A Project Report on

“ARTIFICIAL VISION FOR THE BLIND”

Submitted in Partial Fulfillment of the award of the
Degree of Bachelor of Engineering

in
ELECTRONICS AND COMMUNICATION ENGINEERING

by

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ABSTRACT

Artificial Vision for the blind is an assistant for visually impaired which narrates the description of scene by taking pictures from webcam. There are about 285 million visually impaired people in the world. They are not able to experience the world the way we do. Artificial Vision aims to provide this missing experience for them. The system uses state of the art deep learning techniques from Microsoft cognitive services for image classification and tagging. The Artificial Vision aims bring the beautiful world as a narrative to the visually impaired.

1. INTRODUCTION:

The Artificial Vision aims to bring the beautiful world as a narrative to the visually impaired. The narrative is generated by converting the scenes in front of them to text which describes the important objects in the scene. Examples of text include ‘A group of people playing a game of football’, ‘yellow truck parked next to the car’, ‘a bowl of salad kept on table’. For the first prototype of the system, one line along with some keywords are played as an audio to the users but in the later versions a detailed description would be added as the feature.

1.1 SOFTWARE REQUIREMENTS:

- Amazon Web Services AWS DynamoDB
- Amazon Web Services AWS Lambda
- Amazon Alexa Skill Kit
- Microsoft Azure
- Python 2.7 or higher
- Putty
- VNC server
- Xming

1.2 HARDWARE REQUIREMENTS:

- Amazon Alexa Amazon Echo
- Raspberry Pi Model B
- Creative USB webcam
- Power Bank 5v
- USB cables

2. METHODOLOGY:

The architecture of the system includes Amazon Echo, Raspberry Pi (any version 1,2,3 will work) and online computer vision API’s.
A webcam which is retrofitted into a regular cap is connected to the Raspberry Pi. The code given here runs on Raspberry Pi. The function of the code is to capture the image from the webcam and send it to Microsoft API's for recognition task. The response is then inserted to DynamoDB. When the user asks Alexa to describe the scene, the Alexa Skill Kit triggers Amazon Lambda function to fetch the data from the database (DynamoDB). The correct text is played as an audio on the Alexa device.

2.1 AMAZON ALEXA ECHO:

Amazon Echo is a hands-free speaker you control with your voice. Echo connects to the Alexa Voice Service to play music, provide information, news, sports scores, weather, and more—instantly. All you have to do is ask. Echo has seven microphones and beam forming technology so it can hear you from across the room—even while music is playing.

Echo is also an expertly tuned speaker that can fill any room with 360-degree immersive sound. When you want to use Echo, just say the wake word “Alexa” and Echo responds instantly. If you have more than one Echo or Echo Dot, Alexa responds intelligently from the Echo you are closest to the ESP (Echo Spatial Perception).

2.2 BLOCK DIAGRAM:
3. BUDGET:

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<th>Sl. No.</th>
<th>Vendor</th>
<th>Particulars</th>
<th>Amount in Rs.</th>
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<td>1</td>
<td>Shop Your World</td>
<td>Echo Dot 2</td>
<td>4,990/-</td>
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<tr>
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<td></td>
<td>Creative Cam</td>
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<td>USB cable</td>
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<td><strong>18,072/-</strong></td>
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</table>

4. ADVANTAGES:

- To provide the artificial vision for the blind and visually impaired.
- It acts as a third eye.
- Provides assistance using Raspberry Pi for the blind.

5. FUTURE SCOPE:

- Face and emotion recognition.
- Text to speech for reading books.
- Indoor navigation with visual SLAM
- Outdoor navigation with GPS
- Traffic light colour interpretation

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6. RESULT AND CONCLUSION:

We would like to conclude that the proposed system is completed successfully, as we stated earlier in a problem statement. This paper proposes an enhanced assisting electronic aid using latest technology like Amazon web services, Amazon Alexa and Raspberry Pi for the visually impaired people. This project will successfully implement the object detection and provide a clear information to a blind people. Hence, it can be concluded that this project is able to play a great contribution to the state of the art and will play a great role to assist the blinds to walk easily.

Though being advantageous in several aspects, like providing artificial vision and assistance for visually impaired people by using advanced emerging technologies like AWS and MS cognitive services, it has some limitations of yearly and monthly subscriptions.

7. REFERENCES:

1. https://aws.amazon.com/what-is-aws
2. https://www.youtube.com/watch?v=2MMFNLjkoO