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AUTOMATIC BRAKING AND SPEED CONTROL SYSTEM USING DEEP NEURAL NETWORKS

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Safety is a necessary part of man's life. Due to the accident cases reported daily on the major roads in all parts of the countries, more attention is needed for research in the designing an efficient car driving aiding system. In many road accident cases, a major cause of the accident is the driver distraction and failure to react in time or negligence of the driver or because of failure of braking system to stop the vehicle in time. The number of accidents and the effects of collision can be minimized by developing effective braking systems.

The purpose of Automatic Braking and Speed Control (ABSC) System is to develop an automated control system that would maintain a safe driving distance from obstacles while driving. This project focuses on developing control system based on Deep Neural Network for speed control of vehicle to curb road accidents and effectively assure safety and stress-free driving.

ABSC System basically controls the speed of the vehicle by continuously feeding the driving atmosphere to the pre-trained deep neural network as digital image captured by the camera sensor. The vehicle is attached with camera which will continuously capture the frames. Each frame from the video is extracted and a series of preprocessing steps are done. It consists of the steps like converting the colored image to gray scale, getting only the region of interest from the image, feature extraction etc. The preprocessed image is given as input to the Convolutional Neural Network where it is convoluted and max pooled. There are series of convolution is done on the image. The features from image are finally taken into the fully connected layers which predicts the speed and the amount of brake to be applied. It is then displayed on the interface which alerts the driver to reduce the speed according to the prediction and waits for the user response. If it doesn't get any input from the user, vehicle's controller unit automatically signals the actuator unit to apply required amount of brake as predicted by neural network.

The braking system based on the deep learning is intelligent way of brake control which exhibits desirable and consistent brake control behavior for various scenarios where behavior of the pedestrian is uncertain. It can reduce the velocity of the vehicle automatically when a threatening obstacle is detected. The autonomous braking offers safe and comfortable brake control without exhibiting too early or too late braking.

GUIDE AUTHORIZED: YES