

Thesis Title Improvised Explosive Device Detection Using CNN with X-Ray Images

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ABSTRACT

The idea of a smart city and other related services have been explored widely in terms of innovation development as well as applications of technological concepts. One of the major concerns to promote smart living is the security of personal life and asset, which have been put at risk by organized crime and acts of terrorism. A great deal of attention is paid to preventing terrorism incidence in public areas. In particular, to detect improvised explosive devices known as IEDs. This research focuses on developing analytical models that can recognize X-ray images of baggage contained with IEDs. It provides an alternative to conventional techniques that fail to disclose the truth with concealed or hidden devices. Specific to the current project, sample images are generated by experts to cover a number of cases found in operations during the past decade. These are then used to develop a deep learning model, with the help of several data augmentation methods to overcome the problem of small training datasets. As a result, models are more accurate by measured from sample datasets that never existed in training datasets, with the highest accuracy rate of 0.985. In addition, an empirical study is conducted herein to determine the size of the train set that exhibits good predictive performance.

Keywords: Improvised Explosive Device, Detection, X-Ray Image, Classification, CNN, Augmentation