UNIVERSITI TEKNOLOGI MARA

APPROACH FOR DETECTING LANE LINE BOUNDARIES

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Abstract

Lane detection is a fundamental aspect of most current advanced driver assistance systems (ADASs). A large number of existing results focus on the study of vision-based lane detection methods due to the extensive knowledge background and the low-cost of camera devices. In this paper, previous vision based lane detection studies are reviewed in terms of three aspects, which are lane detection algorithms, integration, and evaluation methods. Next, considering the inevitable limitations that exist in the camera-based lane detection system, the system integration methodologies for constructing more robust detection systems are reviewed and analyzed. Road markings embody the rules of the road whilst capturing the upcoming road layout. These rules are diligently studied and applied to driving situations by human drivers who have read Highway Traffic driving manuals (road marking interpretation). An autonomous vehicle must however be taught to read the road, as a human might. This paper addresses the problem of automatically detecting lane line marking.

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TABLE OF CONTENT

CHAPTER ONE
INTRODUCTION

1.1 Research Background

The past decade has witnessed tremendous progress in the field of automation. Although there has been noteworthy work on autonomous vehicles before, the competition structure of the Defense Advanced Research Projects Agency (DARPA) challenges boosted their development. The first prototypical vehicles that showed up could hardly recover from failures or deal with situations where driving skills such as tightly merging into traffic were required. Through the experience gained, it become feasible to leave the artificial environment of the challenges and cope with the unpredictable nature of the real world by utilizing cost effective sensors and fault tolerant systems.

Traffic safety is a major concern in present days, particularly in underdeveloped and developing countries. According to the (W. H. Organization 2013), 90% of the deaths related to traffic accidents occur in low-income and middle-income countries, in a total of more than 1.2 million deaths per year and 50 million injuries every year. One direction toward the reduction of traffic accidents is the development of computer vision systems for Intelligent Transportation Systems (ITS), Driving Assistance Systems (DAS) based on onboard vehicular cameras for autonomous safety measures. In particular, lane changes or overtaking another vehicle are one of the most dangerous driving maneuvers, being one of the main causes for head-on or sideswipe collisions, which motivate the development of Lane Departure Warning Systems (LDWS) (A. B. Hillel 2014). One key issue in such systems is to identify and classify road lane markings, since they dictate regions of the road where overtaking is possible or not.

Though a truly driverless car is most likely still years away from being available to consumers, they are closer than many people think. Current