A driver- Assisted Automatic pneumatic braking system: a conceptualized Product Development

Driving is one of the prominent necessities of any individual. Due to the growth of the population, transportation has become tight, thus, increasing the risk of accidents. There are several reasons have been highlighted for such accidents, namely, long-distance driving without appropriate relaxation, driving at night, using mobile devices while driving, and driving with alcohol. Even though several pieces of research are available on automatic braking, this research specifically analyses the importance of real-time data, while the system is driver-assisted. This research comprises of ultrasonic sensor, speed sensor, Arduino UNO Board, rain sensor, DC actuator, air compressor, and air reservoirs along with the major elements of the braking system. The results were analyzed in three various situations at the wet and dry conditions. In assumption, 1m of tolerance has been provided for the internal adjustments of the vehicle. At first sight, if the distance between the object and the vehicle is larger than the braking distance tolerance limit, the system functions normally where activation is unnecessary. If the distance between the vehicle and the object interface is less than the braking distance tolerance limit, using the sensing mechanism, the brakes will be actuated and the vehicle will stop immediately. Finally, when the vehicle and object are too close, the system will not function again while giving a warning sign for the driver to steer in the proper direction. The variation in braking distance concerning vehicle speed has been analyzed in both wet and dry conditions. Indeed, the research results have provided the practically applicable automatic braking system with the driver's control. This proactive method of accident mitigation would be a novel solution with the future scope of coordinating the automated braking system with the speed reduction system by regulating the accelerator's rotation.