Automatic Positioning of Two Wheeler's Side Stand

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ABSTRACT—Mostly bikes come with two side stands which are side stand and a center stand. The side stand can be easily uplifted allowing the motorcycle to lean to the left side. The bike must be stand up onto the center stand. It is difficult as these stands need to be stepped upon and the vehicle needs to be lifted manually. Unless on firm, leveled ground, the side stand of bike is not useful.

As we all know that today's life is very fast and the biker start the bike and move towards destination without removing the side stand because of hurry and this may cause accidents. To avoid such accident, cause due to uplift the side stand, we may produce the new advancement in bike that as we switch on the key of bike 12V DC motor will switched ON and the mechanism of side stand will move upward.

All this process is works using Arduino. The need of prevention of the bikers on this type of condition, which is happened many times, hence, it is important to create something or one mechanism, which prevents the biker from the accidents cause due to uplifted side stand. This model will not affect the original assembly of side stand or it will not create any problem. In additional this model comes at cheaper price. It is just a small mechanism, which makes operation of side stand so easy. Therefore, it is necessary to have an extra model attached in a bike to uplift the side stand automatically.

***Index Terms* – Arduino**

1. INTRODUCTION

Now a day's there are so many bike users are on the road. Various motorcycle manufacturing companies have competition between them. Due to Increased percentage of biker's accidents percentage also increased, therefore every company try to find cause of accidents and eliminate this cause, however there is one problem, which is unsolved up to the present day.

The problem is accident cause due to un-lifted side stand. During driving very time due to early, forget next or any other such reasons, rider forgets to lift the side stand, this is very necessary to have an arrangement in the bike to prevents the accidents. some companies try to solve this problem, but they got success in certain extend. The reason behind making any model is to fulfill the requirements of society. Therefore, it is necessary to have a separate attachment, which can be connected to attach to the bike for automatically lifting the stand and this can be possible with DC motor connected with Arduino in addition, this is easily welded or connected to most of bikes.

As we all know that today's generation is quicker. The bikers are always in hurry this will cause bikers will forget to lift the side stand and may cause the accident. This model is new advancement in bike with the facility to lift the side stand automatically. This will reduce percentage of accidents. This is a easy model that does not affect the original stand position of the bike. This model comes at very less price to apply on the bike. It is easily acceptable in market because of its attractiveness and cheaper price.

2. SOFTWARE USED

2.1 PROTEUS

The Proteus Design Suite is a Windows application for schematic capture, simulation, and PCB layout design. It can be purchased in many configurations, depending on the size of

designs being produced and the requirements for microcontroller simulation.

Visual Designer in Proteus takes a cue from Arduino itself, removing the lower-level complexities of software language and hardware design. It uses a combination of its trademark Virtual System Modeling simulation which we will come to later flowcharts and virtual hardware, resulting in an integrated and intuitive development environment for Arduino. Depending on the device you want to connect to Proteus, you can configure the peripheral accordingly and use high-level methods to control it. If you are attaching, say, a robot, you might need different peripherals for the various sensors, one for the wheels and another for the motor. The corresponding microcontroller is automatically updated with connection details. Visual Designer allows you to set breakpoints at which you need to debug the course of the robot and perform simulations around it. To help you get started, the kit provides ready-to-use Arduino shields, breakout boards and sensors in its peripheral gallery. Transferring the data to Arduino board simply requires plugging in the programming cable, making the required configurations and clicking to transfer the flowchart into the board. PICs can be simulated in real time, letting you test circuit functionality effectively.

2.2 ARDUINO

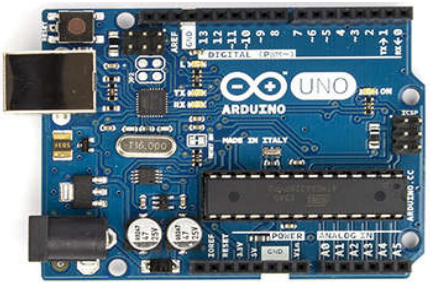


Fig.1. Arduino

Arduino is a tool for making computers that can sense and control more of the physical world than your desktop computer. It's an open source physical computing platform based on a simple microcontroller board, and a development environment for writing software for the board.

Arduino can be used to develop interactive objects, taking inputs from a variety of switches or sensors, and controlling a variety of lights, motors, and other physical outputs. Arduino projects can be stand-alone, or they can communicate with software running on your computer. the board can be assembled by hand or purchased preassembled; the open-source IDE can be downloaded for free.

The Arduino programming language is an implementation of wiring, a similar physical computing platform, which is based on the Processing multimedia programming environment.

3. COMPONENTS

3.1 ARDUINO BOARD

Specifications

SR. NO.	CONTENT	RATINGS
1	Microcontroller	ATmega328
2	Operating Voltage	5V
3	Input Voltage (recommended)	7-12V
4	Input Voltage (limits)	6-20V
5	Digital I/O Pins	14 (of which 6 provide PWM output)
6	Analog Input Pins	6
7	DC Current per I/O Pin	40 mA
8	DC Current for 3.3V Pin	50 mA
9	Flash Memory	32 KB of which 0.5 KB used by bootloader
10	SRAM	2 KB
11	EEPROM	1 KB
12	Clock Speed	16 MHz

Table No.1. Specification of Arduino

3.2 DC MOTOR

Fig.2. DC Motor

12V 5A DC geared motors for robotics applications. Very easy to use and available in standard size. Nut and threads on shaft to easily connect and internal threaded shaft for easily connecting it to wheel.

Features:

12V 5A DC motors with Gearbox

300RPM base motor

6mm shaft diameter with internal hole

125gm weight

Same size motor available in various rpm

1.5kgcm torque

No-load current = 60 mA(Max), Load current = 300 mA(Max)

3.3 SIDE STAND

Fig.3. Side Stand

A side stands usually a piece of metal that flips down from the frame and makes contact with the ground. It is generally located in the middle of the bike or toward the rear. A side stand style kickstand is a single leg that simply flips out to one side, usually the non-drive side, and the bike then leans against it. Side stands mounted to the chain stays right behind the bottom bracket or to a chain and seat stay near the rear hub. Side stand mounted right behind the bottom bracket can be bolted on, either clamping the chain stays or to the bracket between them, or welded into place as an integral part of the frame.

3.4 BATTERY

Fig.4. Battery

A 12-volt motorcycle battery is made up of a plastic case containing six cells. Each cell is made up of a set of positive and negative plates immersed in a dilute sulfuric acid solution known as electrolyte, and each cell has a voltage of around 2.1 volts when fully charged. The six cells are connected together to produce a fully charged battery of about 12.6 volts.

A battery uses an electrochemical reaction to convert chemical energy into electrical energy. Let's have a look. Each cell contains plates resembling tiny square tennis racquets made either of lead antimony or lead calcium. A paste of what's referred to as "active material" is then bonded to the plates; sponge lead for the negative plates, and lead dioxide for the positive. This active material is where the chemical reaction with the sulfuric acid takes place when an electrical load is placed across the battery terminals.

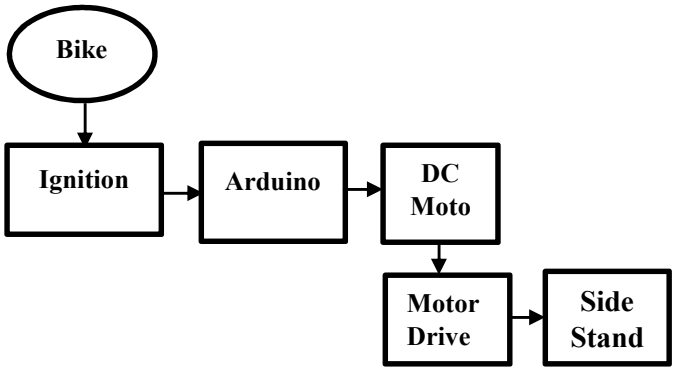
3.5 MOTOR DRIVE

Everywhere DC motors are used in large applications, the use of drives are very necessary for the smooth running and operating of these motors. The DC motor drives are used mainly for good speed regulation, frequent starting, braking and

reversing. Before enlisting the practical applications of the drives used for DC motors, we will discuss about the different operation of electric drives for different purposes:

We know that, normally the rotor of a DC motor is energized by the commutation process through brushes. So the maximum allowable starting current is determined by the current which can be safely carried out by the brushes without sparking. In general, the motors are such designed that they can carry almost twice of the rated current during starting condition. But for some specially designed motors, this can be almost 3-5 times of the rated current. But why so much current flows through the circuit of DC motors during the starting condition? This is because when the motor is at stand still condition, there is only a small armature resistance present in the circuit so no back emf is generated. That is why when the motor is started with full supply voltage across its terminal, there is a huge current flow through the motor, which may damage the motor because of heavy sparking across the commutators and a huge amount of heat is generated. That is the reason why some precautionary measures are taken during the starting of the DC motors.

4. BLOCK DIAGRAM



5. WORKING

Working of this project is simple. when we Turn key to the "ignition" position of the bike. Then 12V DC motor will Switch ON and the mechanism of side stand is going in upward direction. when side stand is completely close which will be determined using the proximity sensor then DC motor will be OFF. When bike key turn to OFF position then DC motor will rotate in reverse direction and side stand will move towards the downward direction. Second Proximity Sensor will detect the position of side stand. When side stand come at particular position proximity sensor will send signal to switch OFF the DC Motor. All This system is works using Arduino

6. Estimation of the project

Sr. No.	Material	Cost
1	Arduino	500
2	Motor	500
3	Motor Drive	160
4	Side Stand	Inbuilt in bike
5	Battery	Inbuilt in bike

Table No.3. Estimation of project

7. Literature Survey

Pintoo Prjapati, Vipul kr. Srivastav, Rahul kr. Yadav, Ramapukar Gon, Pintu Singh, Mr. Sandeep has worked on Sprocket Side stand Retrieve System. It is based on the Working Principle of Two Wheelers. In Motor Bike power is transmitted from engine's pinion to rear wheel. That linear motion of the chain is absorbed by rear wheel's sprocket and converted into rotary motion. That rotary motion of the rear wheel makes the bike to move. This system could be used in all type of two wheelers for retrieving side stand and to control accident due to side stand problem and protect the careless rider.

Bharaneedharan Muralidharan, Ranjeet Pokharel, has worked on automatic side stand retrieve system. This system is based on working principle of two wheelers i.e. the power is generated in the engine's and it transmit power to the pinion and make it to rotate the pinion transmits power to the rear wheel pinion and makes the vehicle to move. The objectives of this system is to provide a device responsive to an operating condition of the engines of the motorcycle for moving the stand to its raised position when motorcycle is in its running position

7.1 Indicator Method for Side Stand:

Some bikes have an indicator for side stand but it is not reliable because sometimes it may not work properly.

7.2 Fabrication of Automatic Side Stand Lifting Mechanism:

The side stand mechanism is a simple mechanism installed in bike to lift the side stand automatically after shifting the gear from neutral gear to first. It was total manually operated system. Its work on the lever arm mechanism when we pull down the side stand it lock into the catch lock hook and when we start the bike for riding and push the lever by our feet to shifting the gear that lever power transfer through the connecting rod to the catch lock hook and catch lock hook is de-locking and due to action of spring side stand is lifted. For lifting side stand no any power required it work on spring action. In this way Automatic side stand mechanism is work. In this only the disadvantages are It is not suitable for auto transmission vehicle and It is not for self-started bike.

8. Applications of Model

It can be used in all type of bikes and motorcycles which have gears, this same gear can be used to operate lift the sides stand.

Many people while driving the vehicles forget to lift up stand and hence accident takes place with the help of these applications road accident can be avoided.

9. FUTURE WORK

Design of this system can be improved In Future by using PLC system. We can also make system compact and easier to install in bike. If PLC is used system becomes more reliable. PLC will also provide indication of side stand position.

10. CONCLUSION

Running a bike with un-lifted side stand may create problems but with the help of this product we can solve this problem. The objective of this project is to provide the rigid and safety mechanism without interfering in any design of bike. it should be economically suitable for every class of society. From above report, it fulfills consumer needs and provides versatility moreover, as it is new product it will promote employment and vast field development for new engineer in day period.

11. REFERENCES

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