

# Morse Code Translator using Eye Blinks

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**Abstract** - An innovative method for creating Morse code that can be understood in English is used. With the aid of the eyes, Morse code is produced. When a person or other user blinks their eyes, a Morse code output of dashes and dots is produced. For the purpose of detecting eye blinks, facial landmark detection is combined with the OpenCV and Dlib libraries. India is home to about 21 million people who have some form of impairment. These folks can communicate with the world in a more graceful manner in a flash. Anyone who understands can easily understand the user with the help of this system.

## 1. INTRODUCTION

### 1.1 Overview

The major goal of this study is to assist those who are blind in navigating by assisting them in spotting hazards. Additionally, it makes it easier for individuals to navigate the streets on their own without the need for assistance. This also seeks to keep users away from hazardous areas. Blinking is the sole way for people with paralysis to communicate because their capacity to control muscle movement is limited, especially around the eye muscles. communicate. In these circumstances, the patient needs a system that is both practical and simple. Speech impediment is not taken into account as much as it should be in the creation of a medical device because it does not immediately impact the patient's immediate health. Voices and facial expressions are typically used in human communication. Other than natural languages (such as spoken languages and written languages), sign language, which consists of facial expressions and body gestures, is another important form of communication for people with special needs. Meanwhile, the body gesture is very significant to increase the effectiveness of natural languages (such as spoken languages and written languages). The goal of this work is to provide an easy-to-use, reasonably priced programme for speech impairment sufferers as well as for persons whose only alternative is to blink their eyes. Eyeblink

can be interpreted as words being formed for communication at regular intervals. Almost any purpose can benefit from the employment of an effective real-time blink detection algorithm, including turning on and off electrical appliances at home. Early in the nineteenth century, when individuals had no idea how to build circuits to transmit voice signals from one location to another, the Morse code was created. The telegraph systems were ways of using electrical impulses to convey and receive messages. After its creator, Samuel F. B. Morse, the Morse code was given that name. It goes on. Although our goal is to support those who

have speech disorders, there are some military-strategic circumstances in which it may also be helpful. Within eyeblinks, the user can see this

can speak their mind clearly. Although it appears to take a while, the user will become proficient at it quickly with practise.

### 1.2 Literature Review

There is a lot of technology employed in face identification and in the creation of morse code using different movements, among other things. Many projects exist that can recognise hand gestures.

To put it simply, sign language detection and interpretation are carried out in order to detect language. We discovered a few systems that produced morse code using their own algorithms and hardware, and where everyone was different. the sigmoid function is utilised. BPNN focuses more on error management. RBF kernel and BPNN algorithms, in brief

the two classifiers that are used to identify human finger gestures. The threshold is activated when the fingertip is touched, and depending on how long it is touched for, morse code is created. These are a few of the methods that were mentioned earlier.

### 2. Limitation in Existing Systems

The approach and technique described above are only available to a certain group of persons, such as those with physical disabilities who are unable to move their jawline or their hands or fingers.

fracture or one of the additional causes. These kinds of restrictions prevent the proposed approach from being entirely relevant to people with disabilities. Their system's inability to speak is another flaw; however, given how far technology has come in recent years, this major limitation should serve as inspiration for us to develop an audible system that can speak, i.e., to convert morse code into a human communicative language.

### 3. PROPOSED SYSTEM

The foundation of our project is the recognition of morse code in eye blinks. As was said in the preceding section, there are numerous

Morse code detection techniques include using the mouth, fingers, or hands. A sequence of eye blinks will be used to identify morse code. We need to identify eyes first in order to decode morse code from eye blinks. There are three main processes in morse code detection:

- 1) Identifying eyes
- 2) figuring out the Eye Aspect Ratio

## 3) reading blinks for morse code

## 4. SYSTEM DESIGN

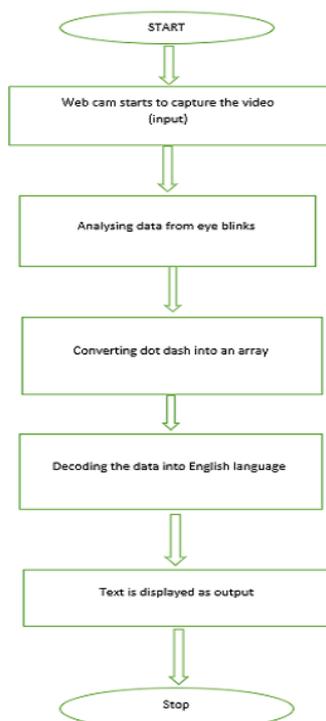


Figure 3. Flow Chart

The proposed design of application of internet of things and a combination of android and cloud technology.

## 5. METHODOLOGY

**Finding Eyes:** In order to find an eye, we must first detect a face. To do this, we will use a pre-trained dataset called "facial landmarks" [3] [8]. Every frame from the

The frames from the incoming video stream must be resized and converted to grayscale images before we can use the dlib package to identify facial features and pinpoint the location of the eye. As seen in figure 2, the term "facial landmarks" refers to 68 (x, y) coordinates of the various face features, such as the left and right eyebrows, eyes, mouth, and jaw line.

**Calculating Eye Aspect Ratio:** We shall compute a measure called Eye Aspect Ratio to ascertain if an eye is open or closed. A formula called Eye may be derived based on these points and uses two pairs of vertical points for computing vertical distance and one pair of horizontal points for computing distance.

As shown in the graph below (figure 7), the EAR remains constant until the eye is shut. Once the eye is closed, the EAR drastically drops until it hits zero.

In the graph below, the threshold frequency is shown as 0.2. If the EAR value falls below 0.2 (while the eye is closed), approaches 0 and then rises, rising beyond the threshold value (when the eye is opened), we can declare that a blink has occurred. A blink has occurred or not using this straightforward calculation of the EAR value's falling

**Morse Code Recognition from Blinks:** Following the implementation of blink detection using EAR, we will now comprehend how the system will produce morse code from these patterns.

many blinks. Therefore, when the user runs the code, data from the webcam or a recorded video will be used; from this, eyes are identified using facial landmarks. The data are then analysed, and EAR values are computed. When the user shuts his eyes for one second, a "." (dot) is detected, and when the user closes his eyes for two seconds, a "-" (dash) is detected. This is how Morse code is formed.

The dot and dash are saved, and then they are translated into English.

## SOFTWARE DEVELOPMENT TOOLS: LANGUAGE OF PYTHON

Python is an interpreted, object-oriented, high-level, dynamically semantic programming language. It is particularly desirable for Rapid Application Development as well as for usage as a scripting or glue language to tie existing components together due to its high-level built-in data structures, dynamic typing, and dynamic binding. Python's straightforward syntax emphasises readability and makes it simple to learn, which lowers the cost of programme maintenance. Python's support for modules and packages promotes the modularity and reuse of code in programmes. For all popular platforms, the Python interpreter and the comprehensive standard library are freely distributable and available in source or binary form. Python frequently causes programmers to fall in love due to the enhanced productivity it offers. given that

## 6. DEEP LEARNING ABOUT

Deep learning is a machine learning method that instructs computers to learn by doing what comes naturally to people. Driverless cars use deep learning as a vital technology to recognise stop signs and tell a pedestrian from a lamppost apart. It is essential for voice control on consumer electronics including hands-free speakers, tablets, TVs, and smartphones. Recently, deep learning has attracted a lot of interest, and for good reason. It is producing outcomes that were previously unattainable.

A computer model learns to carry out categorization tasks directly from images, text, or sound using deep learning. Modern precision can be attained by deep learning models, sometimes even outperforming human ability. A vast collection of labelled data and neural networks are used to train models

## Deep learning at work examples

Applications for deep learning are employed in a variety of fields, including automated driving and medical equipment.

**Automated Driving:** To automatically detect items like stop signs and traffic signals, automotive experts are employing deep learning. Deep learning is also used to identify pedestrians, which reduces accidents.

**Aerospace and defence:** Deep learning is used to recognise things from satellites that detect points of interest and to categorise troops' operating environments into safe and risky locations.

**Medical Research:** To automatically identify cancer cells, researchers studying cancer are utilising deep learning. A high-dimensional data collection produced by a sophisticated microscope created by UCLA research teams was utilised to teach a deep learning application to recognise cancer cells with accuracy. Deep learning is assisting industrial automation in enhancing worker safety surrounding

## THE OPEN CV:

A sizable open-source library for image processing, machine learning, and computer vision is called OpenCV. Python, C++, Java, and many other programming languages are supported by OpenCV. It can analyse pictures and movies to find faces, objects, and even human handwriting. The amount of weapons in your arsenal rises when it is merged with different libraries, such as Numpy, which is a highly optimised library for numerical operations. All operations that can be performed with Numpy can be combined with OpenCV.

With the aid of a sizable collection of OpenCV applications and programmes, this tutorial will teach you how to process images in many ways, such as operations on images and videos.

A Python open-source package called OpenCV is used for computer vision among mark, dash, or dah ( ): three time units long inter-element gap between the dits and dahs within a character. Short mark, dot, or dit ( ): "dit duration" is one time unit long. one unit long or one dot Long gap (between words): seven time units (formerly five[6]), small gap (between letters): three time units. Python frequently causes programmers to fall in love due to the enhanced productivity it offers. The edit-test-debug cycle is extraordinarily quick because there is no compilation step. Python programmes are simple to debug because a segmentation failure is never caused by a bug or incorrect input. Instead, the interpreter raises an exception when it finds a mistake. The interpreter prints a stack trace if the programme

doesn't catch the exception. Setting breakpoints, evaluating arbitrary expressions, inspecting local and global variables, stepping through the code one line at a time, and other features are all possible with a source level debugger. Python's ability to perform introspection is demonstrated by the debugger, which is developed in Python. Contrarily, adding a few print statements to a programme is frequently the easiest method to debug it.

## 7. EXPERIMENTAL RESULTS



Fig -9: Login Page

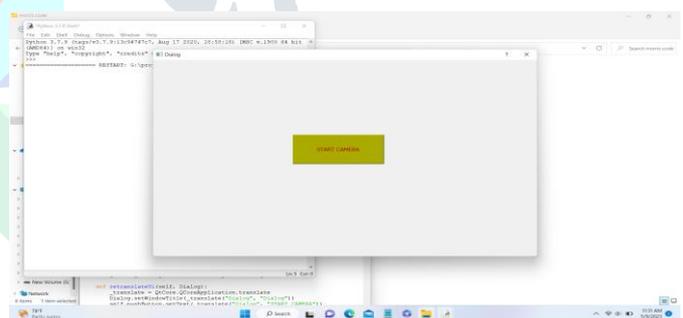


Fig -10: Camera start

## 8. CONCLUSIONS

As opposed to the conventional method for detecting blinks, Eye Aspect Ratio has shown to be particularly effective in doing so. Blink detection for Morse code particularly helpful for those who are crippled or who are paralysed but still have some eye mobility. Blinks can be detected more precisely using the better algorithms and techniques we discussed. These blinks are also being translated into morse code. A customised code that uses a specific pattern to express a special sentence or instruction could be simply developed for patients with reduced communication needs. The existing system was quite complicated and people working on this system must have to remember a lot. whereas our system has resolved the complicated issues and added predictive power to it. But the only flaw in the proposed system is that the time limit is associated with dots and dashes. So, in the future, we can improve the model by removing the time limits and implementing advanced machine learning algorithms such as

Neural Networks. This model could also be extended to words and sentences and even for paragraphs.

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