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Design and Development of Human Identification and Obstacle Detection System for Blind using Machine Learning

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ABSTARCT: According to the World Health Organization (WHO), there are millions of visually impaired people in the world, either completely or partially, and they face numerous challenges in detecting obstacles and identifying persons around them. Not only has information technology evolved rapidly, but the spatial cognition theory for blind and visually impaired (BVI) people has also made great strides, which has opened up a new opportunity. As a result, this prototype develops the concept of supplying them with a simple and cost-effective solution via artificial vision. This project has proposed a novel framework by utilizing AI, which makes the framework more straightforward to use specifically for the individuals with visual impedances and to help the society. we developed an intelligent system for visually impaired people using a Machine learning (ML) algorithm, i.e., convolutional neural network (CNN) architecture, to recognize the human and scene objects or obstacles automatically in real-time. As a result, the proposed approach enables blind users to manage unaware indoor and outdoor locations.

KEYWORDS: Attribute-Based Encryption, re-encrypt, implementation, encrypted data.

I. INTRODUCTION

“Visual impairment” is a broad term that is used to refer to any degree of vision loss that affects a person’s ability to perform the usual activities of daily life.

Vision Impairment Types

The way in which vision impairments are classified differs across countries. The World Health Organization (the WHO) classifies visual impairment based on two factors: the visual acuity, or the clarity of vision, and the visual fields, which is the area from which you are able to perceive visual information, while your eyes are in a stationary position and you are looking straight at an object.

For example, a visual acuity of 20/80 means that you can read the chart from 20 feet away as well as a person who could read the chart from 80 feet away. In other words, what a person with normal vision would see from 80 feet away, you can't see until you move closer to only 20 feet away.

II. EXISTING SYSTEM

Manual rice quality estimation is quite tedious, as it requires experienced inspectors to identify and pick up the kernels with various defects one by one.

Disadvantage

- Existing system appear to be due to the infrared sensor as it starts giving blind spots (no depth values) under strong sunlight.
- Identifying objects and face at reasonable distances and speeds
- Most portable designs seem to resort to mechanical components, thus causing a conflict between their bulkiness and the subtlety of the induced perceptions.
- Very Expensive
- Portability and convenience remain a second major problem
- False Prediction

- Time taken to predict
- **1.3 Proposed System**
- The proposed system of the project is to design and fabricate a Smart Electronic Glass that designed to make recognizing faces and objects easier for visually impaired people.
- One of the best performing object detections (deep learning) algorithms include:
- RCNN (Region-based Convolution Neural Network)
- Fast RCNN
- Faster RCNN
- R-CNN extracts a bunch of regions from the given image using selective search, and then checks if any of these boxes contains an object. We first extract these regions, and for each region, CNN is used to extract specific features. Finally, these features are then used to detect objects. Unfortunately, R-CNN becomes rather slow due to these multiple steps involved in the process.
- The detection speed and accuracy have been greatly improved.

Advantages

greatly reduced the computational complexity.

- Robust aircraft detection should be designed to address cases involving partial occlusions and large numbers of aircraft per image, i.e., closer to daily surveillance application.
- Auto focus different scales objects in multiscale feature map.
- trained assistant who provides spoken feedback about what you are looking at.
- Useful for help with identifying objects

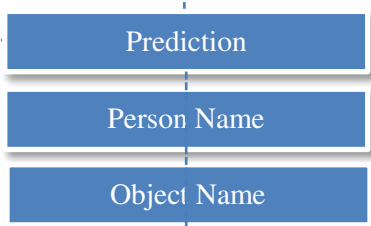
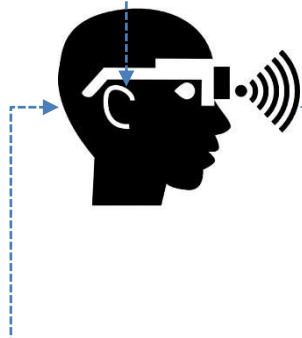
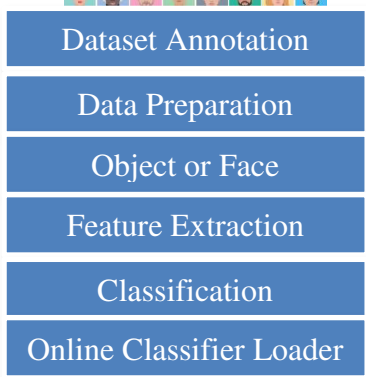
System Architecture

Training Phase

Face Enrollment



Object Dataset



4.1 Modules List

1. Smart Glass
2. Object Detection and Face Recognition Module
 - 2.1. Face Enrollment
 - i) Object Detection
 - ii) Feature Extraction
 - iii) Object and Face Classification
 - 2.2. Object and Face Identification
3. Prediction
 4. Performance Analysis

Modules Description

1. Smart Glass

In this module we design a AI powered smart glass with an integrated camera which helps the user capture images. These images are sent for processing to proprietary FRCNN machine learning models which are deployed on smart glasses. Once the images are processed, the speech response is sent to the Smart glass, which the user hears via the built-in speaker on the glass. **Object Detection and Face Recognition Module**

2.1. Face Enrollment

This module begins by registering a few frontal face of Blind persons friends, family or other know person. These templates then become the reference for evaluating and registering the templates for the other poses: tilting up/down, moving closer/further, and turning left/right.

Object or Face Image Acquisition

Cameras should be deployed in Smart Glass to capture relevant video. Computer and camera are interfaced and here webcam is used.

Frame Extraction

Frames are extracted from video input. The video must be divided into sequence of images which are further processed..

Pre-processing

Object or Face Image pre-processing are the steps taken to format images before they are used by model training and inference. The steps to be taken are:

- Read image
- RGB to Grey Scale conversion
- Resize image

Original size (360, 480, 3) — (width, height, no. RGB channels)

Resized (220, 220, 3)

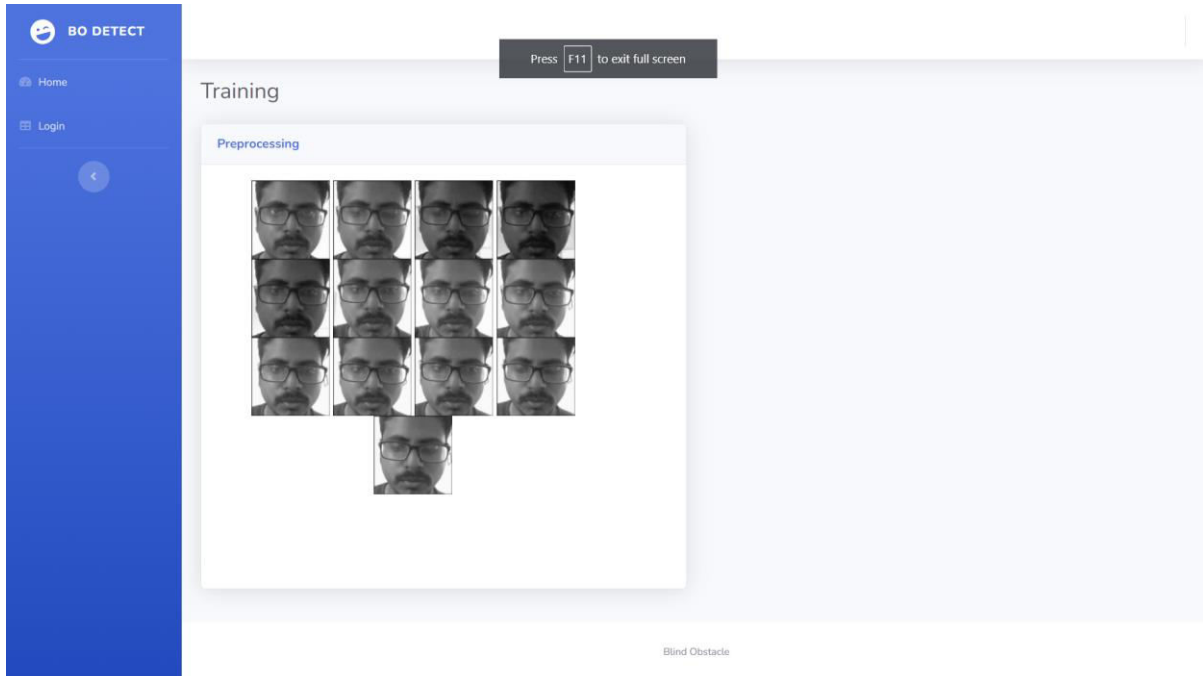
Feature Extraction

After the face detection, face image is given as input to the feature extraction module to find the key features that will be used for classification. With each pose, the facial information including eyes, nose and mouth is automatically extracted and is then used to calculate the effects of the variation using its relation to the frontal face templates.

i. Object and Face Classification

Region-based convolutional neural networks or regions with CNN features (R-CNNs) are pioneering approaches that apply deep models to object detection. R-CNN models first select several proposed regions from an image (for example, anchor boxes are one type of selection method) and then label their categories and bounding boxes (e.g., offsets). These labels are created based on predefined classes given to the program. This makes Fast R-CNN more accurate than the original R-CNN. However, because of this recognition technique, fewer data inputs are required to train Fast R-CNN and R-CNN detectors.

III. RESULT



IV. CONCLUSION

The device presented here is a smart glass that incorporates the functionality of a machine vision and obstacle detection and recognition sensor. It can be conveniently advertised and made accessible to the visually disabled population..

V. FUTURE ENHANCEMENT

Although it is still a prototype, our system represents a promising avenue for future research aimed at enhancing the spatial awareness of visually impaired people traveling in unfamiliar environments.

REFERENCES

1. F. Catherine, Shiri Azenkot, Maya Cakmak, "Designing a Robot Guide for Blind People in Indoor Environments," ACM/IEEE International Conference on Human-Robot Interaction Extended Abstracts, 2015.
2. H. E. Chen, Y. Y. Lin, C. H. Chen, I. F. Wang, "Blindnavi: a mobile navigation app specially designed for the visually impaired," ACM Conference Extended Abstracts on Human Factors in Computing Systems, 2015.
3. K. W. Chen, C. H. Wang, X. Wei, Q. Liang, C. S. Chen, M. H. Yang, and Y. P. Hung, "Vision-based positioning for Internet-of-Vehicles," IEEE Transactions on Intelligent Transportation Systems, vol. 18, no.2, pp. 364–376, 2016.
4. M. Cordts, M. Omran, S. Ramos, T. Rehfeld, M. Enzweiler, R. Benenson, U. Franke, S. Roth, and B. Schiele, "The Cityscapes Dataset for Semantic Urban Scene Understanding," IEEE Conference on Computer Vision and Pattern Recognition, 2016.
5. J. Ducasse, M. Macé, M. Serrano, and C. Jouffrais, "Tangible Reels: Construction and Exploration of Tangible Maps by Visually Impaired Users," ACM CHI Conference on Human Factors in Computing Systems, 2016.
6. J. Engel, T. Schops, and D. Cremers, "LSD-SLAM: Large-scale direct monocular SLAM," European Conference on Computer Vision, 2014.
7. S. Gilson, S. Gohil, F. Khan, V. Nagaonkar, "A Wireless Navigation System for the Visually Impaired," Capstone Spring, 2015.
8. J. Guerreiro, D. Ahmetovic, K. M. Kitani, and C. Asakawa, "Virtual Navigation for Blind People: Building Sequential Representations of the Real-World," International ACM SIGACCESS Conference on Computers and Accessibility, 2017.



9. Kendall, M. Grimes, and R. Cipolla, "PoseNet: a convolutional network for real-time 6-DOF camera relocalization," International Conference on Computer Vision, 2015.
10. Kendall, and R. Cipolla, "Geometric loss function for camera pose regression with deep learning," International Conference on Computer Vision, 2017.



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