

**SPEED SIGN RECOGNITION USING ARTIFICIAL NEURAL NETWORK AND  
THRESHOLD RULE FOR SAFETY PRECAUTIONS**

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## ABSTRACT

The objective of this thesis is to build a system that able to read and extract the speed limit signs and remind the driver for safety application while driving vehicles. This research is focus on speed limits in Malaysian's highway which 90km/h and 110km/h were selected as the sample for the input of the systems. The system consists of three processes which are image detection, image recognition and evaluation. In this thesis, the samples of speed limit signs are taken from the real scene on basis of circle shape, captured in 90° align between camera and the signs with specified distance. The image detection process is base on image processing technique including spatial image transformation, image segmentation and morphological operation. The recognition task is performed by using artificial neural network (ANN) and threshold rule to classify the speed limits type based on total white pixels of the digits. Next, the speed limit's sign is compared to the real speeds of vehicles for evaluation of allowable speed limit for driving on the highway condition. This system was developed using MATLAB 7.0. The experiment result proved the feasibility of this system.

*Keywords* – Image processing, Artificial Neural Network, threshold rule, total white pixel

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# CHAPTER I

## INTRODUCTION

### 1.1 BACKGROUND OF STUDY

Human are less concern about the speed limits that assigned by the authorities. Purpose of speed limits signs is to remind the driver from driving over the allowable speeds which are dangerously to the driver itself and other user. However, most of them are ignored the signs or distracted by other factor. An initial warning could help to prevent these problems as well as to prevent from the accident risk.

In this research, two general processes were implemented in order to develop this system which is image detection which based on image processing and image recognition. Both processes were done properly to make sure good results were obtained in order to implement it in the systems.

This system was developed to remind the speed limits to the driver based on speed limits signs that place all along the highways which could help to prevent from accident risk. This system also includes with voice warning to alert the driver who been distracted about the allowable speed and take an action to reduce the speed

#### 1.1.1 Speed Limits Signs

Road signs in Malaysia were come out with variety of shape and colors. Common shape that been use for speed limit signs are circle and rectangular. From the observation the rectangular shape is place to remind the speed limit in dangerous area and also to emphasize the allowable speed. The circle shape is often used in and place per several kilometers to remind the driver. The speed limits for the highways is 90km/h and 110km/h. Mostly, the speed limit signs were place in left side and in the middle divider of the road, consequently the driver can easily spot it. This thesis is focus on speed limits in Malaysian's highway which 90km/h and 110km/h signs were selected for analysis.