Driver assistance system while overtaking

Abstract

Safety and comfort are two important aspects that must be achieved at the time of driving. The level of safety when driving can be improved by reducing driver (human) error. An auxiliary device is required by the driver to avoid an accident. Advanced Driver Assistance Systems (ADASs) are systems designed to help the driver in the driving process. The Overtaking Assistance System (OAS) is a subsystem of an ADAS that functions by assisting the driver in the overtaking process. This paper presents a decision-making system based on fuzzy logic for the OAS. The inputs in a decision-making system are the distance of the ego vehicle and the vehicle that will be overtaken as well as the distance of the ego vehicle and the vehicle in the other lane. The decisions involved in a decision-making system concern the vehicle performing the approaching, tailgating, and overtaking. The results from hardware simulation using a remote control car show that the decision-making system algorithm can work according to the design.

INTRODUCTION

Traffic safety is a global issue that has received a great deal of attention from various parties. Globally, 1.3 million people each year or 3,000 persons per day die as a result of traffic accidents. The WHO has published that deaths from traffic accidents are treated as one of the non-communicable diseases with the highest mortality level. By the year 2030 road traffic accidents are estimated to be the fifth most common cause of death in the world, after heart disease, strokes, emphysema, and other respiratory tract infections [1]. About 4-10% of all traffic accidents are caused by overtaking [2]. Sequentially from the most, the types of accident that occur through overtaking are a collision with a vehicle that is overtaking when someone is turning right, a collision with a vehicle from the opposite direction, a sideswipe crash while passing, and a collision while returning to the original lane [3]. Efforts are being made to reduce the number of traffic accidents involving fixing vehicles and improve infrastructure technologies as well as to increase the awareness and expertise of drivers. In terms of road transport, driver error contributes to 75% of all roadway crashes [4]. An Advanced Driver Assistance

System (ADAS) or intelligent Driver Assistance System (IDAS) is an existing system in a vehicle that allows the driver to achieve their objectives with less stress, more safely, more comfortably, and efficiently in the pathway [5]. The ADAS is a development of the driver information system and driver warning system. Both these fields continue to be developed, among others, by using GPS as in [6]-[8]. ADAS development is inseparable from the concept of Integrated Human Machine Systems (IHMS) where the intelligent assistant system's role is to help the operator to operate the machine

Block Diagram :