Baggage detection

Baggage detection has been extensively investigated in recent studies and open-source projects [1-6]. The existing works are mainly focused the threat/dangerous objects detection insides baggage using X-ray images. In reference [1], the authors propose an automatic detection approach that includes the estimation of moving direction of humans carrying baggage and the alignment of a temporal human-like template with the best matched view-specific exemplars. Besides, a baggage type classification scheme is proposed based on the determination of the position of the bag in relevance to the human body carrying it. Akcay et al. [4] consider the usage of CNN and transfer learning for the detection and classification of X-rage baggage images. To overcome the problem of limited training data, the authors adopt transfer learning on pre-trained CNN models together with SVM classifier. In literature [5], the authors present a comparison of 3D feature descriptors with application to threat detection in X-ray airport baggage images. The results show that simpler descriptors outperform complex solutions (RIFT/SIFT) in the case of high-degree noise.

Detection Model Training and Accuracy

The deep learning models used in the existing studies are mostly object detection models. The YOLO v3 proposed by Redmon et al. is able to achieve 28.2 mAP (mean average precision) at the processing speed of 22 ms per image. The accuracy is very close to that of SSD (Single Shot Detector) but this model is three times faster. The YOLO v5 developed by the Ultralytics company is implemented using Pytorch. They provide 4 variants of models from v5s to v5x. These models achieve mAP around 36.8 at the resolution of 640.

References

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