North Asian International Research Journal of Sciences, Engineering & I.T.

IRJIF. I.F. : 3.821

ISSN: 2454-7514 Vol. 9, Issue-7 July-2023

AUTONOMOUS SAFETY BRAKING MECHANISM FOR BICYCLES

- DHEER PATEL
- 402, Laxmi Villa, Tagore Road, Mumbai-400054
- Jamnabai Narsee International School std IX

INDEX

PROBLEM STATEMENT

As many as 158,964 two-wheeler road accidents took place in India in 2020, which caused 56,873 deaths(HINDUSTAN TIMES). Some are because of the negligence of the bikers whereas some are because of other vehicles.

Cyclist often come across many obstacles on the road unexpectedly and it may be quite difficult to dodge them. It might be an animal or it might be another vehicle since driving on the wrong side of the road is a huge problem in India. 8764 lives were lost in India because of driving on the wrong side.

1 person dies every 4 minutes; one fatality every 15 mins in case of 2-wheelers(INDIA TIMES)

The aim of this device is to help avoid collisions of two wheelers by breaking or autonomously reducing the speed of the cycle .

EXISTING SOLUTIONS

Most of the existing technology related to cycle accidents is not to prevent but make the accident less fatal.

One of these is the wearable airbag.The bag inflates and then quickly deflates during a collision, providing cushioning to both the driver and the passengers, possibly protecting them from fatal injuries.They protect the upper body of the rider during a crash. The airbag system is incorporated into a vest that is worn with a compatible jacket. The system is totally independent of the motorcycle, meaning that the rider can ride any bike model.

Another one is improved helmet designs. Nowadays, helmets are made out of durable materials, such as fiberglass, Kevlar, or even carbon.This results in a lightweight helmet that is extremely tough and resistant to abrasion.

Both of these devices are for post-accident use and not for its prevention.

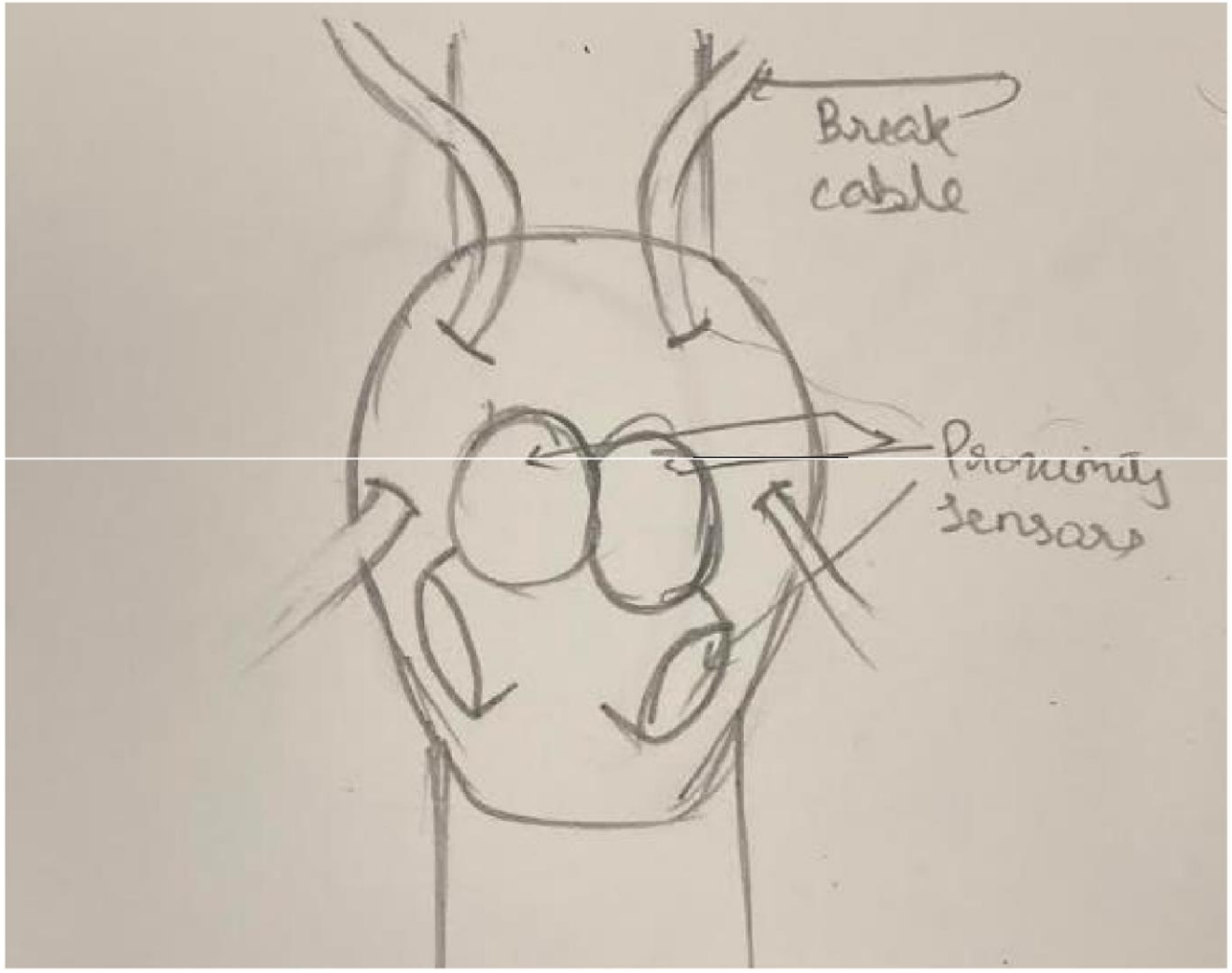
MY SOLUTION

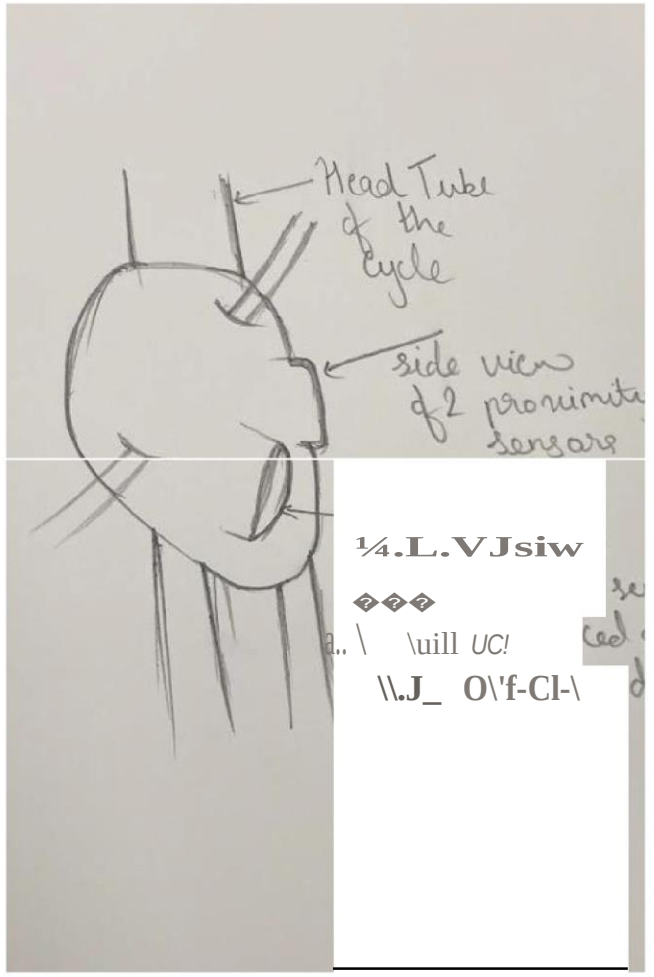
My aim is to use 4 proximity ultrasonic sensor to sense obstacles and vehicles in a nearby proximity.

Once it senses a potential obstacle it could crash into, it will pull on the break cables to reduce the speed.

How this will be done is that there will be 4 ultrasonic proximity sensors attached on the head tube so as to get a precise reading of the objects in front of it and the break cables will be passed through it so when wanted it will be able to pull the break cables at will and give preference to the breaking of the rear wheel and will apply the brakes on the front wheel if necessary.

There will also be a buzzer and a blinker attached under the seat to signal the vehicles behind the cycle once it engages auto brakes.


Break cable
Proximity Sensors


Head Tube of the Cycle
side view of 2 proximity sensors

EXPERIMENTATION

- A fit to scale model of a bicycle along with ultrasonic sensors was made by me to exhibit the mechanism with lego.
- I tested various real-life situation that a cyclist could get into.
- I measured the response timings of the sensors and the overall movement and I came to the conclusion that many fatalities and accidents can be prevented as this device helps aid the cyclists reflex by giving them more time to react as it slows down the cycle for them.

ADVANTAGES OF MY SOLUTION

My solution will help combat and prevent two wheeler accidents compared to the other solutions that do not prevent the accidents but only decrease its impacts and injuries.

The device is small and does not hinder riding the cycle.

It is small and simple yet effective to prevent collisions by controlling the cycles movement.

It also alerts the vehicles behind.

REFERENCES:

[1]. https://timesofindia.indiatimes.com/india/where-are-indias-deadliest-roads/articleshow/91889731.cms

[2]. https://auto.hindustantimes.com/auto/two-wheelers/over-1-58-lakh-two-wheeler-road-accidents-occurred-in-india-in-2020-gadkari-41648635189527.html

[3]. https://www.statista.com/statistics/1071089/india-cyclists-deaths-in-delhi/

[4]. https://savelifefoundation.org/wp-content/uploads/2017/11/Road-Statistics-Involving-Bicycle-Users_111017.pdf