POTHOLE DETECTION FOR VISUALLY IMPAIRED USING YOLO

TITLE

BATCH INFORMATION

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PROJECT NAME	:	POTHOLE DETECTION FOR VISUALLY IMPAIRED USING YOLO

ABSTRACT

The visually impaired people facing many problem in day to day life. The path hole is the major problem in walking. So pothole detection plays a important role in visually impaired people. We proposed a solution that is in the form of Mobile phone app that detects pothole on the road surface especially Indian roads. The dataset used here was modified for Indian roads and visually impaired people. The Object detection algorithm used here was YOLO (You Only Look Once) which achieves faster detection of 45 frames per second. A single neural network predicts bounding boxes and class probabilities directly from full images in one evaluation. Since the whole detection pipeline is a single network, it can be optimized end-to-end directly on detection performance.

Conventions : YOLO - You Only Look Once, VI – Visually Impaired.

INTRODUCTION

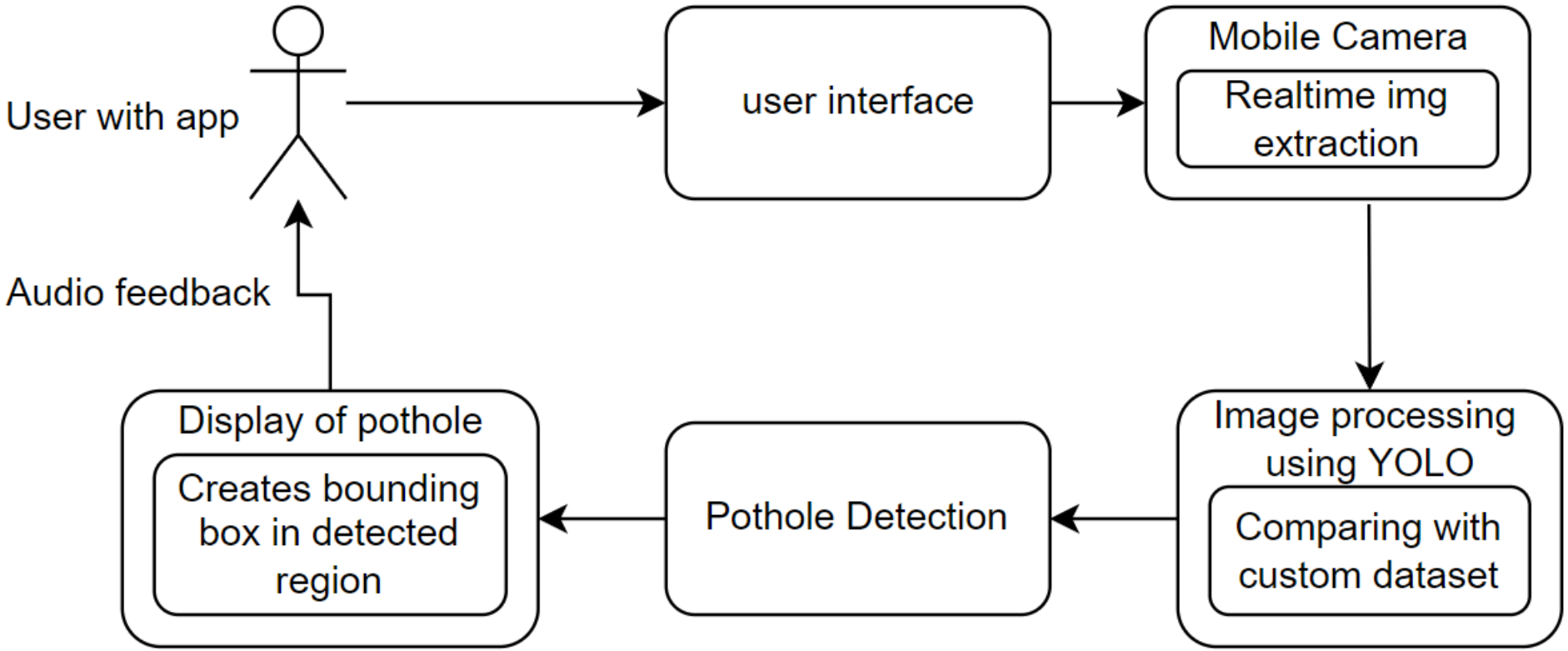
Humans can find the objects in the image at a glance, where they are and how they interact. Human visual system is fast, accurate and perform very complex task. Fast and accurate algorithms make computers to see the world like human. Current technologies have the capabilities to attend performance near to human. Although we are in development stage. But the problem with this systems they need heavy computational resources. An efficient algorithm might solve this problem. YOLO is one of the such algorithm that might solve this problem. The system proposed here might solve the problem of VI people. According to WHO nearly 285 million people are VI worldwide: 39 million are blind and 246 million have low vision (severe or moderate visual impairment). Blindness is the condition of lacking discernment because of physiological or neurological components.

They have difficulties in walking and navigation. Although many new technologies were developed but it remains a significant issue till now. Pothole in the roads is the main obstacle for the VI people to navigate them independently. The system proposed here might solve the problem of path hole specially for VI. The algorithm used here is YOLO (You Only Look Once). YOLO, a new approach to object detection. YOLO is extremely fast in object detection. YOLO is refreshingly simple. A single convolutional network simultaneously predicts multiple bounding boxes and class probabilities for those boxes. YOLO trains on full images and directly optimizes detection performance. The statements are : VI person navigation, Pothole detection, YOLO. Using these three, We develop a solution in remote manner. i.e. Creating an android app that detects pothole in roads and gives assistive audio output specially for VI people using YOLO algorithm.

LITERATURE SURVEY

TITLE	AUTHOR	YEAR	PUBLICATION	MERITS	DEMERITS
You Only Look Once: Unified, Real-Time Object Detection	Joseph Redmon, Santosh Divvala, Ross Girshick, Ali Farhadi	2016	IEEE	It tells about base YOLO algorithm.	It doesn’t tells about object detection for VI people.
Path Hole Detection to Assist the Visually Impaired People in Navigation	Md. Milon Islam, Muhammad Sheikh Sadi	2018	IEEE	It tells about pothole detection for VI people.	It doesn’t uses YOLO algorithm.
Pothole Detection System Using YOLO V4 Algorithm	Kshitija Chavan, Chinmay Chawathe, Vatsal Dhabalia, Amruta Sankhe	2022	IRJET	It tells about pothole detection using YOLO.	It doesn’t tells anything about VI people

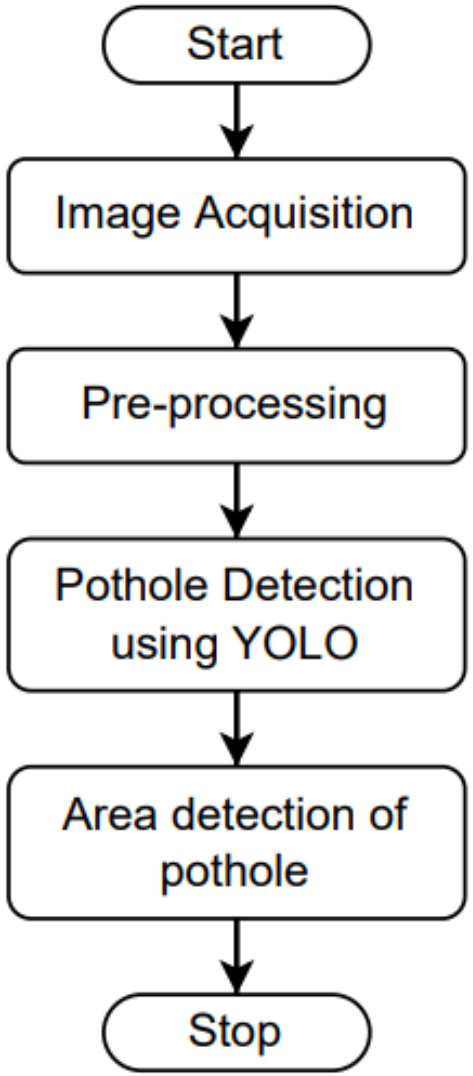
WORKING


User with app
user interface
Mobile Camera
Realtime img extraction
Audio feedback
Display of pothole
Creates bounding box in detected region
Pothole Detection
Image processing using YOLO
Comparing with custom dataset

The VI person is provided with android app on the mobile phone. The app in the mobile phone access the camera and get live video feedback. The system starts scanning for pothole from the video using YOLO algorithm. If it encounters any pothole, It gives audio output like “Whoa !!! be careful there is a pothole in front”.

The System is connected with Google Text to speech Engine. YOLO algorithm find the pothole and sends it to a python script with damage score. Based on the severity of pothole, the python script generate a text message. That message is read loudly by Gtts System.

SYSTEM FLOW


Start
Image Acquisition
Pre-processing
Pothole Detection using YOLO
Area detection of pothole
Stop

SYSTEM FLOW

The real time video is analysed frame by frame for pothole detection. The larger the frame rate with more accuracy we can achieve more performance. The images are analysed and bounding box is created.

PREDICTING BOUNDING BOX

- Centre of a bounding box (bx ,by)
- Width (bw)
- Height (bh)
- Class of an object (c)
- Probability of object (pc)

Y = (pc,bh,bw,bx,by,c)