle unlocked or the engine is started, the device will send a message to the registered owner's mobile number. And finally the location of the bike can be sent to the same number.
  
- The introduction of the EMERGENCY BUTTON is also an added boon.
- Imagine a situation where the rider faces a problem or meets with an accident and the people around him cannot access his family in this case if some one presses the emergency button, the location of the bike along with a message will be sent to the mobile number kept as emergency number.



## Anti-Theft and Emergency Detection System



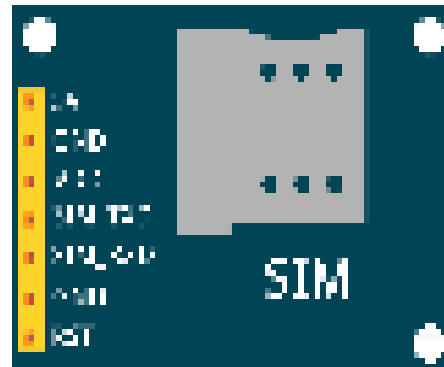
# tyre PRESSURE CHECK SYSTEM



*Arduino Mega  
microcontroller  
board based on  
Atmega2560*



*Emergency  
button for  
uncertain  
mishaps*



*GPS AND GSM MODULES(for sending and receiving location and data )*



*Messages Send to reg. mobile nos.*



# Working Mechanism

- The system should be installed during manufacturing.
- GPS module installed in the bike it will give the location of the bike and that location will be sent to owner's mobile via a message.
- GSM module would send a message to the user when the handle lock is opened and also when the bike is started.
- Messages of location is sent to the registered mobile numbers .As our mobile data is backed up in our drive our vehicle location data is also stored.
- An emergency switch is also provided in bike dashboard that would inform the rider's relative in case of emergency or accident.



# Advantages over conventional methods

- This system not only prevents the theft from happening but also takes the worst case condition and sends the location to the owner, controls mishaps in case of emergency.
- Low cost and can be easily installed in existing technology.
- Security of vehicle is increased.
- Emergency Alert Switch.

Such a device has an added advantage over the conventional methods as it is preinstalled in the bike and cannot be removed.





# Results and potential Business Impact

Our cases are specifically designed with features suiting HERO MOTO Corp. :

- The product range: The product is useful in any automobile(2 wheelers) and implementing new technology in automobile industry for consumers at an affordable price.
- Minimized threat: Our product is durable, low cost. Thus, this product has no significant potential to cause any harm to the operator.
- Minimum outage period: The parts used are not likely to fail. But even if these do, the replacements of every part is of least cost. The product has low maintenance but must be regularly checked.
- Least business risk: The product has design and economic advantage over every other product currently in the market providing accurate and reliable results. Also it can help in increasing the market of Hero Moto Corp.
- Workaround procedures: Our product is user friendly with has easy interface.



THANK YOU