Zebra Vision

Aiding the Visually Impared to Navigate Zebra Crossings

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**Abstract– [INSERT ABSTRACT INFORMATION HERE AFTER WE FINISH THE APPLICATION]**

**Keywords– Zebra crossing aid; Visually impaired; Hough Lines Transform.**

# Introduction

This project aims to create a tool for the visually impaired that provides aid for navigating Zebra crossings. According to the World Health Organization (WHO), approximately 2.2 billion people suffer from vision impairments or blindness [1]. Furthermore, 270,000 pedestrians per year lose their lives on roads, making up 22% of traffic fatalities [2]. These statistics indicate that a large proportion of pedestrians are at danger when crossing roads; and, as for the visually impaired (making up a significant size of the population), it is crucial that despite limited vision, this process should be made safe and easy.

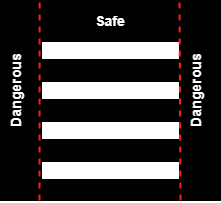


Figure 1: Zebra Crossing Boundaries

The goal of the software is to keep the pedestrian within the Zebra crossing boundaries. As seen in Figure 1, the crossing will be divided by a boundary at the vertical edges of the crossing. It will then be able to inform the pedestrian if they are in a “safe” or “dangerous” position on the crossing. This tool should be robust to varying quality of the Zebra crossing. Despite the existence of tactile tools and visually-impaired-friendly Zebra crossings, there is a substantial amount of old, worn, and hard to navigate crossings. It is the hope that this software improves the safety and quality of life for the blind and visually impaired while crossing Zebra crossings.

# Previous Work

[INSERT PREVIOUS WORK HERE – What are people currently up to in this area? Maybe in the area of computer vision for visually impaired people? Maybe in the area of Hough Line Transformation application?]

# Technical approach

To solve this problem, the Hough Line Transform line detection technique will be utilized. Hough Line Transformation finds straight lines given a grayscale image. It will be used to detect the vertical straight lines of the Zebra crossings (the boundary between Safe and Dangerous as seen in Figure 1). Two straight lines should be formed by this technique. From this, in order to identify the user location, a centre point x and y position of the image will be used to act as the user position. Thus, when this centre point crosses the line boundary, the user will be alerted.

Zebra crossings (large, white, horizontal rectangles) will be used. The image dataset for this project will be created by myself. To test robustness, worn and damaged crossings will be introduced. Initially, only static images will be used, however, if time permits, video will also be attempted.

[ MAKE ADDITIONS TO THIS AS WE CODE]

# Experiments

[INSERT OUR EXPERIMENT RESULTS]

# Conclusions

[INSERT THE CONCLUSIONS WE HAVE]

##### References

1. World Health Organization (2018). *Blindness and vision impairment*. [online] Who.int. Available at: https://www.who.int/news-room/fact-sheets/detail/blindness-and-visual-impairment.
2. World Health Organization, Fia Foundation For The Automobile And Society and World Bank (2013). *Pedestrian safety : a road safety manual for decision-makers and practitioners*. Geneva: World Health Organization.