THE DEPARTMENT OF COMPUTER SCIENCE & ENGINEERING
計算機科學及工程學系

Efficient Image Processing for License Plate Recognition

LEE, Tung
Supervised by Prof. David ROSSITER

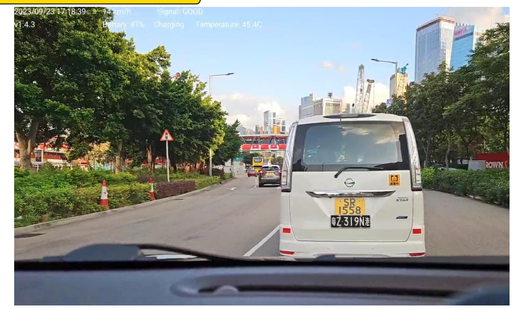
OVERVIEW

Vehicles management has been made more convenient with automatic license plate recognition (ALPR) in reducing the need of human inputs. Mobile ALPR enables moving vehicles to read plates on patrols, facilitating efficient law enforcement and other smart city development.
Recognition through dash cam footages gives it flexibility in finding a car. Yet, A higher recognition accuracy is essential for future system development in Hong Kong, considering the limiting factors in retrieving results.

OBJECTIVES

1. Develop an object detection model that detects and classify all types of license plates available in Hong Kong.
2. Apply optical character recognition to license plate images to obtain license plate contents.
3. Perform image processing techniques to achieve improved recognition results.
4. Integrate the above elements for ALPR in video segments

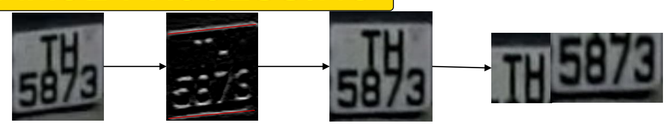
METHODOLOGY



Input Frame

License plate detection | Image processing | Character recognition

IMAGE PROCESSING



A number image processing techniques were experimented, a processing flow of horizontal Sobel edge, Hough transform, perspective warp and projection histograms has yielded the best results.

RESULTS

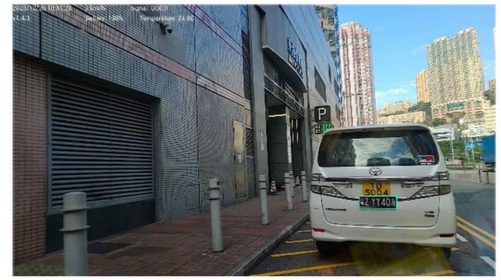


Plate Image	Plate Text	Confidence
	ZYY40	0.9298487901687622
	TD5004	0.8792619109153748

License plate detection	88.4%
Image processing	96.1%
License plate recognition (overall)	84.7%
Hong Kong - front	69.2%
Hong Kong - rear	91.2%
Chinese cross-border	91.9%
Macau	83.7%
Proposed system	**77.0%**

Previous system	66.0%

CONCLUSION

The system has been successfully implemented with a 12% rise in accuracy compared with previous system, it reaches a precision of 77% with a processing rate of 20fps.