GYRO BIKE

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ABSTRACT

A self-balancing unicycle is a type of unicycle, that is an electric vehicle, that uses sensors, gyroscopes, and accelerometers in conjunction with an electric motor to assist a rider with balancing on a single wheeled vehicle

A one-wheeled vehicle may include electric motors, a self-balancing system and steering mechanism, where in the electric motors and self-balancing system are disposed within the wheel of the one-wheeled vehicle

A computational resources such as a microprocessor based controller receives input signal indicative of operation of a twist throttle and brake and produces signals to adjust the tilt angle relative to the acceleration and thereby reduce the need for the rider to lean forward or backward.

I. INTRODUCTION

The problem of creating a self-powered unicycle that balances itself in three dimensions, is an interesting problem in robotics and control theory. The theoretical work on the unicycle problem is complemented by work on the construction of actual mechanically ridden unicycles.

To first order, a self-balancing unicycle can be considered as a non-linear control system similar to that of a two-dimensional inverted pendulum with a unicycle cart at its base: however, there are many higher-order effects involved in modelling the full system.

Rotation of the drive wheel itself can provide control in only one dimension (i.e., forwards and backwards) control in other dimensions generally requires other actuators, such as auxiliary pendulums, reaction wheels, or control moment gyroscopes attached to the main unicycle pendulum.

The desire for new forms of transportation in an ongoing pursuit of modern man. Some of the challenges of designing vehicles revolve around high energy efficiency while maintaining good usability. Reducing weight by simplifying the structure of a vehicle is also a consideration when designing new vehicles. Personal transportation vehicles such as scooters and motorcycles have a known level of user excitement when ridden. They are considered primarily a point-to-point mode of transportation and not necessarily seen as an entertainment ride. Unlike multi wheeled vehicles, which are larger than unicycle there is little room for energy storage and power generation in a unicycle .unicycle is a light weight and has a small footprint both of which are desirable characteristics for a transportation device.

II . METHODOLOGY:

A self-balancing unicycle is a unicycle electric vehicle that assists the rider in staying upright by using an electric motor and gyroscopes controlled by a computer that is fed data from accelerometers and other sensors.

The gyro bike is a kind of vehicle that runs on a single wheel and it consist of motor and gyro and accelerometer sensor and it balances us to run in a single wheel. The finger print sensor id used to access the vehicle.

III . MODES OF IGNITION**:**

a. Push button start.

b. Finger print start.

3.1. MATERIALS USED

1. Drive motor: 750watts 48volts blushless D.c motor.
2. Electronic system
3. Microcontroller: Arduino uno.
4. Motor drive board.
5. Finger print sensor.

IV. WORKING

Like other balance technology products, the GYRO stays upright **front-to-back**. A gyro sensor tells the RYDE-EX control system to drive the wheel forwards or backwards to stay under the center of gravity. Lean forward, and the gyro tells the processor that the bike is falling forward. As a result, it will roll forward until the rider allows the bike to come back to zero. Try testing this by leaning forward slightly with your feet down and then let the bike coast back to upright. The same action works in reverse.

One thing to note is that most new riders naturally lean the opposite way to counter motion. On a bicycle for example, when you are stopping, you tend to lean forward to focus on the front tire. To stop a GYRO, it's more like reining in a horse.

Remember, if you just relax and sit up straight, the bike will always drive the wheel back under you. You can literally walk forward on your feet and the bike will follow you by staying under you.

To help the rider accentuate the effect of leaning back to stop, the GYRO has a handlebar mounted lever that is software controlled. When the rider pulls on the lever it tells the RYDE-eX controller to drive the wheel forward an additional five degrees of tilt angle. This sits the rider back in an attitude that allows them to slow the bike more aggressively. This lever is **not** a conventional brake! It does not stop the bike or take control of balancing the bike away from the rider. The rider is still responsible for stopping the bike at the rate that they desire. If you ever get uncomfortable, quickly lean back while grabbing the stop assist lever firmly. Never pull the stop assist lever while leaning forward.

To stop the bike even more aggressively, a technique can be used to combine using the brake assist with a stance where the rider stands up on the foot-pegs and sticks their hips way back while pulling hard on the handlebars. Caution is advised during this maneuver to listen and feel for the system warning you that you are exceeding the safe performance window. Said a different way, because the bike must always stay in balance, the bike can only stop as fast as the performance window will let it. With an experienced rider, the GYRO can stop on level ground from 10MPH with a 180lb rider in about ten feet.

Note, if the rider overpowers the balance window while braking, it's possible to pull the bike back so hard that you end up standing on your feet on the ground with the bike in front of you. If the bike tips back more than 45 degrees, it will drop out of

balance. If it gets tipped over less than that, it will want to right itself by backing up. Just be aware of this and step back while keeping one hand on the handlebars.

The foot pegs are an integral part of the steering system that can be used by advanced riders. By standing on one foot peg or the other, a rotational twisting moment is imparted on the steering pivot causing the wheel to change direction. As you continue to integrate more of your full body into the riding experience you'll discover how useful the foot pegs are to steering. When the rider is in a seated position most of the steering is done with the handlebars and hip twisting. For example, when the bike is ridden on a non-level surface: Where the road is slanting to the right the rider can put some additional downward pressure on the left foot peg to counter the tendency of the bike to drift to the right.

Standing on the foot pegs allows the rider a tremendous amount of freedom to navigate rugged terrain. It's easy to feel the tire under you as if you are water skiing. Bank right or bank left and the bike responds. If you drive down into a low ravine it's easy to drive back up the other side or over obstacles simply by leaning forward and standing on one foot peg or the other to steer. Another analogy to the feeling of a full body steering experience is like piloting a wave runner water craft. You use handle bars, the tilt of foot pressure to get the hull to carve into the turns and shifting your weight forward and back. With the RYNO though, it all is very subtle, and happening under 10MPH. It's an easy-to-learn dance of balance and poise.

V. Advantage

1.It is much cheaper than any other one wheel bike available in the market.

2.An hour of charge can able to travel around 15km.

3.It is used to travel the places where two wheelers cannot able to travel.

4.In future it will replace segways and anyother vehicle with two wheels.

5.It is less prone to accident when compare to segways.

With the GYRO, you're not limited to the street or the bike lane. It's a transitional vehicle – it goes most places where a person can walk or ride a bike. In an effort to get people out of their cars, cities are trending to allow personal mobility products to mix with pedestrian traffic.Elevators,office,bike lanes-essentially,anywhere you can walk (and you wouldn't walk on a freeway,would you?) keep in mind that regulatory laws differ from state to state,so it is important that potential purchases carefully review the state regulation and comply with any special requirement.