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Hand Gesture Recognition System for Deaf & Dumb People

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Abstract: This project aims to develop an android application that can recognize hand gestures using the Kotlin programming language. The application is designed to be user-friendly and easy to use. The user can perform various hand gestures, and the application will recognize them and perform the corresponding action. The application will use the device's camera to capture the hand gestures and analyze them using machine learning algorithms. The machine learning model will be trained using a dataset of hand gestures to improve the accuracy of the recognition system. The application will have a simple and intuitive user interface that will allow the user to select the action they want to perform based on the hand gesture they make. The application will also have the option to customize the hand gestures and assign different actions to them. The Hand Gesture Recognition System Android Application will be a useful tool for people with disabilities, allowing them to control their devices using hand gestures. It will also be useful in situations where touch input is not possible, such as when the user's hands are dirty or when they are wearing gloves. Overall, this project will showcase the power of Kotlin language in developing android applications and the potential of hand gesture recognition technology in improving the user experience.

Keywords: Hand-Gesture recognition, Convolutional Neural Network (CNN), Machine Learning, Sign language

I. Introduction

The use of hand gestures to control devices has become increasingly popular in recent years. Hand gesture recognition technology has been used in various fields, including gaming, virtual reality, and robotics. The technology has also been used to assist people with disabilities in controlling their devices. In this project, we aim to develop a Hand Gesture Recognition System Android Application using the Kotlin programming language. The application will allow users to control their devices using hand gestures, making it easier and more convenient to interact with their devices. The application will use the device's camera to capture the hand gestures and analyze them using machine learning algorithms. The machine learning model will be trained using a dataset of hand gestures to improve the accuracy of the recognition system. The Hand Gesture Recognition System Android Application will have a simple and intuitive user interface that will allow the user to select the action they want to perform based on the hand gesture they make. The application will also have the option to customize the hand gestures and assign different actions to them. The project will showcase the power of Kotlin language in developing android applications and the potential of hand gesture recognition technology in improving the user experience. The Hand Gesture Recognition System Android Application will be a useful tool for people with disabilities, allowing them to control their devices using hand gestures. It will also be useful in situations where touch input is not possible, such as when the user's hands are dirty or when they are wearing gloves.

II. Literature Survey: Hand gesture recognition system (HGRS) is an emerging technology that has gained popularity in recent years. It is a system that recognizes hand gestures and translates them into commands that can be used to control various devices such as smartphones, computers, and televisions. In this literature survey, we will focus on the development of an Android application using Kotlin language for hand gesture recognition.

III. Approach: The input device in sign language recognition is camera. The input data is in the form of hand gesture images that can be easily captured by camera. The data is then preprocessed.Signer must be ready to perform sign language hand gesture before clicking the start button in the application and click the Stop button when the signer is done performing the gesture. Hand Gesture recognition System consists of three basic levels. Detection: Using camera, a device detects hand gestures, and the machine learning algorithm segments the image to find hand gesture. Tracking: movements of hand are monitored to detect hand gesture to provide accurate input for data analysis. Recognition: The system tries to find patterns based on the gathered data. When the system finds the match and interprets a gesture, it performs the action associated with this gesture. Feature extraction and classification in the scheme below implements the recognition functionality.

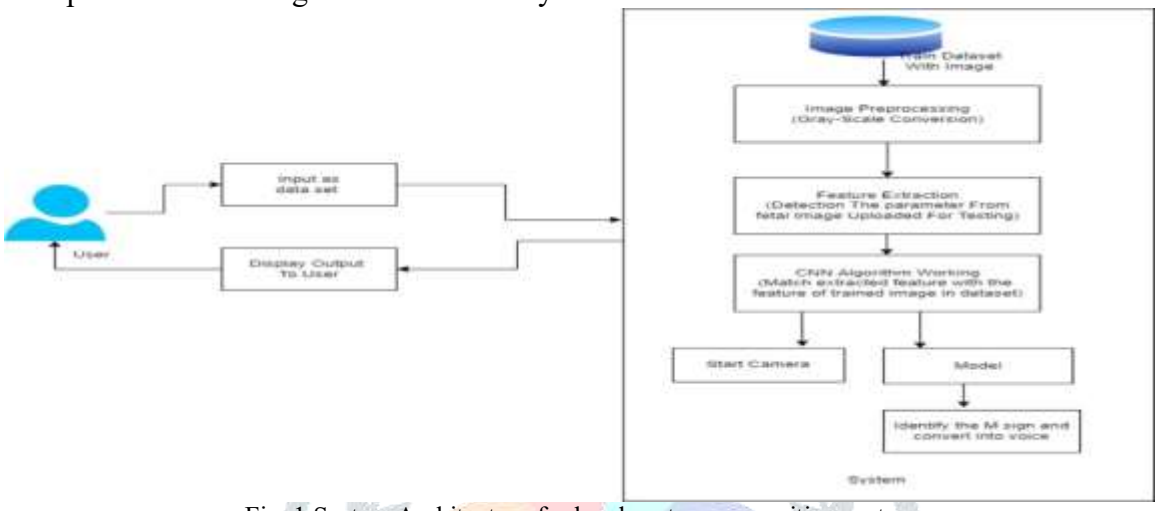

Fig. 1 System Architecture for hand gesture recognition system

IV. Existing Research: There have been several studies conducted on hand gesture recognition systems using different technologies and programming languages. For instance, a study by Sharma et al. (2020) developed a hand gesture recognition system using a convolutional neural network (CNN) and Python programming language. The system was able to recognize 10 hand gestures with an accuracy of 98.5%. Another study by Sahu et al. (2019) developed a hand gesture recognition system using a support vector machine (S VM) and OpenCV library. The system was able to recognize 8 hand gestures with an accuracy of 92.5%.

V. Proposed Research: The proposed research aims to develop an Android application using Kotlin language for hand gesture recognition. The application will use the camera of the smartphone to capture the hand gestures and translate them into commands that can be used to control various devices. The system will be developed using a combination of machine learning algorithms and computer vision techniques.

VI. Future and Applications: The future of hand gesture recognition system is very promising. With the advancement of technology, the accuracy and speed of these systems are improving rapidly. In the future, we can expect hand gesture recognition systems to become more intelligent and intuitive. They will be able to recognize a wider range of hand gestures and translate them into more complex commands.

Applications of Hand Gesture Recognition System Android Application

The applications of hand gesture recognition system Android application are numerous. Here are a few examples:

1. **Smart Homes:** Hand gesture recognition system can be used to control various devices in a smart home such as lights, fans, and air conditioners. With a simple hand gesture, users can turn on or off these devices without the need for a remote control.
2. **Gaming:** Hand gesture recognition system can be used for gaming. For instance, users can control the movement of characters in a game using hand gestures. This will provide a more immersive and interactive gaming experience.

3. **Healthcare:** Hand gesture recognition system can be used in healthcare for remote monitoring of patients. For instance, doctors can monitor the movement of patients with Parkinson's disease using hand gesture recognition system. This will help in the early detection of symptoms and better management of the disease.

4. **Education:** Hand gesture recognition system can be used in education for interactive learning. For instance, teachers can use hand gestures to control the presentation slides during a lecture. This will provide a more engaging and interactive learning experience for students.

VII. CONCLUSION: In conclusion, hand gesture recognition system is an emerging technology that has a wide range of applications. The proposed research will contribute to the development of an Android application using Kotlin language for hand gesture recognition. The application will have the potential to revolutionize the way we interact with devices and make our lives easier.

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