

Tracking passenger movement using descriptive identifications.

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1 Introduction

Most trains are equipped with Closed Circuit Television (CCTV) cameras, which provide valuable data to determine the occupancy of train cars. This information can facilitate the allocation of passengers to less crowded cars, while directing them away from congested ones. However, monitoring the movement of passengers from one car, and consequently one CCTV feed, to another poses a challenge. This project aims to explore the feasibility of recognizing individuals on a CCTV feed and generating a description of each person that is easily understandable to humans, such as "A person wearing a blue sweater with short, black hair." Subsequently, we aim to develop a Natural Language Processing (NLP) model that can distinguish between descriptions referring to the same person and those pertaining to different individuals. In this manner, we can track people in a manner that is less invasive to their privacy, without retaining pictures of individuals.

2 Data availability

We have acquired access to video footage of individuals moving inside a train car, obtained during a prior student project conducted on behalf of Televic Rail. Although the passengers in the footage move around frequently, they do not necessarily exit the train car. This material can be utilized to train our person recognition and description models. Additionally, we possess access to a range of commercially available CCTV cameras, which can be leveraged to acquire our own data, although it can not be captured aboard a real train within a feasible time period.

3 Preliminary work plan

The project would start with the finetuning of pre-existing models, such as YOLO, to enable the recognition of individuals from our dataset. Simultaneously, a model would be developed or fine-tuned to generate descriptions of these individuals. The latter half of the project would focus on developing or finetuning a model that can compare two descriptions and determine whether they correspond to the same individual, although this component may be omitted if time constraints arise. Ultimately, we intend to integrate all three models to create a prototype of our final product, followed by the delivery of a presentation to our colleagues.