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Smart Motor Cycle to Prevent Accidents

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ABSTRACT: The number of accidents is increasing with increase in population. There are several reasons for the occurrence of accidents. Generally, most of the drivers forget to switch the indicators and during monsoon season, drivers face vision bleed on the helmets while travelling. These two reasons are also among the prime causes of accidents. To resolve these issues, smart motor cycle is useful. Smart motor cycle basically works on the principle of auto switching of indicators, when the rider initiates a turn. This mechanism is carried out with the help of a gyro sensor which senses the tilt angle and a potentiometer which is used to give manual speed readings. Based on both of these readings, the instructions are carried forward to the indicators using Arduino. Smart motor cycle is also capable of turning on boomerang shaped sleek wipers which are fixed to the rider's helmet. These wipers work with the help of servo motors. Here, a rain sensor is used to detect the rain and guide the wipers accordingly. This smart motor cycle is helpful in reducing the accidents.

KEYWORDS: Smart Motor Cycle, Boomerang shaped sleek wiper, Indicators.

I. INTRODUCTION

Generally, turn indicators are used when a rider wants to take a turn while driving. According to the Society of Automotive Engineers, usually 48 percent of the drivers forget to switch the indicators, only 1/4th of the drivers, switch indicators properly.

During monsoon season, the weather conditions might not be favorable for the drivers while driving a motor cycle. The driver has to be mentally and physically alert in such situations and should take care of several aspects such as wet roads, rain droplets and moisture. The rain droplets accumulate outside the helmet's visor and moisture is formed inside the helmet. Thus, drivers face vision bleed due to rains.

These two factors are among the most common reasons for the occurrence of accidents. In such situations, smart motor cycle comes to the rescue. Smart motor cycle is capable of managing these two issues and in turn reducing accidents to a certain extent.

Smart motor cycle uses two separate circuits for each cause, which are mentioned above. The first circuit automatically turns on the indicators of the motor cycle, when the rider takes a turn and turns off the indicators when the motor cycle's handle returns to its original position.

This circuit works with the help of a potentiometer, gyro sensor, LCD display, two LEDs and a micro controller. It might not be possible to show the output by making use of a real motor cycle in order to get the speed readings. Hence, a potentiometer is used to give the speed readings manually to show the working of the circuit.

This setup can also erase the rain droplets present on the helmet's visor and removes the moisture formed inside the visor using another circuit of components. This methodology of erasing rain droplets and moisture at a time is known as Dual-wiper technology.

Dual-wiper technology is nothing but the operation of two wipers at the same time. For this purpose, two boomerang shaped sleek wipers are used.

The second circuit uses rain sensor, servo motors, boomerang shaped sleek wipers and a micro controller for its functioning.

Rain sensor is used to sense the rain droplets. Servo motors are used to operate both the wipers. In this way, smart motor cycle is useful to prevent accidents to a particular extent by resolving the above issues.

II. LITERATURE SURVEY

Sarika Kanetkar, Ankit Rathore, Krati Maheshwari, Prasanna Dubey, Ankit Saxena: Authors proposed a smart helmet wiper which works using a small wiper. A rain sensor is used to detect the rain droplets which operates the small wiper placed above the helmet. In addition to this, speed adjustment system is provided to the wiper that works based on the type of rainfall. [1]

Madhumohan, Girisha C, Ankit Kumar Sinha: The authors proposed a system that switches the indicators of the vehicle by taking the readings of speed without the involvement of the driver. The system uses an angle sensor, a speed sensor, a steering rotary sensor, and a micro-controller. This setup reduces the count of accidents to a certain extent. This system is very much efficient on highways. [2]

Pamarthi Kanakaraja: The author proposed an automatic bike turning indicator system based on sensor technology. The system is used to switch the indicators of a motor cycle while taking a turn. For this operation, two separate circuits are used, i.e., one for left indicator and one for right. The author used an accelerometer sensor to switch the indicators. [3]

Peter Otchere, Daniel K. Owusu, Angela A. Otchere: The system comprises of a car wiper that automatically detects the rainfall intensity using rain sensor and works accordingly with the help of servo motors. [4]

F. Baronti, F. Lenzi, R. Roncella, R. Saletti: The authors proposed a pocket-friendly method to implement a system to turn off the indicators of a motor cycle automatically. Taking Earth's magnetic field into consideration, a hall sensor is used to detect whether the turn is completed or not. The system is affordable for all the classes of people. The results of the system are shown before and demonstrated for the ease of solution which leads to a certain amount of improvement in terms of safety of the motor cycles. [5]

S Usha, Karthik Murugesan, R Lalitha, Jothibas Marappan: The authors proposed an auto-switching system of the bike indicators. It runs with an offline GPS navigating system. The system works even without internet access, as it generates hotspot on itself and gets connected with the mobile's Wi-Fi. The destination of the rider is pre-fixed in an application. Hence, the indicators are operated before 100 meters of taking a turn and are switched off, after the completion of the turn. [6]

Mahesh S Gour, Druva Kumar S, Pradeep Kumara, Manjunatha S, Sunil Kumar K, Chetan H: The authors proposed a system that prevents the road accidents, especially for the safety of the passengers travelling on the motor cycles. The proposed smart helmet system uses Arduino UNO, GPS and GSM modules in order to track the location in case of any emergency. The system is also capable of turning on the wiper placed on helmet during rain. [7]

Mukul Joshi, Kaustubh Jogalekar, D. N. Sonawane, Vinayak Sagare, M. A. Joshi: The authors demonstrated a system which senses the rain using a rain sensor. It performs various operations based on different rain conditions. A PIC motor controller is used to regulate the motor speed based on the sensor readings. [8]

III. SMART MOTOR CYCLE

The system is useful to prevent the road accidents. This system performs two key operations which are helpful in supporting the setup.

Smart motor cycle basically works on the principle of auto-switching of indicators, when the rider initiates a turn. This mechanism is carried out with the help of a gyro sensor which senses the tilt angle and a potentiometer which is used to give manual speed readings. The readings are forwarded from both the gyro sensor and potentiometer to the microcontroller. Based on those readings, the instructions are given by the microcontroller. The microcontroller i.e., Arduino UNO compares the speed readings and the angle readings. If the speed is greater, the angle of tilt should be minimal and if the speed is lower, the angle of tilt should be more for the effective functioning of the turn indicators. This system prevents the distraction that occurs due to the irregular functioning of the indicators.

Smart motorcycle is also capable of turning on boomerang-shaped sleek wipers that are fixed to the rider's helmet. These wipers work with the help of servo motors. Here, a rain sensor is used to detect the rain droplets and send the readings to the Arduino UNO. The microcontroller then forwards the instructions to the servo motors. To these servo motors, the boomerang-shaped sleek wipers are attached. Hence, the system accordingly using the rain sensor

and servo motors.

The above operations make the system as the smart motor cycle.

Block diagram 1

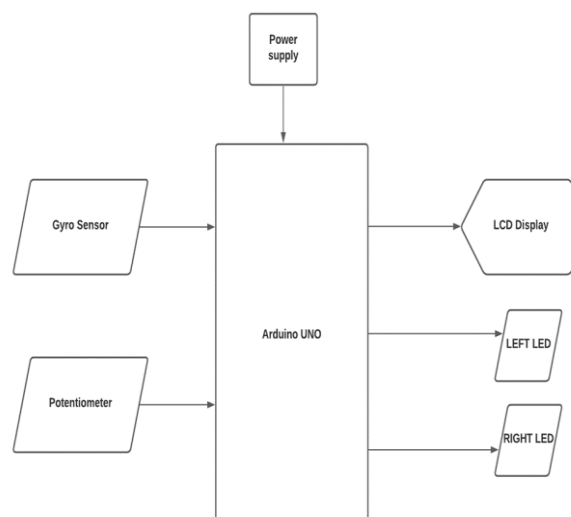


Figure 1: Block diagram of first stage

The components used in order to perform the first operation are given as follows:

- Gyro sensor
- Potentiometer
- Arduino UNO
- LCD display
- 2 LED
- Power supply

Flow chart 1

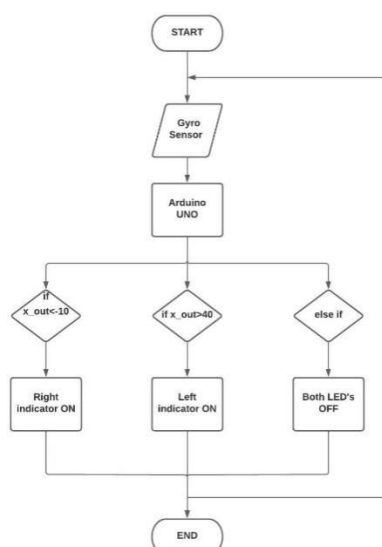


Figure 2: Flow chart of first stage

- The above flow chart shows the working of automatic indicators as the part of smart motor cycle.
- Initially, the instructions are forwarded only when the rider initiates a turn.
- The instructions are given based on the readings received from gyro sensor.
- Then, the readings will be carried out to the Arduino UNO microcontroller.
- The Arduino UNO is then responsible for switching the indicators based on the readings received from the gyro sensor.
- The gyro sensor is responsible for sensing the angle of tilt.
- So, considering the above factor, left and right indicators will be operated.
- The process will be terminated if the angle of tilt becomes 0 degrees i.e., when the handle of the motor cycle returns to its original position.

Block Diagram 2

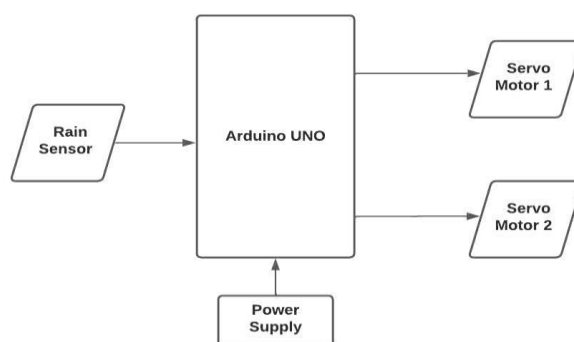


Figure3:Block diagram of second stage

The components used in order to perform the first operation are given as follows:

- Rain sensor
- 2 servo motors
- Arduino UNO
- Power supply

Flow chart 2

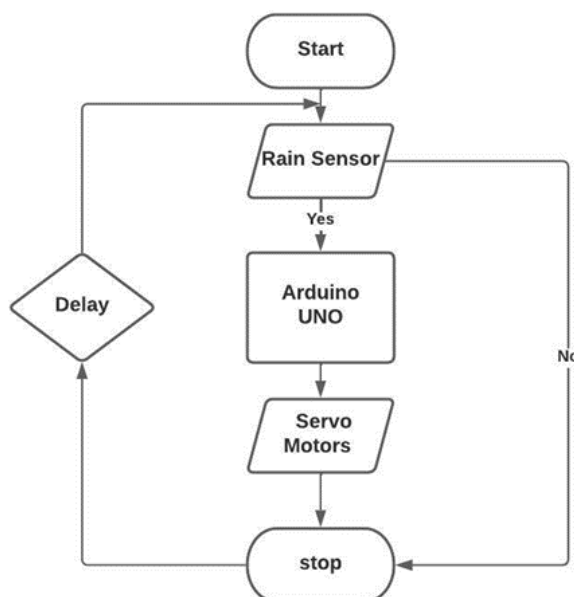


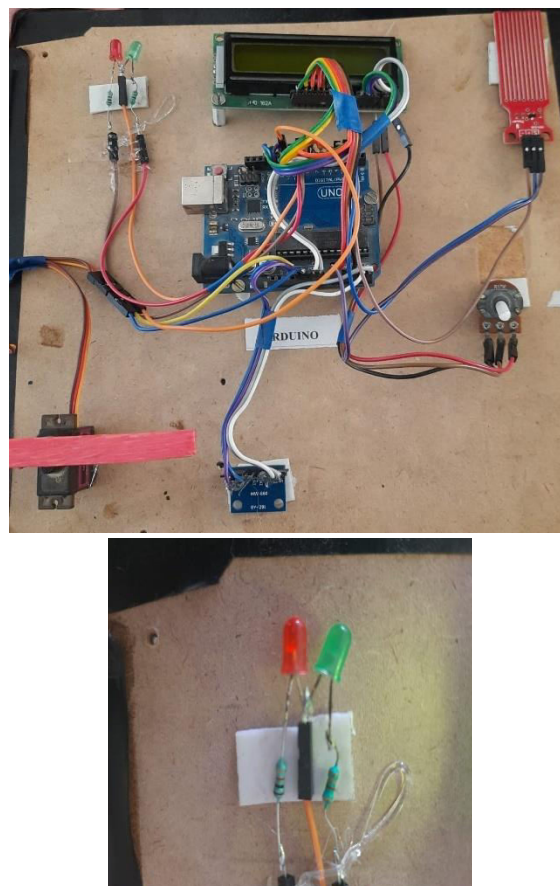
Figure 4: Flowchart of second stage

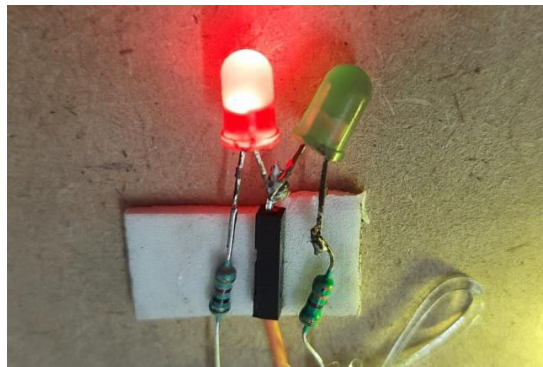
- The above flow chart shows the work flow of automatic wipers, which is the second operation of smart motor cycle.
- Firstly, the rain sensor is activated whenever there is a contact of rain drop or water drop to it. The rain sensor forwards the status to the Arduino UNO.
- The Arduino UNO turns on the servo motor. Two wipers are fixed to the servo motor, which helps in erasing the rain drops that accumulate outside the helmet's visor and removing the moisture that forms inside the helmet's visor during rain.

IV. CONCLUSION

In this project, which is entitled "Smart motor cycle to prevent accidents", we have proposed a system that prevents the accidents by switching the indicators automatically without the involvement of the rider, when the rider initiates a turn. Gyro sensor, potentiometer, LCD display, LEDs and Arduino UNO are used to carry out the mechanism of automatic switching of indicators. As discussed previously, this project is capable of performing two key operations. Another operation is capable of auto switching of the wipers placed on the helmet. This uses rain sensor, servo motors, boomerang shaped sleek wipers and a micro controller. Hence, smart motor cycle is capable of reducing the number of accidents.

V. RESULTS





Left Indicator ON



Right Indicator ON



Water sensor readings

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