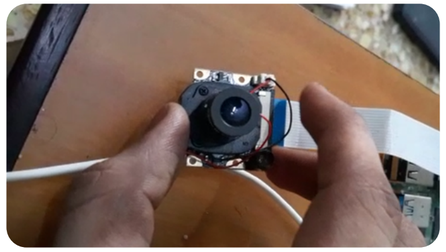
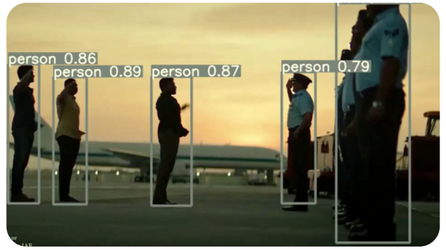
IDEA AND SOLUTION

As per the problem statement, the solution can be furnished into several phases. They are;
(Here we have attached our demo (screenshots of our output) under each



1. SCAN THEIR SURROUNDINGS (OBSTRACLES , ORIENTATIONS , HARMFULS)

Images will be detected from a live video feed using a camera. Live detection is also available or the user points a certain spot for identification. The images are classified based on computer vision algorithm (YOLOX)



OBSTRACLES

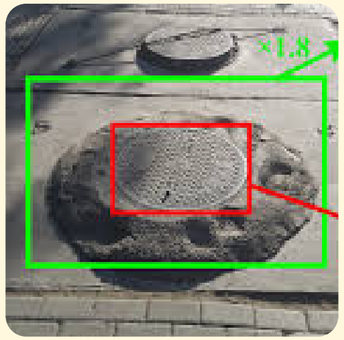
Here we have trained with a custom dataset on various obstacles and also use the COCO dataset to identify common objects.

ORIENTATION MARKS

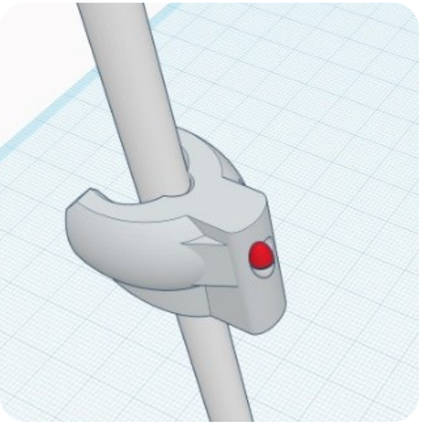
Deep learning models have been trained for various orientation marks like Stop, No passing, etc.

HARMFULL OBJECTS

Sharp, Point objects, obstacles that can cause harm were segregated under certain classes as harmful objects, these classes were then trained into a model. Examples : manhole ,fire ,iron rod ,sharp points etc...



A camera, sensor, and module integrated device that can be attached to the existing white cane.



OUR COMPUTER VISION BASED APPROACH

2.NEAREST DETECTION

For identifying the nearest harmful object detection, the areas of the detected bounding box have been stored in a list. The nearest object would have a larger area, hence by identifying the largest area in the list (using the max function) we could determine the nearest object.

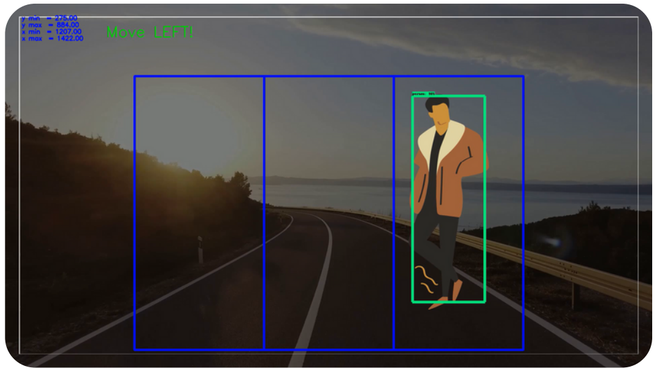
Calculation:
area = w * h (in loop)
myTargetListArea = []
i = myTargetListArea.index(max(myTargetListArea))

DISTANCE DETECTION OF TARGET

The distance of the detected object is calculated based on, the aside formula (Focal Length Calculation). By describing the known values, we could alter and obtain the distance of the object at a certain level.

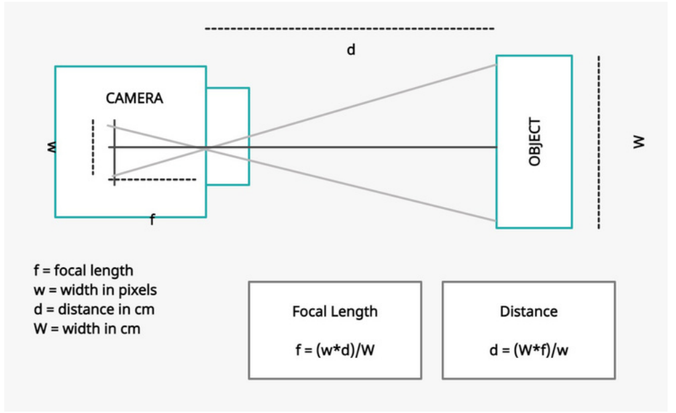
GRID BASED FRAME SEGREGATION FOR NAVIGATION COMMAND

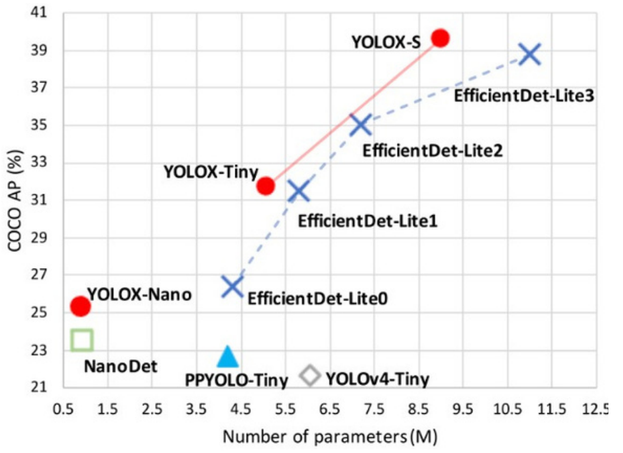
The frame divides into grids, based on the position of the target in the frame, it sends the navigation information to the user.
Link for reference (Our published work):
https://link.springer.com/book/10.1007/978-981-16-2641-8



JUSTIFICATION FOR USING YOLOX

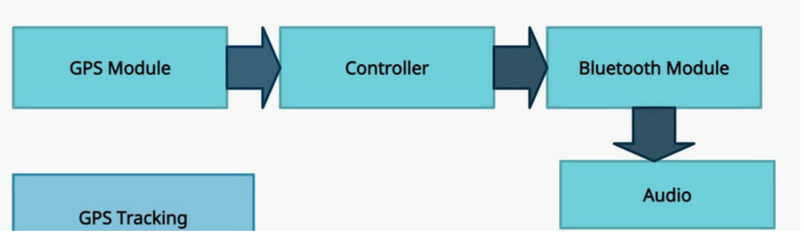
YOLOX Algorithm has increased efficiency and accuracy when compared to previous algorithms (Yolo family and R-CNN) And also used few-shot learning





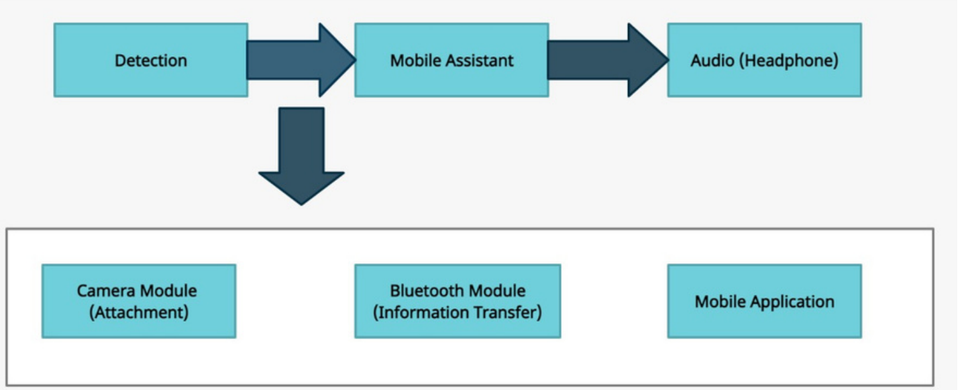
3. GPS TRACKER :

- Helps in identifying the current location of the user . We have integrated using GPS Module .GPS modules contain tiny processors and antennas that directly receive data sent by satellites through dedicated RF frequencies.



4.VOICE ASSISTANT :

- Once the obstacle is identified, it sends the information to a mobile application using a Bluetooth module and produces audio, which can be heard by the wearer.



5.MOBILE APPLICATION :

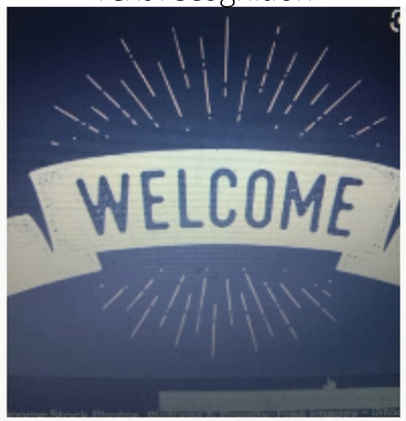
- Voice Alert
- Text Recognition (ML Kit)
- Alert Button

(Alerts the preferred contacts with message of the user's current location)

TECHNOLOGY STACK AND COMPONENTS

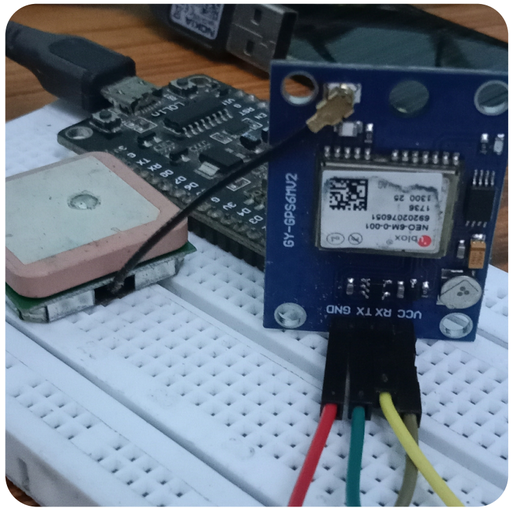
- Tensorflow , APIs
- ESP826 CAM
- NodeMCU
- Battery
- GPS Tracker Module
- Bluetooth Module

Text recognition



WELCOM

GPS Tracker



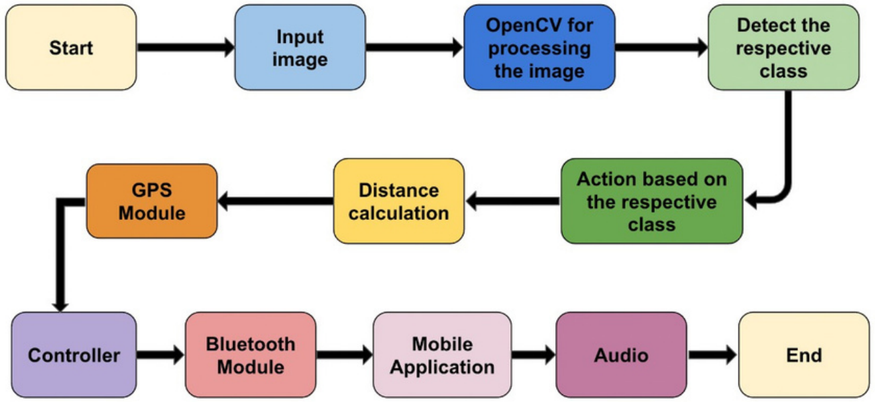
- **WOW FACTOR :**

- Our system is Cost effective as it will be a supplement to the existing cane So that they don’t have to buy the entire system again. Hence, by providing an AI-IOT-based system they will be able to know and access their surroundings to the fullest.

- **DEPENDENCIES:**

Efficiency of the system depends on the processing speed of the controller.

FLOW DIAGRAM



- **TEAM DETAILS :**

TEAM LEADER: SHYAMKUMAR M IIIrd year ECE
TEAM MEMBER 1: JAGADEESH R IInd year ECE
TEAM MEMBER 2: JAYASAKTHI J R IInd year ECE
TEAM MEMBER 3: MATHUMITHA S IInd year ECE
TEAM MEMBER 4: KEERTHANA SATHISH IInd year AIDS
TEAM MEMBER 5: KEERTHIKA SATHISH IInd year AIDS
TEAM MENTOR NAME: Dr. Soma Prathibha. Expertise: AI Domain Experience: 15 years