Bangla Automatic Number Plate Recognition System using Artificial Neural Network

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***Abstract*— Bangla automatic number plate recognition (ANPR) system using artificial neural network for number plate inscribing in Bangla is presented in this paper. This system splits into three major parts- number plate detection, plate character segmentation and Bangla character recognition. In number plate detection there arises many problems such as vehicle motion, complex background, distance changes etc., for this reason edge analysis method is applied. As Bangla number plate consists of two words and seven characters, detected number plates are segmented into individual words and characters by using horizontal and vertical projection analysis. After that a robust feature extraction method is employed to extract the information from each Bangla words and characters which is non-sensitive to the rotation, scaling and size variations. Finally character recognition system takes this information as an input to recognize Bangla characters and words. The Bangla character recognition is implemented using multilayer feed-forward network. According to the experimental result, (The abstract needs some exact figures of findings (like success rates of recognition) and how much the performance is better than previous one.) the performance of the proposed system on different vehicle images is better in case of severe image conditions.**

***Index Terms*— Number Plate Detection, Number Plate Recognition (NPR), Bangla Number Plate, Artificial Neural Network.**

I. INTRODUCTION

During the recent years, intelligent transportation systems (ITSs) are most important implementations for analyzing and also handling the moving vehicles in roads and cities. Due to the growth in the number of vehicles, like other modern cities, Bangladesh needs intelligent traffic management system in order to cope with the constantly increasing traffic on today's roads. One of the effective solutions to manage the traffic of vehicles and control the traffic viaolation is employing an Automatic Number Plate Recognition (ANPR) System which is most important topics of ITSs. ANPR system identifies vehicles, via various techniques which mainly based on automated algorithms rather than manual. Image processing is one of these techniques which deal with images and/or video sequences taken from vehicles. All vehicles have their own plate numbers which is a unique property and that take into account for identifying vehicles.

Automatic Number Plate Recognition is an important research field due to its number of applications such as parking lot management, enterprise entrance management, automatic toll collection enforcement, traffic law enforcement, border surveillance, stolen vehicle search [2]. Many intensive research studies have been conducted in other countries in the area of automatic number plate recognition, to our knowledge; there is virtually no research studies conducted in Bangladesh in this area. However, ANPR for vehicle identification is an essential area in the development of intelligent traffic systems and surveillance. The use of vehicles in Bangladesh has increased rapidly due to urbanization and modernization, especially in recent years, and thus, traffic congestion in cities specially Dhaka, Chittagong has become a major issue due to inadequate road infrastructure (please put some relavant data of traffic in major cities in recent years indicating the growth and some data of traffic viaolation which actually will justify and show the significance of this research). Therefore, control of vehicles and identification of traffic violators to maintain discipline, is becoming a big problem in those cities. For this reason, development of Automatic Bangla number plate recognition system is seen as a highly essential requirement.

ANPR algorithms are generally composed of the following three processing steps: 1) extraction of a number plate region; 2) segmentation of the plate characters; and 3) recognition of each character. This task is quite challenging due to the diversity of plate formats, the non-uniform outdoor illumination conditions, complex background, and distance change during image acquisition [1]. To overcome these problems we apply image enhancement method and also a novel match filter proposed by V. Abolghasemi and A. Ahmadyfard to increase contrast of plate-like regions to avoid missing plate location especially in poor quality images and to detect candidate regions as plate [1]. This paper proposed a feature extraction method which is rotation, scaling and translation invariant to recognize characters of number plate in real time.

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