INTRODUCTION

According to survey done India is now home to the world’s largest number of blind people. Of the 37 million people across the globe who are blind, over 15 million are from India. So in India blindness is the biggest problem. The leading causes of blindness are cataract, uncorrected refractive errors, glaucoma, and macular degeneration. Our goal is to create a portable, self-contained system that will allow visually impaired individuals to travel through familiar and unfamiliar environments without the assistance of guides and to recognize persons in front of the blind with the help of a smartphone .We use a technology called Neural Network for image recognition. A key priority of this system is to meet the users navigation needs while ensuring low cost and portability embedded it with a Smartphone. The camera of the smartphone is used to take real time images in front of the user, detect faces, process these faces using Neural Network and analyze it and finally recognize the face in front of him. A database consisting of images is compared with the images captured at real time and suitable results is obtained.

Problem definition

The blind people in our society are facing problems during their navigation. There are no proper navigation systems that help blind people effectively. One of the disadvantage about the existing navigation systems are they are not affordable for the common user. A key priority of our system is to meet the users navigation needs while ensuring low cost and portability embedded it with a Smartphone. The existing systems cannot identify objects and people in front of the person. The project described here develops a navigation system that makes use of GPS, voice, ultrasonic sensor for obstacle detection and includes face detection system using neural network.

Scope

The existing systems cannot identify objects and people in front of the person. The project aims to create a low cost system which uses the smartphone for real time images and identifying persons in front of the user. The images are analyzed and suitable results are obtained using neural network technology. Apart from this the person can navigate easily with the help of ultra-sonic sensors and the associated devices with the user.

PREVIOUS WORKS

Experimental Settings

System requirements

* Microsoft® Windows® 8.1/10 (32 or 64-bit)
* 2 GB RAM minimum
* 400 MB hard disk space
* At least 1 GB for Android SDK, emulator system images, and caches
* 1280 x 800 minimum screen resolution
* Java Development Kit (JDK) 7
* Optional for accelerated emulator: Intel® processor with support for Intel® VT-x, Intel® EM64T (Intel® 64), and Execute Disable (XD) Bit functionality

The software section of the experiment consist of following components,

1. Android SDK version 18 or higher: It is the software development kit developed

by android which helps developers to create software.

2. Google API: It is the application programming interface provided by google in

which developers can interface their application with google services like google

map etc.

3. TTS: It is another application service provided by the android which helps to

convert text into speech.

4. Android studio 5.0: It is the SDK which helps android programming easier.

5.Open cv

The main hardware components are:

1. Arduino UNO : It is micro-controller which is used in the hardware part which

receives information from ultrasonic sensor and sends this data to a smartphone

via a bluetooth module attached to it.

2. Ultrasonic sensor (HC-SR04): It is an ultrasonic sensor which detects obstacles

in-front of the user and gives information to the micro-controller attached to it.

3. Bluetooth module (HC-06): It is connected to the micro-controller, sends instructions

to the Smartphone whenever obstacle is detected in-front of the user.

4. Smartphone: Any Smartphone which has android OS can be used which has access

to the Google services and have a compass inbuilt in it.

Conclusion and future scope

The project provides the blind people a system for identification of people infront of him using neural learning image recognition.Blind people can easily navigate and identify individuals.This also provides voice instructions for navigation through the smartphone and ultrasonic sensors detect the obstacles and instructs the user through the smart phone paired by Bluetooth module. Most systems that have been developed, so far lack the kind of dynamic interaction and adaptability to changes that our system provides to the user. The Google Map provides all the instructions for navigation.

In future this project can be enhanced for character recognition,object recognition and navigation can be done using camera instead of ultrasonic sensors.

**References**

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Activity Block diagram

|  |  |  |  |
| --- | --- | --- | --- |
| **Sl no** | **date** | **Work intended** | **Actual work done** |
| 1 | 14/7/2015-24/7/2015 | To find a problem for main project | Find out a problem of face recognition embedded with blind navigation |
| 2 | 25/7/2015-07/08/2015 | Familiarize with the details of the project Topic | Study Various fields related to the topic and presented the summary |
| 3 | 14/8/2015-16/09/2015 | Works for submitting slides for each reference paper | Submitted slides for each reference paper |
| 4 | 29/9/2015-30/10/2015 | Work for submitting literature review  To familiarize the concept of Neural network | Submitted literature review  Familiarized neural network concept including Multilayer perceptron concept |
| 5 | 20/11/2015-14/12/2015 | Started coding in Android studio to create the front end | Created the front end of the app |
| 6 | 15/12/2015-25/12/2015 | Work for 1st presentation to prepare slides | 1st presentation slides were prepared |
| 7 | 26/12/2015-08/01/2016 | 1st presentation preparation | First presentation was conducted |

APPENDIX

Installation steps

**Install JDK and Android Studio**

• Download and install java JDK, SDK.

• Download and install Android Studio 5.

Set up opencv in android studio

1. **Download** latest OpenCV sdk for Android from [OpenCV.org](http://opencv.org/downloads.html) and decompress the zip file.
2. **Import OpenCV to Android Studio**, From *File -> New -> Import Module*, choose *sdk/java* folder in the unzipped opencv archive.
3. **Update build.gradle** under imported OpenCV module to update 4 fields to match your project build.gradle a) compileSdkVersion b) buildToolsVersion c) minSdkVersion and 4) targetSdkVersion.
4. **Add module dependency** by *Application -> Module Settings*, and select the *Dependencies* tab. Click *+* icon at bottom, choose *Module Dependency* and select the imported OpenCV module.
   * For Android Studio v1.2.2, to access to Module Settings : in the project view, right-click the dependent module -> *Open Module Settings*
5. **Copy *libs*** folder under *sdk/native* to Android Studio under *app/src/main*.
6. In Android Studio, **rename the copied *libs* directory to *jniLibs*** and we are done.

Step (6) is since Android studio expects native libs in app/src/main/jniLibs instead of older libsfolder. For those new to Android OpenCV, don't miss below steps

* include static{ System.loadLibrary("opencv\_java"); } (Note: for OpenCV version 3 at this step you should instead load the library opencv\_java3.)
* For step(5), if you ignore any platform libs like x86, make sure your device/emulator is not on that platform.

OpenCV written is in C/C++. Java wrappers are

1. [**Android OpenCV SDK**](http://opencv.org/platforms/android.html) - OpenCV.org maintained Android Java wrapper. I suggest this one.
2. [**OpenCV Java**](http://opencv.org/opencv-java-api.html) - OpenCV.org maintained auto generated desktop Java wrapper.
3. [**JavaCV**](https://github.com/bytedeco/javacv) - Popular Java wrapper maintained by independent developer(s). Not Android specific. This library *might* get out of sync with OpenCV newer versions.

**Install Arduino**

• Download and Install the Arduino Software.

• Install the Arduino Windows Drivers.

1. Plug the Arduino into the PC.

2. Start the Windows Device Manager.

3. Install the Device Driver.

4. Setting up the Arduino Software.

5. Testing the Installation.