"DEVELOPMENT OF AN AUTOMATIC BIKE SIDE STAND BY USING MICROCONTROLLER"

Tahir Shaikh[1], Shubham Bobade[2], Abhijeet Tambave[3], Pratikraj Sangitrao[4]
Under Graduate Student, S.M.S.M.P.I.T.R, AKLUJ.

Abstract: In the present scenario, the living standard was developed. Bike plays a very important role in our life. It helps to travel from one place to another place in very short time. The bike is a widely used vehicle in everyone life. As we know that side stand plays a very important role while the vehicle is in the rest condition. It may cause the death of riders or maybe some bad injuries. In a country like India, this reason causes the increment rate of the accident. This rate is increasing day by day so it is necessary to take up some preventive measures to avoid an unwanted accident. In manual side stand there is a possibility that the riders have been forgetting off to lift the stand and it causes an unwanted accident. So to overcome this accident we make a project that is automatic side stand.

Keywords –Stand,Microcontroller, Motor etc.

1. INTRODUCTION

The automatic side stand works on the simple mechanism and no need to take extra power while operating. So it does not affect the vehicle efficiency and also suitable for any two-wheeler vehicles. The design of the vehicle is not affected only simple mechanism is added to the vehicle. In the current world, technology plays a very important role so we updated our technology day by day and it is also needs of our society.Here are only two components are added and that is dc motor and microcontroller which is cheap in price. So overall price after installing this idea in a vehicle is not affected. This is the new advancement in a bike with the facility to lift the side stand automatically. This may avoid an unnecessary accident in the day to day life. The mechanism of this project is simple that why it does not affect the current design of the bike. This is very cheap so we can install this features in any type of two-wheeler vehicles.

2. METHODOLOGY

Proposed work is planned in following phases:

Phase I - Literature survey

In depth literature review we will carried out on working of Automatic bike side stand lifting mechanism, study of different elements of our project, study of different theories and concept related to our project. this phase is about getting information regarding to previous work that has been carried out till date. This will be carried out referring journals and research papers.

Phase II – Theoretical Design

The theoretical design consists of selection and designing of different elements of Automatic Bike Side Stand lifting mechanism and deciding the strategy of operation .

Phase III – Preparation of Electric Circuit

Microcontroller is a major component of our project so there is a need to prepare a proper circuit.

Phase IV- Performance checking / Trial on it

After the completion of our project we are going to check the performance as per our requirement and also getting a trial on it.

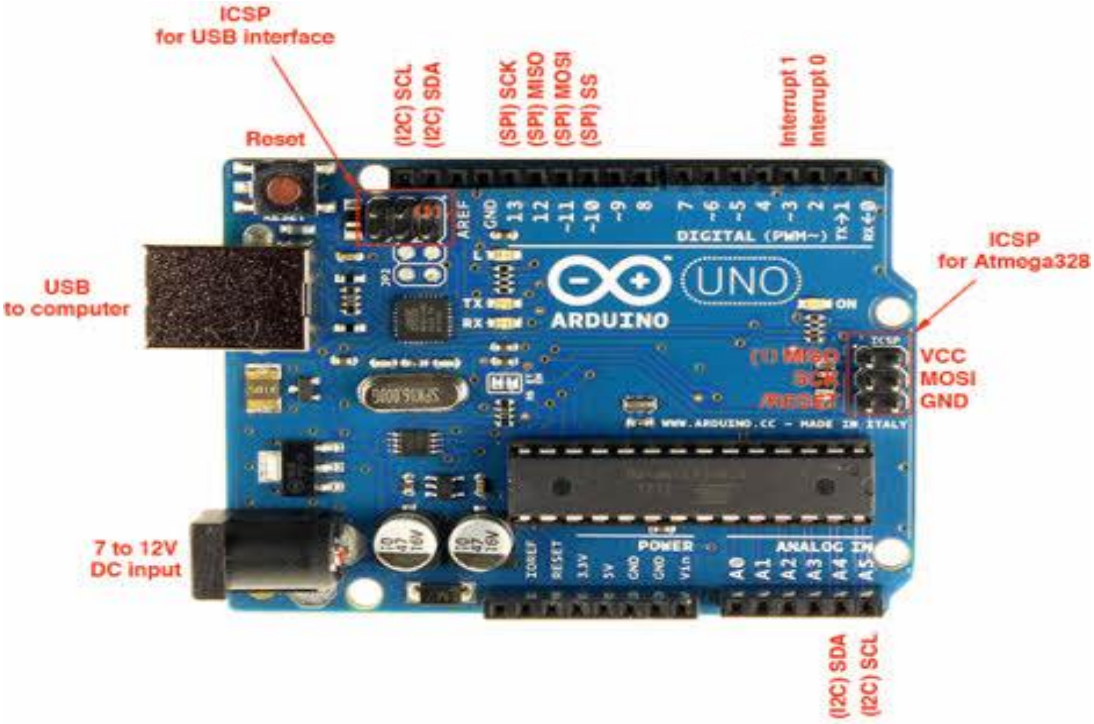
3. DEVELOPMENT OF PROGRAMMING

Program for circuit –

```
const int sensorPin = 2; //used for distance sensor
const int startPin = 3; // the number of the pushbutton pin
const int motorPin =  12; //motor connected to this pc
int lastButtonState = 0;
int buttonState = 0;         // variable for reading the pushbutton status
int buttonState2 = 0;        //variable for reading the sensor status
void setup() {
  pinMode(motorPin, OUTPUT);

  pinMode(sensorPin, INPUT);
   pinMode(startPin, INPUT);
    digitalWrite(motorPin, HIGH);

}

void loop() {

  buttonState = digitalRead(sensorPin);
  buttonState2 = digitalRead(startPin);

  // check if the pushbutton is pressed. If it is, the buttonState is HIGH:
  if (buttonState == HIGH)
  {
     if (buttonState2 == LOW)
     {
    digitalWrite(motorPin, LOW);
    delay(1100);
     digitalWrite(motorPin, HIGH);

  }

     delay(500);
}
}
```

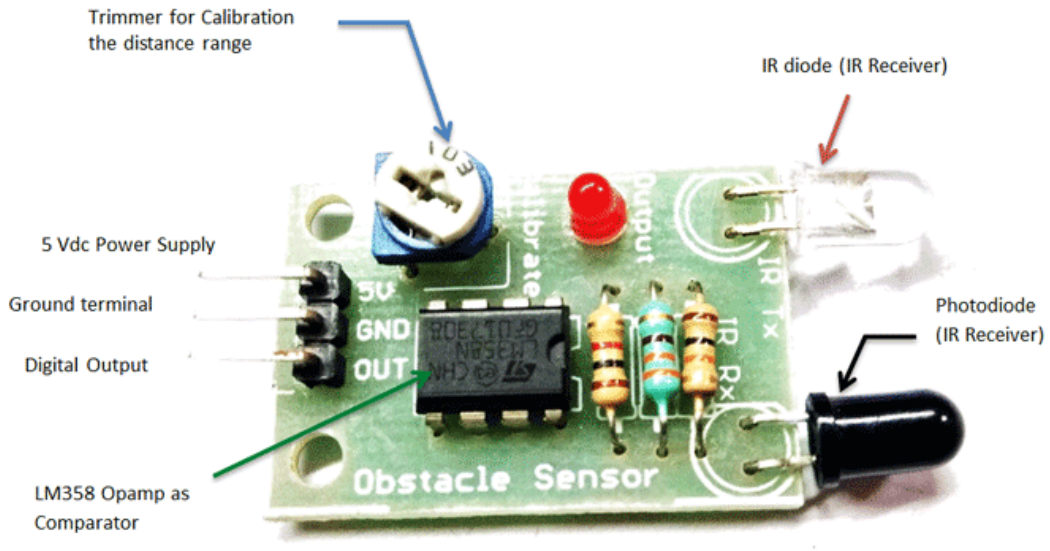
4. CONTAINING COMPONENTS

4.1Arduino Microcontroller



First choice for this development of side stand will be arduino 328 microcontroller because arduino microcontroller don't need external programming sources because it has capacity for internal programming by itself so it's automatically utilise the program by itself and it support any advanced operating system like windows, McIntosh so there is no problem for programming for theproposed circuit.

4.2 IR Sensor



The Sensor used here is infrared sensor.infrared sensor are more sensitive interms movement detection. Infrared sensor can detect distance movement upto 15 mm from ground which is sufficient distance to lift the stand from ground 3.3.1 infrared sensor propertie The IR sensor module consists mainly of the IR Transmitter and Receiver, Opamp, Variable Resistor (Trimmer pot), output LED in brief.IR LED Transmitter IR LED emits light, in the range of Infrared frequency. IR light is invisible to us as its wavelength (700nm – 1mm) is much higher than the visible light range. IR LEDs have light emitting angle of approx. 20-60 degree and range of approx. few centimeters to several feets, it depends upon the type of IR transmitter and the manufacturer. Some transmitters have the range in kilometers. IR LED white or transparent in colour, so it can give out amount of maximum light.Photodiode ReceiverPhotodiode acts as the IR receiver as its conducts when light falls on it. Photodiode is a semiconductor which has a P-N junction, operated in Reverse Bias, means it start conducting the current in reverse direction when Light falls on it, and the amount of current flow is proportional to the amount of Light. This property makes it useful for IR detection. Photodiode looks like a LED, with a black colour coating on its outer side, Black colour absorbs the highest amount of light.

LM358 Opamp LM358 is an Operational Amplifier (Op-Amp) is used as voltage comparator in the IR sensor. the comparator will compare the threshold voltage set using the preset (pin2) and the photodiode's series resistor voltage (pin3) Photodiode's series resistor voltage drop > Threshold voltage = Opamp output is HighPhotodiode's series resistor voltage drop < Threshold voltage = Opamp output is LowWhen Opamp's output is high the LED at the Opamp output terminal turns ON (Indicating the detection of Object).Variable ResistorThe variable resistor used here is a preset. It is used to calibrate the distance range at which object should be detected.

4.3 Selection Of Relay

A **relay** is an electrically operated switch. Many relays use an electromagnet to mechanically operate a switch, but other operating principles are also used, such as solid-state relays. Relays are used where it is necessary to control a circuit by a separate low-power signal, or where several circuits must be controlled by one signal. The first relays were used in long distance telegraph circuits as amplifiers: they repeated the signal coming in from one circuit and re-transmitted it on another circuit. Relays were used extensively in telephone exchanges and early computers to perform logical operations.

A type of relay that can handle the high power required to directly control an electric motor or other loads is called a contactor. Solid-state relays control power circuits with no moving parts, instead using a semiconductor device to perform switching. Magnetic latching relays require one pulse of coil power to move their contacts in one direction, and another, redirected pulse to move them back. Repeated pulses from the same input have no effect. Magnetic latching relays are useful in applications where interrupted power should not affect the circuits that the relay is controlling.

4.4 Selection Of Motor

Monster Guts 12VDC Wiper Motors have been the most widely used electric motors for any Halloween prop builder ever since we started Monster Guts! As a matter of fact, 80% of all Halloween props with electric motor use Monster Guts 12VDC Wiper Motors!What makes OUR Wiper Motors superior to the other? Monster Guts Premium 2-Speed 12VDC Wiper Motors are super-strong with plenty of torque, compact, reliable, and best of all, in-expensive!Not to mention that all Monster Guts Premium 2-Speed 12VDC Wiper Motor already have / had the special "parking brake" feature already part of the motor, while other vendors charge the customer EXTRA for this already built-in feature!! Includes: Standard Wiper Arm + Mounting Bolts.

5. CONSTRUCTION AND WORKING CONSTRUCTION:

Firstly we are made a general layout of side stand frame according to
dimension given in present time of two wheeler. In the next step we are made plate on which side stand are pivoted. The dimension of this plate is given according to motorcycle specification.. First the switch is on and the supply of battery is given to starter as well as microcontroller .then microcontroller actuates .the rider lifts the motorcycle or bike hence the distance between stand and ground increases suddenly the ir sensor gives signal to the arduino microcontroller as an input then relay is on it actuates the wiper motor and hence in a such way that stand automatically lifted
and while programming a time limitation is given to microntroller hence after particular revolutions motor stops automatically.
A Arduino microntroller is self programming microcontroller which doesn't require any external programming source so it runs it's own program. The program is created in emded C Which is upgraded version of C Programming after selection of microcontroller programming is done in emded C. Arduino is a single-board microcontroller meant to make the application more accessible which are interactive objects and its surroundings. The hardware features with an open-source hardware board designed around an 8-bit Atmel AVR microcontroller or a 32-bit Atmel ARM. Current models consists a USB interface, 6 analog input pins and 14 digital I/O pins that allows the user to attach various extension boards.
The Arduino Uno board is a microcontroller based on the ATmega328. It has 14 digital input/output pins in which 6 can be used as PWM outputs, a 16 MHz ceramic resonator, an ICSP header, a USB connection, 6 analog inputs, a power jack and a reset button. This contains all the required support needed for microcontroller. In order to get started, they are simply connected to a computer with a USB cable or with a AC-to-DC adapter or battery. Arduino Uno Board varies from all other boards and they will not use the FTDI USB-to-serial driver chip in them. It is featured by the Atmega16U2 (Atmega8U2 up to version R2) programmed as a USB-to-serial converter.

6. CONCLUSION

We observe that from the design and analysis D.C motor and another component like as microcontroller and speed sensor, switch are occupies less space and this space is easily available into the mechanical frame of the motorcycle [5]. The automatic stand is presently in use and quite successful. In future, it is applicable to all type of vehicle whether it is costly or cheaper bike.

In future there is also some advanced modification is possible to like on the basis of the sensor. In this project, we operated mechanism of lifting off the stand in the very smooth way.

7. FUTURE SCOPE

In future there is advanced modification of a bike stand by using electronic systems which are comparatively cheaper and more efficient .hence this modification will turn into the life saving modification of a bike riders component used in modification are more trustworthy and easily available hence this system will not fail under any circumstances and there is not much mechanical parts are used in modification there will be less wear and tear and hence it will cause less maintains.

8. REFERENCES

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