Problem Statement and Goals
Mechtronics Enigeering

Team 32, Wingman
Edward He
Erping Zhang
Guangwei Tang
Peng Cui
Peihua Jin

Table 1: Revision History

Date	Developer(s)	Change
2020-09-24	Edward He	Problem Statement Vision 0
Date2	Name(s)	Description of changes
...	...	...

1 Problem Statement

1.1 Problem

Ever having an occasion when you are desperately trying to find something and despite you scratching your head and searching for hours, that specific item is nowhere to be found? It can be a very frustrating experience, especially if that item appears out of nowhere when you no longer need it and once again gone missing when you are looking for it. Although there has been different technology employed for digital devices that can help identify where the device is located, it does not help with small items that are not digital. Our team's proposed solution will be able to assist the user to remember where his/her belongings are and the most recent time the user had used or placed their belongings. The proposed system is capable of tracking and following human activities to position itself best for capturing any moving objects caused by the user. The system will identify each item that is being moved and record/update their corresponding positions. The user then has the ability to interact with our system through an interface and select which item the user is looking for. Given this information, our system would identify where that specific item is and assist the user to locate their belongings in a short time.

1.2 Inputs and Outputs

Input:

- Live video feed from camera capturing human and object activities.
- Frames of start and end position of a complete movement of an object.
- User inputs of description of the missing items or the items to be found.

Output:

- Based on the position of the human detected by the camera, camera will be repositioned itself to keep human in the center of the frames.
- Based on the frames detecting moving object, record the end position and update to the database its new position.
- Upon receiving user input, scan over the database and match the item that fits user's description and outputs its most recent position to the user.

1.3 Stakeholders

Anyone who has struggled in their daily life trying to find some of their belongings and people who has bad memories.

1.4 Environment

Hardware:

- A camera capable of recording live video with high resolution and sending live video to the software.
- A mount that is attached to the camera, capable of rotating 360 degrees and be stationary to a wall or ceiling.

Software:

- Object detection algorithm capable of detecting multiple different objects at the same time at minimal resources. Able to identify which item has changed position and accurately update new positions.
- Human detection algorithm that can accurately detect human from live video.
- Control system for moving and repositioning the camera based on the position of detected human both accurately and smoothing.
- An user friendly user interface for the user to input what item is to be found.

2 Goals

3 Stretch Goals