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# Android Application Camera for Text and Product Labelling for Unsighted People

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***Abstract*— As you are well aware, people with low vision blindness might get the most from camera reading. It might provide ways to obtain printed materials. A camera can be used to take an image from written text by utilizing technology. The technique known as camera reading has the potential to make blind individuals more autonomous and accessible, giving them access to a greater variety of written things including books, newspapers, and documents. Text-to-speech (TTS) and optical character recognition (OCR) systems can be used to convert information obtained from cameras into accessible formats, such as audio output or braille. People who are unsighted can become more autonomous and have more access to information because to the combination of OCR and TTS technology.**

**It is a commendable and significant endeavour to develop a system that uses a camera to narrate scene descriptions using images for the blind. Your invention has the potential to greatly enhance the quality life for blind individuals by resolving the difficulties they have when navigating their environment.**

**Blind people can now independently access and comprehend language found in images, including signs and written text on paper, thanks to this creative approach. To put it simply, the software improves the quality of life for people who are unsighted by serving as a link between aural cognition and visual information. Through the use of technology, "Camera Reading for Blind People" seeks to alleviate the difficulties faced by those who are blind. This project entails developing a smartphones app to help blind people with reading-related tasks.**

***Index Terms*— Blind People, Camera Based, Image Processing, Object detection, Text classification.**

## I. INTRODUCTION

For those who are blind or unsighted people, accessing printed documents can be challenging or even impossible. It is now possible to assist in overcoming these challenges thanks to the advancement of technology that may result in new solutions. These technologies exist,

And one of them is camera reading, which provides those who are blind or unsigned with an innovative way to read written documents. Using a camera to capture written text and turning it into audio or braille output that can only be ready by the user is known as camera-reading technology. In this process, optical character recognition (OCR) technology is used to transform the text in the image into a digital format that can only be read by a computer. Examining the transformed text.

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The ability to provide each unsighted people individual with optimal access to a range of printed materials, such as books, documents and newspapers, is one of many benefits of camera reading technology. By enabling children to access information without assistance from others, these technologies increase their independence and help them learn to read. The most promising technologies for improving accessibility and quality of life for the blind and unsigned include Camera reading, TTS and OCR, albeit these technologies are still depending development.
There is also discussion of the limitations and potential of camera-reading technology. These devices use a combination of cameras, OCR, and TTS technologies to scan printed text and read it aloud to the user. The audio output can be listened to through headphones or a speaker. By using camera reading, blind individuals can become more autonomous with technology and develop better spatial awareness. People who are blind or unsighted people can now access information that they may not have been able to in the past because to technological advancements that translate text into audio or braille.
Print media can consist of books, magazines, and other materials. People with visual impairments can now more easily purse educational opportunities that were previously inaccessible or challenging to attain thanks to the availability of printed materials. Thanks to TTs (test-to-speech) technology. users can now access written content by completing previously difficult or impossible tasks. The global frequency and intensity of natural and man-made disasters have both grown. The safety and well-being of communities are significantly reliant on effective disaster management and preparedness. It's good that so many countries, including New Zealand, are putting a significant emphasis on risk reduction and disaster management plans.

## II. Literature Survey

There are a number of systems and techniques that leverage different software tools or languages, such as machine learning, Python, MATLAB, tec., that are available in the literature for usage by employees with sensors.
Vipul Samala [1] Images of written or printed text are mechanically or electronically converted into machine-encoded text by the system Audio Assistance using Optimal Character Recognizer (OCR). Beginning with the conversion of the grayscale image to binary, binarization takes place. With the aid of text-to-speech technology, this system recognized the text and transformed it into speech. However, it is unable to recognize images or sums of numbers.
X. Chen and A.L Yuille etc. al [2] Text from the scene is being detected using an algorithm that will either print the text or read it aloud from the image. Included in this text are bus numbers, hospital signs, and traffic signs.
Xiln Chen etc.al [3] The ability to automatically recognize and detect indicators in the natural world is an area of ongoing research and development. It involves leveraging technologies such as computer vision, machine learning and pattern recognition to identify signals or cues in unscripted environments. The aim is to extract meaningful information from the visual data present in the natural world. The development of algorithms and models that can Recognize and categories different signs to curses based on their visuals properties is the main goal of research in this field.
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## III. Proposed System

The use of camera-reading technologies by the blind and unsighted people could alter people's lives. Camera reading technology can greatly improve their quality of life by allowing them to access printed documents, navigate their surroundings more quickly, and receive information that was before difficult or unattainable. The following are some particular advantages that camera-reading technology offers to the blind and visually impaired.
Enhanced Self-sufficiency, Quicker information Processing and Better Access to education and improved perception of the surroundings. Through the use of camera-reading technology, people who are blind or visually

challenged can now see and interact with the world in ways that were before difficult or unattainable. It eventually improves their general quality of life by providing access to economic opportunities, educational opportunities, and a deeper understanding of their surroundings.
The two primary components of this suggested system model's design are:
1. Image acquisition and text conversion
2. Text-to-Speech.

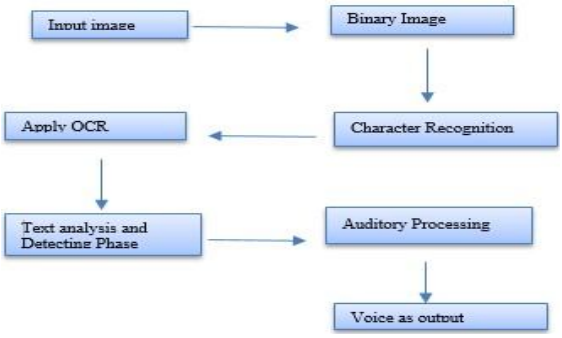


Figure 1. Proposed System Architecture for Text to Speech

The Raspberry Pi is a well-liked and adaptable platform that is frequently utilized in many different applications, such as camera reading systems. A cheap and small way to execute software programs and carry out operations like text extraction and picture processing is with the Raspberry Pi single-based computer. When it comes to camera-reading technology, the main component of the setup can be a Raspberry Pi. A camera module that takes pictures of printed text can be attached to it. The text is then extracted from the collected photos by the Raspberry Pi using optical character recognition (OCR) software and image processing methods.
After the text has been extracted, the Raspberry Pi can process it further by turning it into audio output using text-to-speech (TTS) technology. People with visual impairments can listen to the content by using headphones or speakers to play the audio output. Because of its small size, low power consumption, and processing capability, the Raspberry Pi is a good choice for creating portable camera-reading systems. Because of its adaptability, customized camera-reading solutions can be made by integrating it with other software libraries and peripherals and customizing it.
The Raspberry Pi community also provides an abundance of information, guides, and assistance, so developers and enthusiasts can use this platform to investigate camera reading projects. All things considered, the Raspberry Pi is a key component in the creation of camera-reading systems because it has the flexibility and processing capacity required to extract text from photos and turn it into audio output for those with visual impairments.
It is challenging for those who are blind and visually impaired to go about their daily lives. Our intension is to provide those people with some support by informing them about their environment. This story will give a broad summary of the surroundings. We need to get set up a system that depicts this lovely environment because people who are visually handicapped cannot perceive it. Embedded systems and image processing methods allow us to put it into practise. We use a camera to capture a photo of something that really exists and put it in a database . The device's camera can be accessed by using the Android camera API.
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Investigate the incident and capture on camera in real-time. To extract text from images, have a reliable optical character recognition (OCR) system in place. OCR libraries that can be utilized include Tesseract and Ml. Utilise a machine learning model that has been trained on numerous product label datasets to develop a product recognition system. For object detection, think about utilising pre-trained models or building a new model according to your needs. To convert the product labels and recognized text to speech, use Android's Text-to-Speech functionality.

Allow customers to change the voice's cadence and loudness. Activate voice command to enable hands-free communication. Give consumers the option to initiate tasks like taking pictures, reading messages, and identifying items with voice commands.
Check to see if it works with the accessibility services that Android provides. Include features like haptic feedback, high contrast mode, and huge text options. Make a user interface that is both friendly and intuitive by using big, sharply contrasting buttons. Permit users to contribute via the user interface (UI) to aid in their acclimation to the programme. If you want the app to function even when there isn't a reliable internet connection, consider adding an offline feature to the main features.
Give users the ability to customise the app's language, speech tempo, and camera settings to suit their tastes. Establish a feedback mechanism so that users may submit suggestions and issues, assisting in the app's ongoing improvement. Prioritise user privacy by ensuring that the device securely handles the data and images it takes .Obtain consent from the user and confirm that they are aware of the limitations on the amount of data the application can use. Extensive testing is done on people with visual impairments to gather their feedback on usability and accessibility. Update the app often to take into account customer comments and new technological advancements.
Next, work with it using a variety of image processing techniques, including Canny Edge Detection Algorithm, Speed Up Robust Features (SURF), and Convolutional Neural Networks and Image Classification (CNN) for picture classification and pattern matching. We are classifying the object t after determining the pattern. It turns into text format and employs the voice to narrate after detecting the thing.

*Software Requirement*

*Operating System*: Microsoft Windows 7 and above
1.Programming Language: Python
2.IDE: Python IDLE
•Server: Flask Server
*Tools aand Technologies*: Python and MySQL are software's which need to installed on system for running the application on system for recognition of object or people around captured through camera.

## IV. METHODOLOGY

1. *Image Acquisition:* A camera records an image, and each image is processed using the above-described method.
2. *Training Model*: The model is trained with images in order to eventually enable item and face recognition.
3. *Face and Object Identification*: To get results for both face and object identification, the model is tested.

*CNN Encoder* :

Convolutional neural networks, also known as CNNs, are a subset of artificial neural networks used extensively in deep learning for object and picture recognition and categorization. Thus, Deep Learning uses a CNN to identify items in a picture. Spatial correlations present in the input data are used by CNN. A portion of the neural network's input neurons are connected by each concurrent layer. We refer to this area as a local receptive field. The hidden neurons are the centre of the local receptive field.

*STEPS*:

*Step 1*: Dataset containing images along with reference caption is fed into the system
*Step 2:* The convolutional neural network is used an encoder which extracts image features 'f' pixel by pixel.
*Step 3*: Matrix factorization is performed on the extracted pixels matrix is of m x n.
*Step 4*: This matrix is subjected to max pooling, in which the maximum value is chosen and once more fixed into the matrix. Step 5: Normalization is the process of converting all negative values to zero.
*Step 5:* Repaired linear units are employed, where each value is filtered and converted to zero. Zero is the value of a negative.
*Step7:* The veiled strata Assign the weights based on the input values obtained from the visible layers.

YOLO:

Most people mistakenly believed that YOLO object detection meant "You Only Live Once", but in reality, it stands for "You Only Look Once" object detection using neural networks. This algorithms precision and speed have made it popular. It has been applied to the detection of humans, animals, parking metres, and traffic signals in a variety of ways. The YOLO architecture divides the input image into m x m grids, and then produces two bounding boxes

and their class probabilities for each grid. The primary thing to notice in this situation is that the bounding box's size exceeds the grid's actual sizes.For instance, the yellow bounding box surrounds the bicycle while the pink bounding box surrounds the car. The blue bounding box has been used to highlight the dog.

*Python Idle Installation*

IDLE and Python are not installed by default .
Go to https://www.python.org/ to see the download page. Look for the windows downloads and choose the version that is compatible with your system. At the time of writing, the choices are: 32-bit Python 2.7.3 Windows Installer – 64-bit Python 2.7.3 Windows X86-64 Installer.
If you are not familiar with the architecture of the system, you can try running winwsd.exe on Windows XP or msinfo32.exe on Windows XP or msinfo32.exe on Windows 7. Examine the system type or processor. It will look like this for 32-bit. Start the installation adhere to the prompts on the screen. Generally speaking, default settings are excellent. This is also means that IDLE is installed by default.

*Tools And Technology*

An application that detects objects for people in the surroundings area that has been taken by a camera requires the installation of Python and MYSQL on a computer.
High-level, general-purpose, interpreted programming is done with python. Guido an Rossum created Python, which was released in 1991. Code readability is given priority in its design philosophy when it comes to technology.

## V. CONCLUSION

Numerous studies have looked into the difficulties that disabled individuals, particularly those who are unsighted people, encounter both during and after disasters. Regretfully, this demo graphics consistently left out of disaster management program sinmanynations, and they don't receive any particular equipment or services to help them during or after emergencies.
As susceptible population that calamities may have a signify antimpacton. As susceptible population that calamities may have a significant impact on. In addition to their visual impairment, they face difficulties with mobility and communication during emergencies. The research study has suggested the Smart Cap as a solution to this problem, which the visually impaired can use for everyday tasks and, in particular, in emergency situations. This Smart application gadget will offer a narrative system and real-time navigation. Because of its low cost, the gadget is accessible and inexpensive to a larger community of people who face this issue. In order to give unsighted people the assistance and resources they so sorely need before, during, and after crisis situations, we hope that this proposed Smart Cap will be a first step in that direction.
They not only lose their vision during emergencies, but they also have trouble moving around and communicating. The Smart Camera, which the Blind can utilise for daily duties and especially during emergencies, has been proposed by this research study as a solution to this issue. Real-time narrative system are features of this android camera device. Due to its low price, a wider range of individuals experiencing this problem can afford and have access to the device. We think the planned Android Camera would be a first step towards providing visually impaired persons with the support and resources they so desperately need during and after crisis situations.
The challenges faced by disabled people, especially those who are visually impaired, during and after disasters management plans and does not receive ay additional support or resources in the case of a disaster. It has been acknowledged that these people belong to a vulnerable group that disasters could greatly affect.

## FUTURE SCOPE

This research study is merely a proof-of-concept; in further work, we aim to create a fully functional independent version with additional blind assistance features. Schools and other organizations for the blind may use camera-reading equipment.
Applications involving artificial intelligence may also make use of it. When combined with other camera-reading technologies, such as virtual assistants, wearables, and smart home systems, it can be helpful for individuals who lack literacy. Additionally, it can provide blind and visually impaired people with greater independence and all-encompassing support. Augmented reality integration. The blind and visually impaired can use this technology in conjunction with camera reading systems, which provide extra support and information to help them navigate their surroundings.

This research study is only a proof-of-concept; our goal for future work is to develop a standalone, fully functional version with additional capabilities to help the visually impaired.

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Ultrasonic sensors are a useful tool for users to identify obstacles in their way. The obstacle detection stick's ultrasonic sensors are designed to detect its environment. When a blockage is found, the system notifies or alerts the user through an Android smartphone application. The smartphone application allows the user to get information about their surroundings. It may provide current information in real time about any obstacles, the condition of the route, or any other relevant factors. People with visual impairments can become safer and more autonomous with the use of technology.

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The creation of a "Ultrasonic Smart Cane" that directs blind persons to secure, barrier-free locations is the primary objective of the project.

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[13] Blind users can combine the LOOXCIE wearable camera with the Android application X-EYE for safe navigating. Present-day navigational aids depend on a wide range of expensive and occasionally hazardous hardware elements, such as sensors.