

# INTELLIGENT MULTI BRAKING SYSTEM

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## ABSTRACT

Road accidents are a commonplace in today's scenario. Accident prevention has been one of the leading areas of research. This system is designed to prevent accidents due to loss of control, bumpers, obstacles, dig and pits for handicap people's vehicle. In this work, braking distance and the distance of the obstacle are taken into consideration along with the speed of the vehicle to provide. The main aim of our project is to prevent the accident of physically handicap people. For this we use multi breaking technique.

**Keyword:** Mobility Device, Wheel Chair, IR Sensor, Breaking mechanism

## 1. INTRODUCTION:

- (1.1) Brakes are used to inhibit the motion in order to prevent the collisions. Generally During emergency situations, whenever drivers see an object in front suddenly, they get panicked and fail to apply brakes completely. For normal drivers the reaction time to press the brake pedal is high but the force applied is insufficient, hence they may fail to use the full braking efficiency of the car which leads to accident.
- (1.2) Active safety braking system will help in emergency conditions by increasing braking force. The speed with which driver presses the brake pedal in normal conditions is different with speed in emergency conditions. Drivers press the brake pedal quickly during emergency situations. By analyzing the speed With which brake pedal is pressed active safety system will detect the emergency condition and applies full braking force even though diver did not press the brake fully. This active safety system has to be used with ABS and ESP equipped cars in order to increase the control of the car while emergency braking.
- (1.3) Over the last years a number of projects, such as Path have dealt with the platoon concept as an approach to increase traffic safety and efficiency on urban areas and highways. A vehicle platoon can be defined as a set of vehicles, that move together while keeping a predefined geometrical configuration, without any material coupling.[1]
- (1.4) Platoon is a set of vehicles that moves together while keeping a particular geometrical configuration without any material coupling. Before defining the different configuration that a platoon can take, lateral and longitudinal distances (fig.1) have to be defined. These parameters are used in the geometrical definition of a platoon formation.
- (1.5) Lateral distance represents the horizontal spacing between two neighbor vehicles.
- (1.6) Longitudinal distance represents the vertical spacing between two neighbor vehicles.[2]

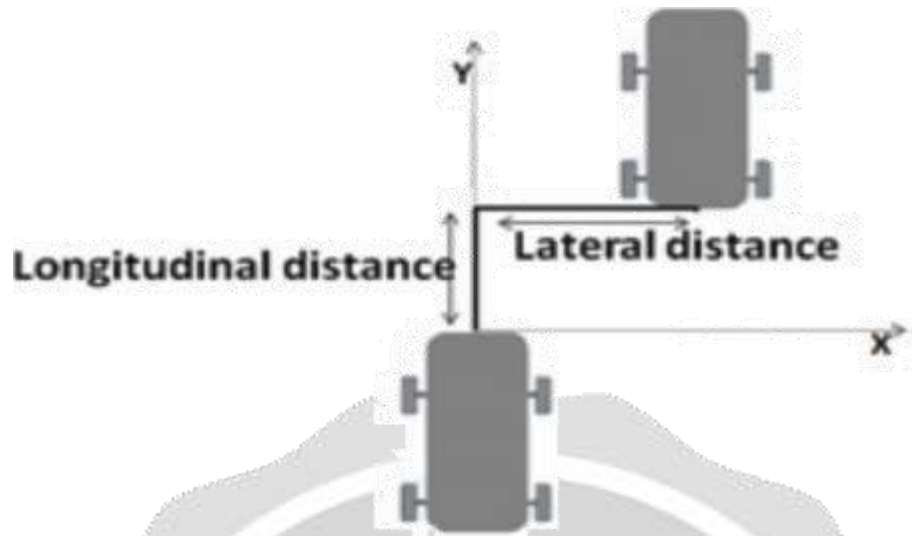


Figure 1: Lateral and longitudinal distances

**1.1 IR Sensors**

An infrared sensor is an electronic instrument that is used to sense certain characteristics of its surroundings by Either emitting and/or detecting infrared radiation. We used IR sensor in this project to sense the presence of Obstacle.

Infrared technology is found in many of our everyday products. For example, TV has an IR detector for Interpreting the signal from the remote control. Key benefits of infrared sensors include low power Requirements, simple circuitry, and their portable feature.[3]

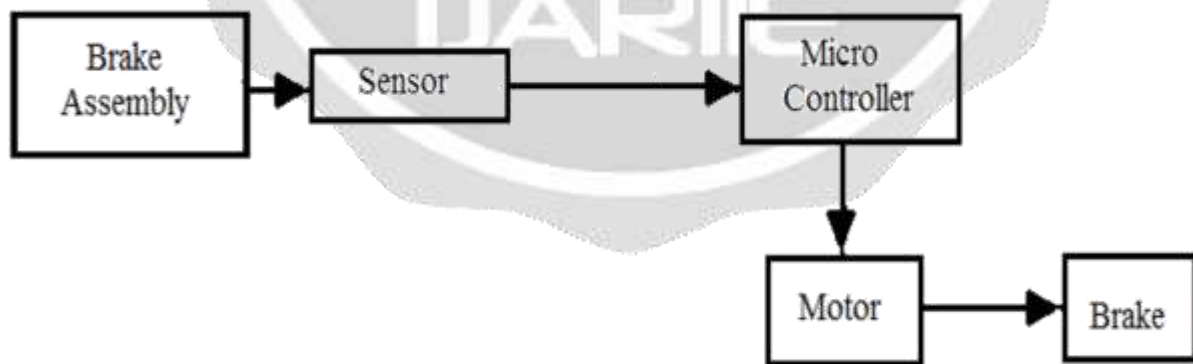


Fig.1. 1: Method of Multi breaking System

**1.2 Working:**

Brake pedal will give analog output voltage when brake is pressed. This voltage value is given as input to the micro controller. Optical sensor is used to detect the speed with which brake pedal is pressed. Optical sensor is placed at 70% of brake pedal path. Optical sensor gives analog value which has to be converted into digital value for analyzing. Optical sensor values are given as input to micro controller.

Micro controller will take two inputs one is from brake pedal another is from optical sensor. Output from brake pedal will determine whether brake pedal is pressed or not. Optical sensor will give output voltage whenever brake pedal crosses it. When brake pedal is pressed a timer is switched on. Timer is switched off whenever brake pedal is released. Time between the brake pedal pressed and brake pedal crossing the optical sensor is given by the timer. This timer value is compared with threshold value. Whenever the timer value is less than threshold value the system declares it as emergency condition and motor is actuated to increase the braking force.[4]

## 2. FACTORS CONSIDERED

Factors considered in designing the system are:

- [A] Braking distance
- [B] Distance of obstacle in front.[5]

### 2.1. BRAKING DISTANCE

The braking distance is the main factor considered in this system. Braking distance for a particular speed is the Distance between the point of application of the brakes and the point at which the vehicle comes to a complete stop from the present speed. It is calculated by using following formula.

$$\text{Braking Distance} = V^2 / 2\mu g \text{ (meter)}$$

Where,

- V= Velocity of the vehicle (m/s)
- $\mu$  = Coefficient of friction of road = 0.8
- g = Acceleration due to gravity = 9.81(m/s<sup>2</sup>)

In this formula the condition of brakes and the road conditions are not considered for coefficient of friction  $\mu$ .

### 2.2 ADVANTAGES

- A high variance in speed.
- An increase in speed together with higher acceleration and deceleration rates.
- A decrease in spacing in order to force drivers to accelerate or move out of the way.
- An increase in emergency braking and rubbernecking.
- An increase in the intensity with regard to speed and braking rates over time.

## 3. CONCLUSIONS

The Intelligent Braking system, if implemented can avert lots of accidents and can save invaluable handicap people. Our Intelligent braking system provides a glimpse into the future of automotive safety, and how much more advanced these individual systems can be for avoiding accidents and protecting vehicle occupants when they are integrated into one system. The future of automotive safety is more than just developing new technology; it is shifting the approach to safety. INTELLIGENT BRAKING SYSTEM for handicap peoples approach represents a significant shift from the traditional approach to safety, but it is fundamental to achieving the substantial benefits

## 4. REFERENCES

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