Learning Summary:

ISee

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Abstract— Having observed that the mobility and eyesight of elderly and the visually impaired tend to deteriorate over the years, we aim to improve the situation by designing “iSee” with collision avoidance technologies in order to prevent potentially fatal accidental trips and falls.

1. Introduction

ISee is a mobile device attached to a user’s clothing piece (e.g. collar, front pocket, back pocket) that detects objects in the surroundings and identify potential objects that may be obstacles, thereby alerting the user when he/she approaches the object/obstacle.

1. Background

Online analysis and statistics show that [about 36 million](https://www.cdc.gov/mmwr/volumes/69/wr/mm6927a5.htm) falls are reported among older adults each year, which results in more than 32,000 deaths. Falls are also reported as the leading cause of injury-related death (among older adults aged 65 and older) at 64 deaths per 100,000 older adults.

Problems encountered by elderly

* Poor eyesight
* Poor reaction time

We make use of collision avoidance technologies to function as the user’s eyes and warn them for obstacles in time. This is why our project is titled “ISee”.

1. Materials

Materials needed for our project are listed in the table below.

Materials

|  |  |  |  |
| --- | --- | --- | --- |
| Item | Appearance (in Time New Roman or Times) | | |
| Picture | Function | Quantity per device |
| CPU |  | For running the trained model | 1 |
| Camera |  | To retrieve real-time images from the user | 1 |
| Buzzer |  | To remind users when obstacles are detected | 1 |
| Base shield | N/A | To connect the CPU and the Arduino buzzer / camera | 1 |
| Clip | N/A | To attach the device to users’ clothings | 1 |

1. Process

* Collecting data

We took pictures of positions that are blocked or free from obstacles and sorted them into two folders in a dataset.

* Training the model

We trained the model using the dataset created in the first step.

* Testing and running

1. Methodology

1.

First, the camera is used to scan the surroundings of the user. The footage obtained will be sent to the CPU immediately.

*2.*

Second, the footage is processed in the CPU. The footage is put into the model to look for objects in parts of the scanned surrounding of the user that may be obstacles.

*3.*

If obstacles are found or identified to be in the way of the user and might block him/her, the user would be warned of the obstacle by making a beep sound with a buzzer.

1. Technologies applied

Our project involves the application of:

* Artificial Intelligence

(For detecting obstacles by training and running the model)

* Arduino (IOT)

(For warning users when obstacles are detected)

1. Conclusions

We hope that ISee can successfully reduce the number of trips and falls of elderlys, especially as a result of their poor eyesight and reaction time, by watching out for them.

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References