The Effect of ANPR Camera Settings on System Performance

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Fifth International Conference on Imaging for Crime Detection and Prevention
16-17 Dec 2013, London UK

Introduction

Law Enforcement agencies in the UK have utilised Automatic Number Plate Recognition (ANPR) technology for several decades with a number of high profile crime detection successes. In an effort to ensure that end users are provided with the very best investigative opportunities, data accuracy and system performance must be constantly reviewed. This primary research has been conducted with the aim of better understanding the effect of ANPR camera settings on the performance of imaging systems used by the Police and other Law Enforcement Agencies for crime prevention and detection purposes.

This paper examines key performance factors and outlines empirical real world field assessment of the infra-red set up of a poorly performing fixed ANPR system. The outcomes of this work are intended to support the formulation of international guidance around camera set up published alongside the latest National ANPR Standards for Policing.

Field Trial

The ANPR camera under study has an operational range of 6-25m and the camera manufacturer recommends setting the camera such that the capture of a vehicle is in the range 18-23 metres for the camera type tested.

Fig.1 is a schematic layout of one camera installation for a two lane highway. This installation was tested by a series of known vehicles driving past the camera on multiple occasions, both day and night, using both lanes. The camera gave some misreads for both lanes and a substantial number of missed reads at night for lane 1 (the lane furthest from the camera).

Fig.1 indicates where three cones were placed; 18m, 23m and at 32m. These distances are represented by green, red and black lines respectively. The figure also indicates the 18m and 23m arcs across the road. The grey shaded area represents the capture zone which is 18m to 23m from the camera.

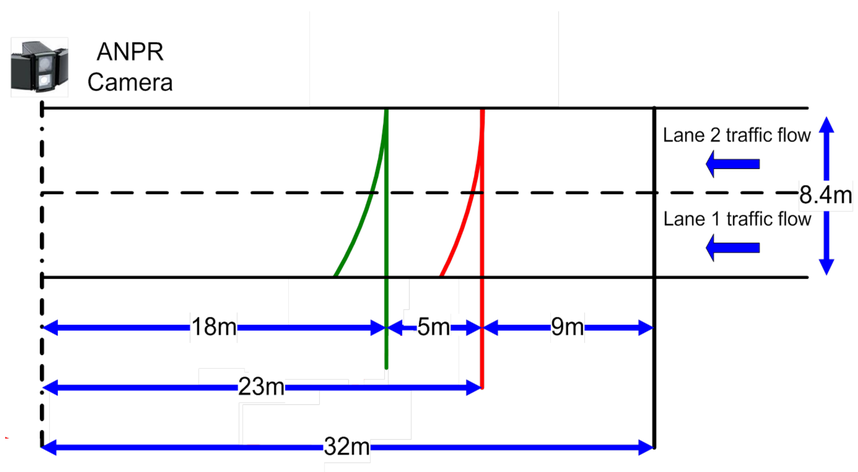


Fig.1 ANPR Camera Setting Schematic

Results

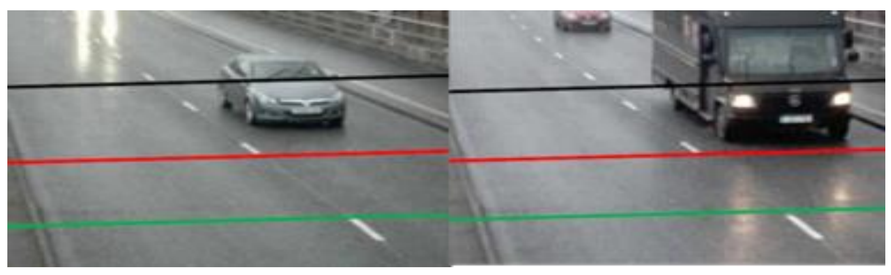


Fig. 2 Images of vehicles captured outside the operational range.

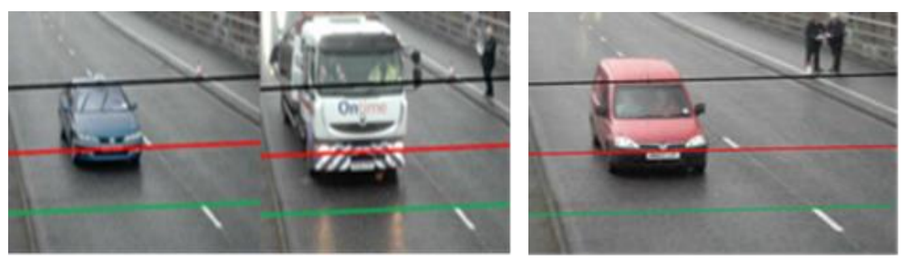


Fig.3 Fig.4
Images captured of vehicles at extreme limits of operational range 6-25m

Fig.5 18m away from camera Fig.6 28m away from camera
Both images are within daylight and infra-red capture ranges

Monitoring Two Lanes

The camera under investigations is capable of monitoring two lanes of traffic provided the width is not more than about 6 metres. To achieve this then the field of view will need to clip 1 metre from the edge of the nearside lane and from the edge of the outside lane. This should result in no missed vehicles unless they drive on the pavement or central reservation to go past the camera.

Fig 7 Poor Coverage

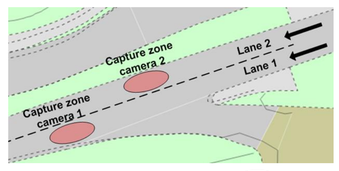
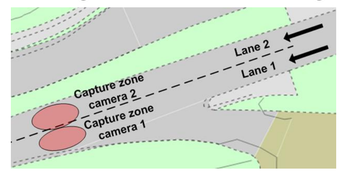


Fig 8 Correct Setting



Conclusions

High quality input images provide better opportunities for OCR which in turn results in better read accuracy. The challenges of image artefacts can be overcome by ensuring that the camera lens, the camera, the filter and lighting are properly aligned. By combining this alignment with optimal contrast and sharpness very high quality images can be obtained. This in turn enables the OCR software to work more efficiently leading to much better overall performance. The authors recommend further research into camera set-up to ensure optimum performance is achieved both at installation and throughout the life of the system

Acknowledgements

Dr Peter Billington – UTMC, Mark Jones - Home Office, Detective Superintendent Paul Ealham - ACPO ANPR Countermeasures Group.