

UNIVERSITI TEKNOLOGI MARA

**SNATCH THEFT CRIME FOR
CRIMINAL PATTERNS
DETECTION AND CLASSIFICATION
USING DEEP LEARNING MODEL**

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Thesis submitted in fulfilment
of the requirements for the degree of
Master of Science

Faculty of Electrical Engineering

December 2022

ABSTRACT

Every year, millions of crimes are reported all across the world. According to the statistical analysis of the crime rate for Malaysia, it shows that in Malaysia, the crime index ratio per 100,000 population was 273.8 cases in the year 2018. However, for WP Kuala Lumpur, for every 100,000 population it is 642.6 cases. Thus, it shows that crime usually happens within cities and towns. Besides the negative impacts on citizens' everyday lives, there is a significant impact on economic growth that shows the relationship between crime and economic growth in Malaysia. Hence, this study focused on snatch theft, including evaluation and validation in real-time detection, which has not been fully explored. This study aims to differentiate snatch theft scenarios from normal scenarios in predicting and detecting snatch theft crimes classification utilising snatch theft databases obtained from 120 videos on YouTube and Google. A new deep learning (DL) technique, namely Convolutional Neural Network is applied in this study. Several CNN models used are AlexNet, GoogleNet, ResNet18, ResNet50, ResNet101, InceptionV3, VGG16 and VGG19 for detecting and predicting the snatch theft event using crime event videos. The best DL model is determined to detect snatch theft activities, and real-time experiments were conducted to validate the model. Various angles of snatch theft scenarios were tested. Firstly, data augmentation was utilised for classification purposes, however overfitting occurs, hence retraining of the database is done. During retraining of the CNN models, an early stopping method was implemented to minimise overfitting. Results obtained showed that all models achieved 89% and higher accuracy. The overall accuracy for AlexNet and ResNet18 was 89.1% and 92.4%, respectively. Both AlexNet and ResNet18 achieve 100% sensitivity. However, ResNet18 achieves the highest specificity, which is 86.8%. Hence, all CNN models were conducted in real-time mode and only few CNN models showed good results in detecting snatch theft, which is AlexNet and ResNet18. Therefore, CNN could be used to develop intelligent surveillance techniques for reducing crime rates related to snatch theft.

ACKNOWLEDGEMENT

First and foremost, praises and thanks to God, the Almighty, for His showers of blessings throughout my research work to complete the research successfully. Firstly, I would like to express my gratitude to the Ministry of Higher Education (MOHE) Malaysia, Grant No: 600-IRMI/FRGS 5/3 (394/2019), Sponsorship File No: FRGS/1/2019/TK04/UITM/01/3 for the graduate research assistant (GRA) sponsorship during my study.

I would like to express my deep and sincere gratitude to my research supervisor, Prof. Dr. Nooritawati Md. Tahir, for giving me the opportunity to do research and providing invaluable guidance throughout this research. Her dynamism, vision, sincerity, and motivation have deeply inspired me. She has taught me the methodology to carry out the research and to present the research works as clearly as possible. It was a great privilege and honour to work and study under her guidance. My appreciation extends to my co-supervisor Nur Dalila Khirul Ashar and Dr. Megat Syahirul Amin Megat Ali for their priceless assistance and support.

I am extremely grateful to my parents for their love, prayers, caring and sacrifices for educating and preparing me for my future. I am very much thankful to my parents for their love, understanding, prayers and continuing support to complete this research work. Also, I express my thanks to my sisters and brother in laws for their support and valuable prayers. I would like to say thanks to my friends and research colleagues, Dr. Nur Khalidah Binti Zakaria and Dr. Hana Abd Razak for their constant encouragement and their genuine support throughout this research work. Finally, my thanks go to all the people who have supported me to complete the research work directly or indirectly.

Nurul Farhana Binti Mohamad Zamri

2022

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