



## IMPROVED AUTOMATED NUMBER PLATE RECOGNITION SYSTEM WITH HISTOGRAM AND TEMPLATE MATCHING

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Automatic Vehicle number plate recognition (AVNR) is a very popular and highly demanding in transportation industry, law and enforcement such as automating fines for traffic rule violations, automating parking lots, entry and exit in highways, quickly identifying granted vehicles. Most of the AVNRs use image processing techniques such as image enhancement, restoration, segmentations, block-based character recognition, optical character recognition and template matching. This paper presents the design and implementation of such a system to military organisations to capture and recode vehicle logs. People face difficulties at the gate premises due to the existing manual system. To collect the data, qualitative research techniques such as interviews and observations were used. Once an image captured, median filters were used to remove noises. Sharpen filters used to detect edges. Camera calibration was used to correct the perspective view. Lines were detected using Hough transformation and, rectangles were identified. Histogram processing is used to identify the number plates. Template matching with different letters, numbers, and special character were used to recognize its content. Once a license plate is found, its figures are recognized, displayed on the user interface and checked in the database for grants. Moreover arrival or departure times are being recorded. MATLAB was used to develop the prototype together with MySQL. Two cameras with 720x480 resolution and an i5 laptop with 4GB RAM is used to test the system. 96 vehicles were tested under different conditions and the overall accuracy of the system was 84%. Although the system miss reads number 3 or 6 as 8 or vice versa 12% times, it didn't record as false positive. Miss read mostly happened with older number plates since they didn't have proper style. The other fact was the muddy conditions. However, 8% of false negative has been recorded. But as the database groves and close numbers are entered, there is a possibility of getting false positives. Further quantitative measures such as light conditions, and distance from vehicle to camera have been collected and analysed. Post research questioners have proven that the system is very useful and time saving methods for military organisations and also its reliability.

**Keywords:** Image Processing, Camera Calibration, Histogram, Template matching, AVNR