

Two Wheelers Balancing System

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Abstract: The project is based on safety measures of vehicles. It is inspired by the daily observation during riding a bike. While slowing down bike, we have to touch one or both of our legs to ground to keep the bike standing. Moreover, if there is a slippery road, there are chances of bike getting slipped due to losing of balance. To avoid this, an extra balancing wheels will deploy so that in case if the bike is slipping, due to the balancing wheels, the bike will remain balanced and the rider and to just focus on the brakes and the direction to stop bike safely. When stopped on signal, the riders won't need to balance the bike with legs, the balancing wheels will keep the bike standing and the rider can sit comfortably. Also, while parking, the rider doesn't need to put the bike on stand. The rider can just put on the brake and handle lock. Riding in traffic won't be terrifying for the riders to balance the bike, balancing wheels will help them balance. Due to these balancing wheels, the riders won't need to touch his feet to the ground while riding at all.

Keywords: Microcontroller, Servo Motor (DC), Switch Button, Wheel, etc.

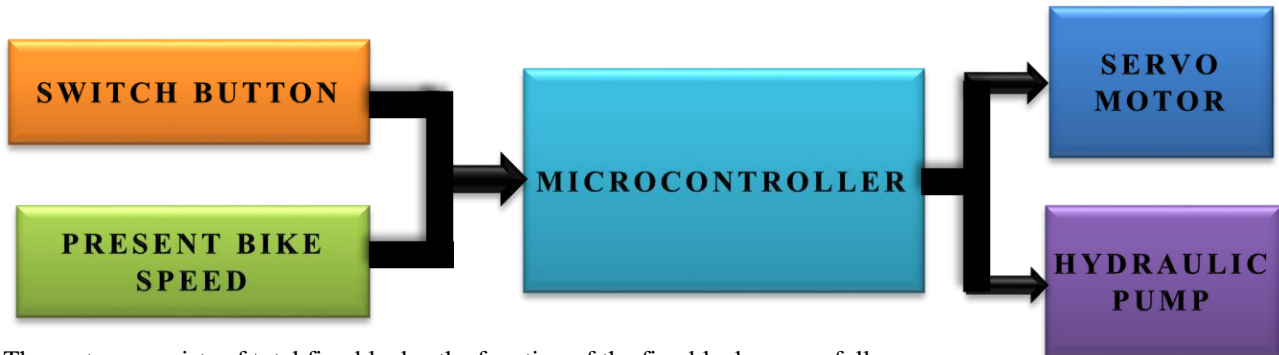
I. INTRODUCTION

While riding bike on highways, if we are at high speed and are approaching at certain parts of the road where the road is under construction, then we have to quickly slow down the bike's speed. And during this situation, there is high possibility that the bike can slip. To avoid this, the balancing wheels will keep the take care that the bike won't slip. The balancing wheels will have hydraulic pump which will deflate fully when the bike's present speed will be less than 5 kilometres per hour. The hydraulic pump's pressure will be at 50% when the bike speed will be between 5 to 10 kilometres per hour. And when the bike's present speed will be greater than 10 kilometres per hour, the balancing wheels will be closed. There will be a switch button which will have two options for controlling balancing wheels including automatic and manual control. When the switch button will be in automatic mode, the deflating and closing of the balancing wheels will be according to the present speed of the bike. And in the Manual mode, the balancing wheels will be deflated. Manual mode will be required in situations like driving on under construction road, slippy roads and wet roads, etc. where the rider will deflate the balancing wheels pushing this button if he sees any situation where the bike can possibly slip.



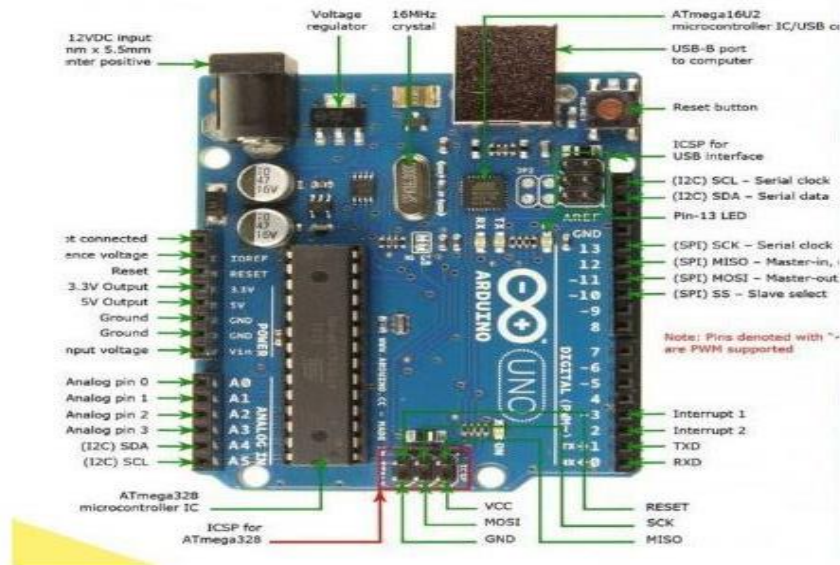
II. PROPOSED SYSTEM

Below shown is the block diagram representation of the "TWO WHEELER BALANCING SYSTEM".



The system consists of total five blocks, the function of the five blocks are as follows:

1. Microcontroller : A microcontroller is a compact integrated circuit designed to govern a specific operation in an embedded system. In this system we are using ARDUINO UNO as microcontroller. The purpose of choosing this as a microcontroller is due to its compact size and number of input/output pins available (14 digital and 8 analog pins available) which will make future development of the system of the easy and compact alongside.



2. Present Bike Speed: This block is given as input to the microcontroller. It consists of present speed of the vehicle. Continuous vehicle speed reading will be given as the Input.

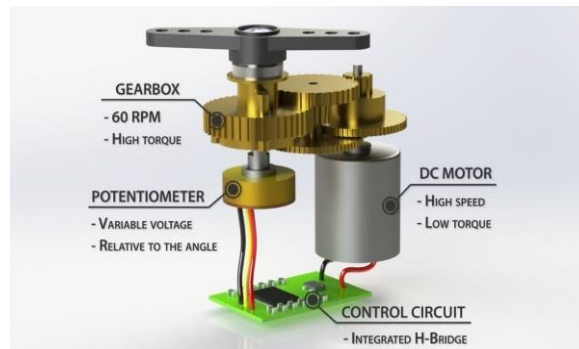
3. Hydraulic Pump:



A **hydraulic pump** is a mechanical source of power that converts mechanical power into **hydraulic** energy (hydrostatic energy i.e. flow, pressure). It generates flow with enough power to overcome pressure induced by the load at the **pump** outlet.

4. Servo Motor: Servo motor works on the PWM (Pulse Width Modulation) principle, which means its angle of rotation is controlled by the duration of pulse applied to its control PIN. Basically **servo motor** is made up of

DC motor which is controlled by a variable resistor (potentiometer) and some gears.



5.Switch Button: A push button switch is a small, sealed mechanism that completes an electric circuit when you press on it. When it's on, a small metal spring inside makes contact with two wires, allowing electricity to flow.



III. NEED OF THE SYSTEM

The intention of this project is to avoid bike accidents during slowing down and balancing of bikes. Only the good tires are not enough to make your bike have control in wet roads. If you are using small cc bike, then you can't make cornering fast. There are chances that Ur bike can slips. If you are using a heavy bike more than 150 cc then it depends on quality of Ur tires. If you are using hard compound tires, there are less chances of puncture and you are able to use tires 25000 km to 30,000 km. But these tires are worst in wet and muddy road conditions. Many times heavy sports bikers lose their control with these stock tires. As per Indian road conditions, we should use medium compound tires, which can ensure good grip and long lasting performance. If you use soft compound tires, these are best for wet and hilly road conditions. But you have to replace these tires after 15000 kilometers. This system will let the rider to sit comfortably throughout. The driver doesn't need to worry about balancing the bike. This system will balance the vehicle completely. Moreover while passing through under construction or wet roads where there is possibility of skidding, this system will balance the bike in Manual mode.

IV. WORKING

Position of the balancing Wheels and Hydraulic Pump is given below:



Situations when this System will be used:

1. **Traffic Signal-** The rider do not need to touch his feet on the ground to balance the bike. He can sit comfortably until he gets down from the bike.



2. **Parking-** Bike stand will not be required after this system is implemented. Handle lock , Brake lock and Balancing wheels will help to park bikes in proper standing way.

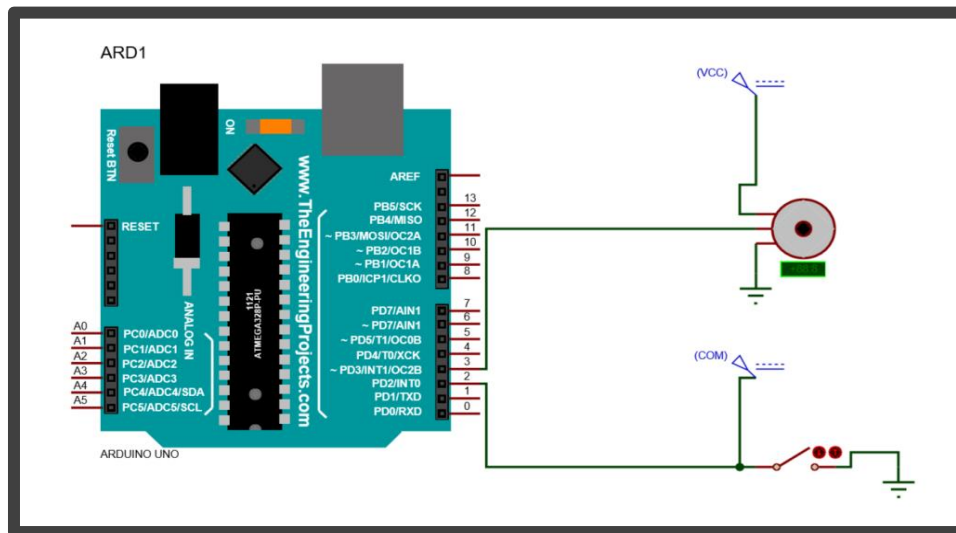


3. **Bike Skidding:** If the rider sees bad or wet roads and need to drive slowly and carefully so that the bike won't skid, the rider needs to put the switch button to Manual mode. In this situation , the balancing wheels will be deflated which will balance the bike. Possibility of bike skidding due to bad roads or wet roads. To avoid skidding, this system will balance the bike and let the driver focus on acceleration and brakes.

Stages in the System:-

- 1) Switch Button will give mode as in input to the microcontroller. If the Switch Button is set to Manual mode, the balancing wheels will be deflated all the time.
- 2) In the Automatic mode, the balancing wheels will be deflated according to the present speed of the bike. And the pressure of the Hydraulic pump will also be set according to speed.
- 3) The present Bike Speed will be processed by the microcontroller. If the speed is above 10 kilometers per hour , the balancing wheels will be kept closed checking the switch button's mode.
- 4) If the speed of the bike is between 5 to 10 kilometers per hour , then the balancing wheels will be deflated and the pressure in the hydraulic pumps will be reduced to 50%. This will help on turns while tilting the bike.
- 5) If the speed is less than 5 kilometers then the balancing wheels will be deflated but now the pressure in the hydraulic pump will be set to 100%. So the bike will be balanced and the rider do not need to touch the feet on the ground.

V. CIRCUIT DIAGRAM



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BIOGRAPHIES



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