Sign Language Through Video-Call

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SIGN LANGUAGE THROUGH VIDEO-CALL

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Abstract— **The "Sign Language Through Video Calling" plays an essential role in helping people to have interactive communication with deaf people. In the last few years, a few changes in tradition have been made: most importantly, educational interpreting is now available in high schools and at the university level. Given the lack of bilingual deaf education and early sign language exposure, deaf children make very slow progress in literacy, compared with deaf children of deaf parents. The benefits of early sign language acquisition can be seen in deaf children of deaf parents not only in better social adaptation skills but also in their better academic achievement compared with other deaf children. The cultural approach to deaf education views sign language as the most natural linguistic form of deaf people, and a powerful means of communication for all purposes and in all circumstances.**

I. INTRODUCTION

Today we as human beings interact with each other to convey their ideas, thoughts, and experiences to the people around them, but this is not possible for deaf-mute people and this issue could be solved by using Sign Language.

Sign language paves the way for deaf-mute people to communicate and help others to understand but it is not simple for a normal person to understand since it is a special kind of language that is not spoken by words rather it is understood using specific hand gestures to those who can't hear or talk.

Since not everyone can understand this language, it becomes very difficult for some people to understand, but various technologies help them convert sign language into normal language and to understand what others want to convey. But these technologies are limited to personal work or limited to work at that place and time, where users cannot use this while interacting online with others.

Sign-Language through Video Calling for reliable and helpful conversion of sign language of users who cannot hear or speak with the helpful implementation of a suitable machine learning algorithm.

1.1 Motivation

1.1.1 Way of Communication: There is a huge gap in communication for Deaf and mute people with others because of language understanding, as deaf and mute people cannot understand the normal language it becomes very difficult for them to convey their message to others so they use Sign language as there means to translate to others. But it is not easy to learn as well as not everyone is familiar with this language. It is important to make this system easy for everyone.

1.1.2 COVID-19 Scenario: As we know due to COVID-19 virus situation it is mandatory for us to stay indoors so now a days people usually meet others on online video calling platforms but we cannot easily use the sign language easily as another user who doesn't know about sign language would get confuse what the person wants to say.

II. PROBLEM DEFINITION

Sign-Language through Video Calling for reliable and helpful conversion of sign language of users who cannot hear or speak with helpful implementation of suitable machine learning algorithm. Its purpose is to allow users who are physically disabled (someone who has hearing aid) to communicate more effectively with other people through video calling. To be specific, using this program, we can train the model using hand gestures and then giving each hand gesture its own name so the user can use this while communicating. By this, we can use the trained gesture to communicate with other users by translating the trained gesture into words and displaying it on another user's screen. Hence using this technology, we can help someone who cannot speak or hear,

communicating with each other irrespective of their disabilities.

3.1.1 Project Scope

1. Useful for cold start users. 2. This project enables users to interact with another user using sign language. 3. In this pandemic it becomes extremely hard for deaf users to communicate with others especially when it comes to interacting with normal users who cannot understand what the other person is trying to say. Thus, this project helps to overcome this problem.

3.1.2 User Classes and Characteristics User Modules:

1. User Registration and login.
2. Users interact with another user using Video Call.
3. Users can Update their profiles.
4. Users can Add or Remove their friends (registered).
5. Users can try different Gestures added by the Administrator. Admin Modules:
   a. Admin view/modify all users.
   b. Add/Remove different Gestures for better Working of website.
   c. Admin can update algorithms to improve the efficiency of the system and better prediction.
   d. Admin is responsible for training the model to improve prediction of the model.

3.2 Functional Requirements

3.2.1 System Feature 1(Functional Requirement): Here we propose a Personalized Video Calling System by implementing machine learning based algorithms and APIs to provide tailored experiences to users.

3.2.2 System Feature 2(Functional Requirement): For front end we have used React Library which is open source and supports JavaScript. For backend we are using Django framework/Node JS which is python-based web framework/JavaScript based respectively. We have used MySQL database/ NoSQL which are fully manageable database systems.

3.3 External Interface Requirements

3.3.1 User Interfaces

• Dashboard

• User Login page

• Interface Page

3.3.2 Hardware Interfaces - The entire software requires a completely equipped computer system including monitor, keyboard, a good Webcam and other input output devices.

3.3.3 Software Interfaces - The system can use Microsoft Windows/Linux/MacOS as the operating systemplatform. System Also Makes use of certain GUItools. To Run This application, we need a suitable browser and a platform to compile python 3 or JavaScript and Localhost as a server. To store data, we need MySQL/NoSQLdatabase.

3.3.4 Communication Interfaces - Communication using Django/ NodeJS.

3.4 Nonfunctional Requirements

3.4.1 Performance Requirements The performance is the main aspect as well as performance of any system lies in the way it is handled. Every user must be educated and have proper guidance regarding how to use the system.

3.4.2 Safety Requirements To ensure the safety of the system, perform regular monitoring of the system and false user so as to trace the proper working of the system. A registered user can only access the system.

3.4.3 Security Requirements Any user which is not part of the system should be prevented from accessing the system. Password hashing and salting can be introduced for extra security.

3.4.4 Software Quality Attributes

Accuracy: - The level of accuracy in the proposed system will be as high as possible. All transactions would be done accurately and it ensures that whatever information is transferring from the center is accurate and correct. Result is organic results.

Reliability: - The reliability of the proposed system will be as high as possible. The reason for the increased reliability of the system is that now there would-be proper communication as well as better functionality as well as ease of use for specific users.

3.5 System Requirements

3.5.1 Database Requirements - MySQL/ NoSQL Database

3.5.2 Software Requirements - (Platform Choice) • Operating System – Windows/Linux/MacOS • Application Server - Localhost • Front End - HTML, CSS, JavaScript • Scripts - JavaScript • Server-side Script – JavaScript/ Python3 • Database - My SQL 5.0/ NoSQL (MongoDB) • IDE – Visual Studio Code

3.5.3 Hardware Requirements -
• Processor – Any latest Intel/AMD/M1 • Speed - 1.1 GHz • RAM – 4GB+ • Hard Disk – 20GB+ • Camera – 720px/1080px (inbuilt/removable) • Key Board - Standard Windows Keyboard • Mouse - Two or Three Button Mouse • Monitor - SVGA

IV. SYSTEM DESIGN
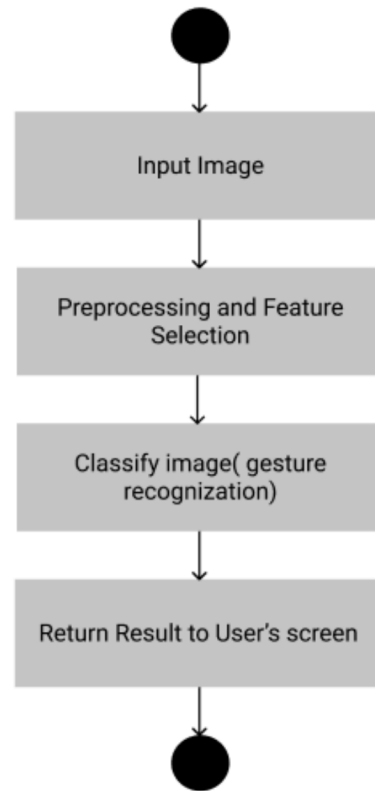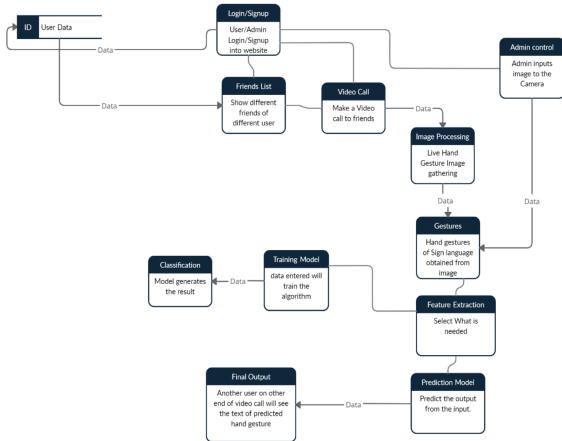
4.1 System Architecture
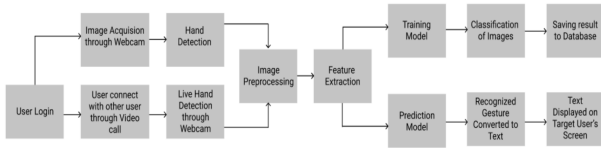
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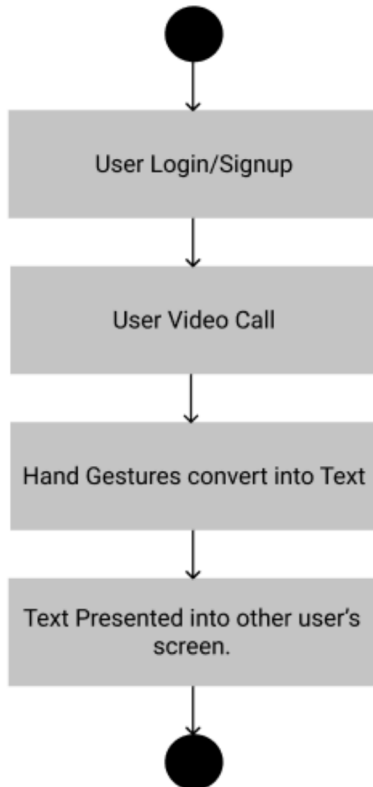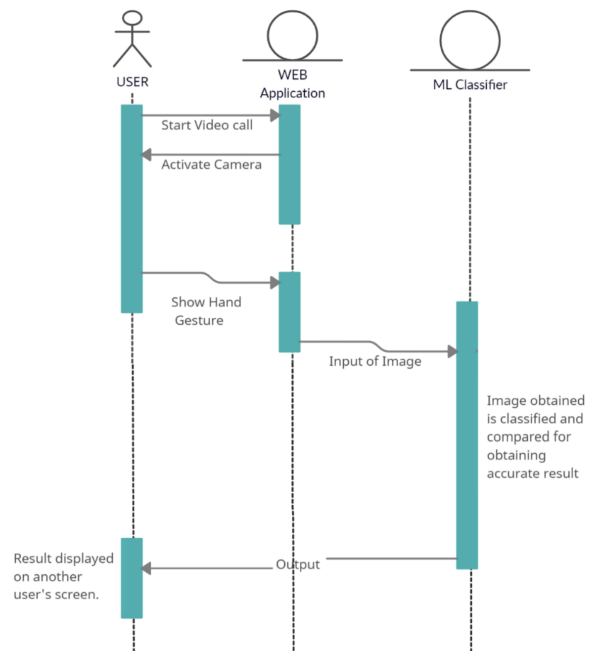

Fig. ML Activity Diagram

4.3.3 Activity Diagram:

4.3.5 Sequence Diagram:

Fig. User Activity Diagram

V. Other Specification

5.1 Advantages

5.1.1 Cost Cutting: Video conferencing helps in reducing the travel costs incurred by a company manifold. It allows the company to interact with its employees and clients, and share screens, files, HD audios and videos without any hassle.

5.1.2 Enhances Productivity: Video conferencing prevents back logging of work, as it allows the employees to discuss the problems with the concerned person without any delay. Easy availability of communication prevents communication gaps; thus, lessening the chances of pitfalls in the work.

5.1.3 No barrier of time: Video conferencing erases the barriers of time and place by allowing a group of people to discuss things with those working in distant locations without moving from their location. This allows a smooth workflow in the company without any breaks and hitches.

5.2 Disadvantages

5.2.1 Technical issues: The malfunction of any of the hardware or software components can hamper the smooth functioning of the work. To rectify the issue, skilled technical people are required. This may delay the work and add to the maintenance cost of the company.

5.2.2. Leads to misjudgments: A meeting or an interview via video conferencing can sometimes lead to wrong decisions and selections, as many a time it becomes difficult to access the gestures and personality of a person through this virtual medium.

5.2.3 Financial strain: Installing a video conferencing system can be a financial burden for a small-scale company, as it is a bit expensive technology and requires regular maintenance.

VI. Conclusion

In this project, we present an efficient application for Deaf-mute people. This application aims to help deaf and mute People by providing them with an attractive communication tool. This work introduces a Mobile application that enables the communication between Deaf-mute and normal people in our society. It also develops an aid tool for deaf and mute in many fields like fitness, Hospitals, education, and so on. Moreover, this application introduces an easy translator from sign language to English and vice versa over video calling.

VII. Future Scope

1. This application can also help users to convert simple language to Sign language.

2. This application can be implemented at public places such as schools, government offices in order to help special abled (deaf & mute) people so they could convey their message to others.

3. Due to the current pandemic it is very difficult for deaf & mute people to convey their message to others as we cannot physically meet, thus this application would help them for communication.

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