Elevator Pitch Script – Helping the Visually Impaired Navigate at Bus Stops (RO026)

The visually impaired face many infrastructural and social barriers while taking public transport. Thus, there we need to help the visually impaired more independently utilize public transport to create an inclusive society.

My project aids this by proving the feasibility of using computer vision technologies to help the visually impaired to identify the bus numbers of buses at bus stops. I implemented a proof-of- concept software that processes a video stream and reports the number on buses that arrive to the visually impaired via audio.

My implementation works in 4 main steps. First is identifying where a bus number is in an image using object detection, second is cropping the image to contain only the bus number, third is sending the cropped image to an Azure optical character recognition algorithm to extract the bus number and lastly is synthesizing and playing the audio message to the visually impaired.

To implement this, I took videos of buses at bus stops and trained the object detection model. Following which, I compared different OCR algorithms to choose the one that has the best combination of accuracy and speed for my situation. Finally, I combine the different components together with an audio synthesis API to form the final software product.

This approach seems to hold a lot of promise as despite me having only 386 low variance labelled images for my object detection training data, the system managed to attain high accuracy rates. When it was tested in real life, the system as a whole managed to correctly identify the buses coming to the bus stop 5 in 6 times. With further fine tuning and better data, this method is likely highly reliable to help the visually impaired in taking buses, thus being feasible for future real world implementation and can greatly help the visually impaired.

[302 words]

Note: Test out the an API implementation of my project with some sample images at https://brandontang89.github.io/Bus_Numbers/