A Mini Project Report on

Indian Sign Language Recognition and Translator

T.E. - I.T Engineering

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Academic year: 2022-23

CERTIFICATE

This is to certify that the Mini Project report on Sign Language Recognition and Translator has been submitted by **Pooja Sharma (20104090)**, **Nainisha Sharma (20104042),** and **Disha Bendale (21204011)** who are a Bonafede students of A. P. Shah Institute of Technology, Thane, Mumbai, as a partial fulfilment of the requirement for the degree in **Information Technology**, during the academic year **2022-2023** in the satisfactory manner as per the curriculum laid down by University of Mumbai.

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ACKNOWLEDGEMENT

This project would not have come to fruition without the invaluable help of our guide **Prof. Sonal Balpande**. Expressing gratitude towards our HoD, **Dr. Kiran Deshpande**, and the Department of Information Technology for providing us with the opportunity as well as the support required to pursue this project. We would also like to thank our teacher Prof. Geetanjali Kalme who gave us her valuable suggestions and ideas when we were in need of them. We would also like to thank our peers for their helpful suggestions.

ABSTRACT

So many brilliant ideas can be used to help others that come from people who are deaf, mute, or unable to communicate. However, those thoughts go unnoticed because other people do not know how to communicate with these unique people. Through Sign language, deaf and mute people who are unable to communicate can have a conversation by using gestures, particularly hands, and arms. Sign language. Many people who don't know sign language require a means of communication with those who do. We created a system for Indian Sign language that can be used as a communication tool. The technology can recognize sign language and convert it into text for users. The VGG16 algorithm is used for recognizing sign language. Additionally, the system will accept text input from the user and translate it into sign language using the NLP algorithm. People who can or cannot understand sign language will find it simple to communicate with one another through this system.

TABLE OF CONTENTS

Chapter 1

Introduction

The deaf and hard-of-hearing minority in India uses a distinctive language known as Indian Sign Language or ISL. It is a gestural and visual language that expresses meaning through hand and body gestures, facial expressions, and body language. ISL is a visual language, as opposed to spoken languages, which rely on sound. ISL is the principal form of communication for the estimated 10 million deaf and hard-of-hearing individuals in India. ISL is a fascinating language with a rich history and culture. It is not only a means of communication, but also an important part of the deaf community's identity and culture. By learning about ISL, we can gain a deeper understanding of the experiences and perspectives of deaf and hard-of-hearing people in India, and work towards creating a more inclusive and accessible society for all.

Indian Sign Language Recognition and Translation System is a technology that uses artificial intelligence and computer vision to interpret and recognize user sign language gestures in real time. This system is designed to assist the deaf and hard-of-hearing community by translating sign language into text, thus enabling communication with non-sign language users. The Indian Sign Language Recognition System uses a combination of hardware and software components to capture and interpret sign language gestures. The hardware includes cameras or sensors that capture and convert the user’s movements into digital data. The software then analyzes this data and matches it with a database of sign language gestures to determine the meaning of the gesture. The system will also take text as input and translate it into sign language for the users.

1.1. Purpose:

1. Accessibility: The main purpose of both the Indian Sign Language recognition system and translator is to provide accessibility to individuals with disabilities. The systems allow people with visual or hearing impairments to access information and communicate with others.
2. Inclusion: By providing accessibility, these systems help promote inclusion and reduce the communication barriers faced by people with disabilities. It allows them to participate in social, educational, and professional activities, which in turn promotes equality.
3. Language and Culture Preservation: Both the Indian Sign Language recognition system and audio text conversion systems also help preserve and promote different languages and cultures. It enables the preservation of Indian Sign Language as a legitimate language and audio text conversion can help preserve other languages by converting written text to audio format.
4. Innovation: These systems represent a significant technological innovation, opening up new possibilities for people with disabilities in areas such as education, employment, and social inclusion.

1.2. Problem Statement:

One of the main challenges facing the Indian Sign Language community is a lack of awareness and understanding of sign language and the needs of the deaf and hard-of-hearing population. This lack of awareness can result in social and communication barriers that prevent the deaf community from fully participating in society.

Here are some specific problems related to Indian Sign Language awareness:

1. Limited education and training: There is a shortage of educational and training programs for sign language interpreters, teachers, and other professionals who work with the deaf community. This limits the availability of quality services and resources for the deaf community.
2. Stigma and discrimination: Due to a lack of awareness, a stigma is often associated with deafness and sign language. This can lead to discrimination and exclusion from social, educational, and professional opportunities.
3. Inaccessible information: Many government and private organizations do not provide accessible information in sign language, which can prevent the deaf community from accessing important services and resources.
4. Limited research and development: There are a lack of research and development in the field of sign language and deaf culture in India. This limits our understanding of the needs of the deaf community and can hinder the development of effective policies and programs.

1.3. Objectives:

The primary objective of our Indian Sign Language Recognition and Translator (ISLRT) is to enable effective communication and enhance accessibility for the deaf and hard-of-hearing community. By recognizing sign language gestures and translating them into text, ISLRT technology can help bridge the communication gap between the deaf community and non-sign language users.

The specific objectives of the Indian Sign Language Recognition and Translator System are:

1. To improve communication: ISLRT technology aims to improve communication between deaf and non-deaf individuals, making it easier for them to interact in a variety of settings such as schools, workplaces, healthcare facilities, and public spaces.
2. To enhance accessibility: By recognizing sign language gestures, ISLRT technology can enhance accessibility for the deaf community by making it easier for them to access information and services that are not currently available in sign language.
3. To promote inclusion: ISLRT technology can promote inclusion by reducing barriers and enabling deaf and hard-of-hearing individuals to fully participate in society.
4. To advance research and development: By developing and improving ISLRT technology, we can advance research and development in the field of sign language recognition and deaf culture, leading to more effective policies and programs for the deaf and hard-of-hearing community.

Overall, the objective of the Indian Sign Language Recognition and Translator System is to create a more inclusive and accessible society where everyone can communicate and participate on equal terms.

1.4. Scope:

1. To create a more appropriate prediction, and improve the dataset: The training dataset's quality and size significantly impact the ISLRT System's accuracy. We need to gather a bigger, more varied dataset that includes a wide range of signs and variations to increase the model's accuracy. This dataset should include gestures used in various regions and dialects of sign language and variations in sign environment, style, and speed. To ensure the model is trained on reliable data, the dataset should also be accurately and consistently labeled.
2. Train the model on more precise data to enhance prediction accuracy: When we have a more accurate dataset, we can train the Indian Sign Language Recognition System on it to boost the model's prediction accuracy. Enhance the model's capability to recognize sign language gestures accurately, may entail using cutting-edge machine learning algorithms and deep learning technique
3. To include more sign languages, such as American Sign Language and others: The ISLRT System can be expanded to include other sign languages as well as Indian Sign Language, such as American Sign Language and British Sign Language. To accomplish this, data from other sign language communities can be gathered and used to train the model to recognize various sign languages accurately.
4. To improve comprehension of more language in speech or text: While the primary objective of the ISLRT System is to identify sign language gestures, its integration with other language recognition technologies may be advantageous. For instance, the system can be taught to translate spoken or written language into sign language gestures and vice versa. Bridging the communication gap between the deaf and hearing communities can facilitate communication between them in a range of contexts.

   By incorporating these enhancements and improvements, we can make the Indian Sign Language Recognition System more accurate, comprehensive, and accessible to a wider range of users.

Chapter 2

Literature Review

Sr.no	Title	Author(s)	Year	Outcomes	Methodology	Result
1	Indian Sign Language to Speech Conversion Using Convolutional Neural Network	Shashidhar R, Surendra R Hegde, Chinmaya K, Ankit Priyesh, A S Manjunath and Arunakumari B. N.	2022	The proposed method aims to improve communication between deaf and dumb people and others by developing a deep learning-based application that can recognize Indian Sign Language (ISL) and translate it into text using Google's text-to-speech API. The custom Convolutional Neural Network achieved an accuracy of 99% in recognizing 4972 static hand signs for the 24 different English alphabets. The long-term goal of this initiative is to create an iOS or Android-based application that is more adaptable and can recognize more words and symbols in sign language.	Experimental	The proposed method achieved a high accuracy of 99% in recognizing 4972 static hand signs for the 24 different English alphabets in Indian Sign Language (ISL). By using Google's text-to-speech API, they successfully translated sign language into text, facilitating communication between signers and non-signers. The proposed method provides an affordable and reliable approach to recognizing and translating sign language, which can significantly improve the communication pathway for deaf and dumb people.
2	Speech-to-Sign Language Translation	Jashwanth Peguda, V Sai Sriharsha	2022	The proposed system aims to improve communication between deaf or	Experimental	The proposed system provides an accurate and efficient approach to

	for Indian Languages	Santosh, Y Vijayalata, Ashlin Deepa R N and Vaddi Mounish		mute people and others by converting speech to Indian sign language for six Indian regional languages. The system uses techniques such as Speech Recognition, Discrete Wavelet Transformation, MFCC, GMM, LSTM, and Direct Translation to accomplish the task. The proposed system provides an affordable and reliable approach to converting speech to sign language, which can significantly improve the communication pathway for deaf and mute people.		converting speech to Indian Sign Language for six Indian regional languages. The use of techniques such as Speech Recognition, Discrete Wavelet Transformation, MFCC, GMM, LSTM, and Direct Translation leads to better results. The proposed system can be useful in enhancing communication between deaf or mute people and others, improving their quality of life. The proposed system can also be expanded to recognize and translate more languages and dialects in the future.
3	Audio to Sign Language Translator Web Application	Anju Yadav, Rahul Saxena, Bhavna Saini, Vivek K Verma, and Vibhav Srivastava	2022	The proposed system aims to develop a web-based application for translating English text into Indian sign language. The system includes a parser element that converts incoming speech data or English text to a phrase structure grammar representation, which is then used by another module that	Experimental	The proposed system provides an efficient and reliable approach for translating English text into Indian sign language. The use of a parser element and Indian sign language grammatical format leads to better results. The system's video converter components and substitution and lexicon-based interfaces provide an accurate

				contains the Indian sign language grammatical format. The system has video converter components and substitution and lexicon-based interfaces that convert ISL sentences to video film representation. The proposed system is platform agnostic and more versatile to use, and it transforms phrases to sign language in real-time.		representation of ISL sentences in video film format. The proposed system is platform agnostic, making it more versatile and easier to use. It can be useful in enhancing communication between deaf or mute people and others, improving their quality of life. The proposed system can also be expanded to recognize and translate more languages and dialects in the future.

Chapter 3

Proposed System

The Indian Sign Language Recognition System (ISLRS) is a technology that uses computer vision and machine learning to interpret Indian Sign Language (ISL) gestures made by individuals who are deaf or hard of hearing. The system can recognize a variety of hand gestures, facial expressions, body movements, and other non-manual cues that are used in ISL.

Text to Indian Sign Language (TISL) is a technology that converts written language into Indian Sign Language. This is useful for individuals who have difficulty hearing or understanding spoken or written language. The converter uses text-to-sign language translation to transcribe spoken or written words into Indian Sign Language.

When these two technologies are combined, they can enable effective communication between individuals who use spoken or written language and those who use Indian Sign Language. This system could enable effective communication between individuals who use different modes of communication, helping to break down barriers and promote inclusivity.

3.1. Features and functionalities:

- Uses computer vision and machine learning to interpret Indian Sign Language (ISL) gestures.
- Recognizes a variety of hand gestures, facial expressions, body movements, and other non-manual cues used in ISL.
- Can recognize signs in real-time, with high accuracy, and in different lighting conditions and backgrounds.
- Scalable, making it useful for various applications, including educational and communication tools for the deaf and hard of hearing.
- Easy to use with a simple and intuitive user interface.
- Converts written language into Indian Sign Language (ISL) using machine learning and computer vision techniques.
- Helps individuals who have difficulty hearing or understanding spoken or written language.
- The user interface is simple and intuitive.

- Enable effective communication between individuals who use different modes of communication.
- Breaks down barriers and promote inclusivity. Can facilitate group communication with multiple ISL users and non-ISL users.

Chapter 4

Requirement Analysis

Feasibility Study:

Feasibility is an important consideration for Indian Sign Language Recognition Systems (ISLRS) and audio/text to Indian Sign Language (ISL) conversion systems as these technologies need to be practical, achievable, and economically viable. Feasibility studies need to be conducted to determine whether the technology is technically feasible, economically feasible, and operationally feasible. The technical feasibility can be assessed by evaluating the availability of hardware and software resources, and the ability to develop accurate and reliable algorithms. The economic feasibility can be assessed by evaluating the cost of development, deployment, and maintenance of the technology. Finally, the operational feasibility can be assessed by evaluating the acceptability and usability of the technology. By focusing on feasibility, we can ensure that the technology is practical and can be successfully implemented to improve the accessibility and effectiveness of communication for individuals who are deaf or hard of hearing.

Technical Feasibility:

- The technology required for ISLRS, such as computer vision and machine learning, is available and can be integrated into a system.
- The system can recognize a variety of ISL gestures, facial expressions, and body movements with high accuracy.
- The system can be designed to recognize signs in real time, making it suitable for real-world applications

Functional Requirement:

1. Gesture Recognition: The system should be able to recognize a wide range of hand gestures, facial expressions, and body movements that are used in Indian Sign Language (ISL).
2. Real-time Recognition: The system should be able to recognize signs in real-time to enable effective communication between ISL users and non-ISL users.
3. Multimodal Recognition: The system should be able to recognize non-manual cues, such as facial expressions and body movements, used in ISL to enhance the accuracy of recognition.
4. Training and Adaptation: The system should be able to learn and adapt to the signing style of different users to improve accuracy over time.
5. Integration: The system should be able to integrate with other software and hardware, such as text-to-speech and speech-to-text conversion systems, to facilitate communication between different modes of communication.
6. Accuracy and Reliability: The system should be accurate and reliable, with a high level of confidence in recognition results.

Non-Functional Requirement:

1. Accessibility: This requirement involves ensuring that the system is accessible to a wide range of users, including those with visual and hearing impairments. The system should be designed with features such as adjustable font sizes, high-contrast displays, and support for alternative input devices to accommodate users with different needs.
2. Usability: This requirement involves making the system easy to use, with a simple and intuitive user interface that does not require extensive training. The system should be designed with clear and consistent navigation, well-organized content, and contextual help features to guide users through the interface.
3. Reliability: This requirement involves ensuring that the system is reliable and robust, with a high level of accuracy in recognizing signs and non-manual cues. The system should be designed with a strong recognition engine that can handle a variety of gestures and movements, and it should be able to detect and correct errors in real time.

4. Performance: This requirement involves ensuring that the system has high performance, with low latency and minimal errors, to ensure smooth and efficient communication. The system should be optimized for fast recognition and response times, and it should be able to handle Compatibility: This requirement involves ensuring that the system is compatible with various hardware and software platforms to ensure interoperability with other systems. The system should be designed with standard communication protocols that allow it to integrate with other systems seamlessly.
5. User Feedback: This requirement involves ensuring that the system has a mechanism for users to provide feedback, suggestions, and complaints to improve the user experience. The system should be designed with user feedback mechanisms, such as surveys and feedback forms, that allow users to provide feedback on their experience with the system.
6. Scalability: This requirement involves ensuring that the system is scalable and able to handle a large number of users and recognition requests. The system should be designed with a distributed architecture that can handle increased traffic and load-balancing mechanisms that ensure optimal performance.

Usability:

Usability is a critical consideration for Indian Sign Language Recognition Systems (ISLRS) and audio/text-to-Indian Sign Language (ISL) conversion systems. The user interface for both systems should be intuitive, user-friendly, and easy to navigate. ISLRS should provide real-time feedback to users on the accuracy of the signs being performed, and support a variety of input options to accommodate the preferences of different users. Similarly, the audio/text-to-ISL conversion system should support a range of input options and provide accurate and clear output. Designers should focus on making the systems as user-friendly as possible to improve the user experience and the effectiveness of communication.

Scalability:

Scalability is an important consideration for Indian Sign Language Recognition Systems (ISLRS) and audio/text to Indian Sign Language (ISL) conversion systems as these technologies need to be able to accommodate large volumes of users and data. The systems should be designed to scale easily to accommodate additional users and data without affecting performance. This can be achieved through the use of cloud-based architecture and distributed computing systems, which allow the systems to handle large volumes of data and users. Additionally, the systems should be designed to work with a range of hardware and software configurations to ensure that they can be easily integrated into existing technology infrastructures. By focusing on scalability, we can ensure that the systems can support future growth and expansion.

Chapter 5

Project Design

5.1. Use Case Diagram

Fig. 5.1.1. Use Case Diagram for ISLRT

- Real-time sign language can be recognized by the user using the sign language recognition feature.
- With the aid of this system, the user can also translate text into Indian sign language.
- The user can also give his/her feedback to the system using the feedback feature
- The system can be enhanced by the developer by adding more datasets for more precise results.
- The developer will receive the user's feedback, which can help him or her improve the system.

5.2. DFD (Data Flow Diagram)

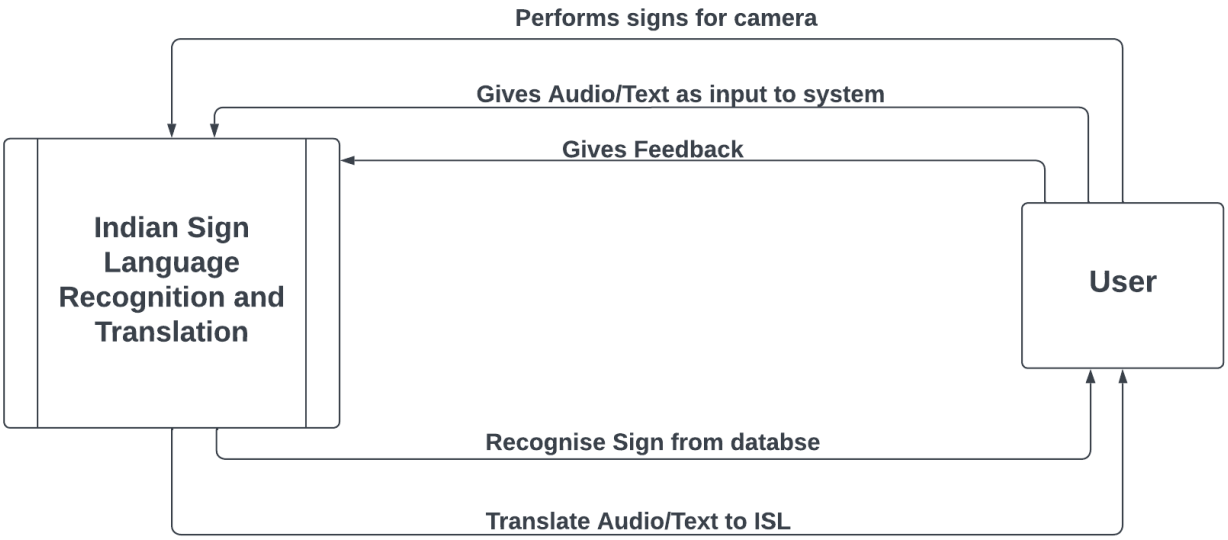


Fig. 5.2.1. DFD Level 0

- The user can use the system's sign-language recognition feature by making signs in front of the camera as input for the system.
- The user can also use the system's sign-language translator feature by giving text to the system as input.
- The user will also be giving feedback regarding the system.
- The ISLRT system recognizes the user's sign and returns the output to the user.
- The ISLRT system converts the text provided by the user into sign language and returns it to the user as output.

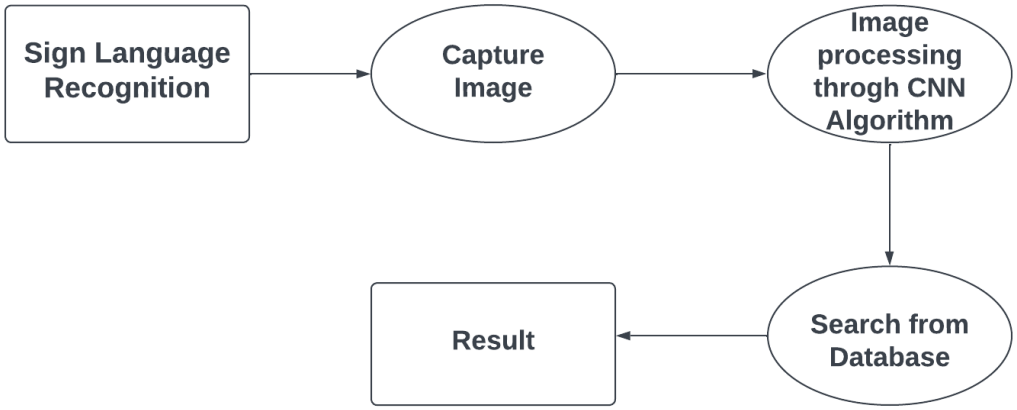
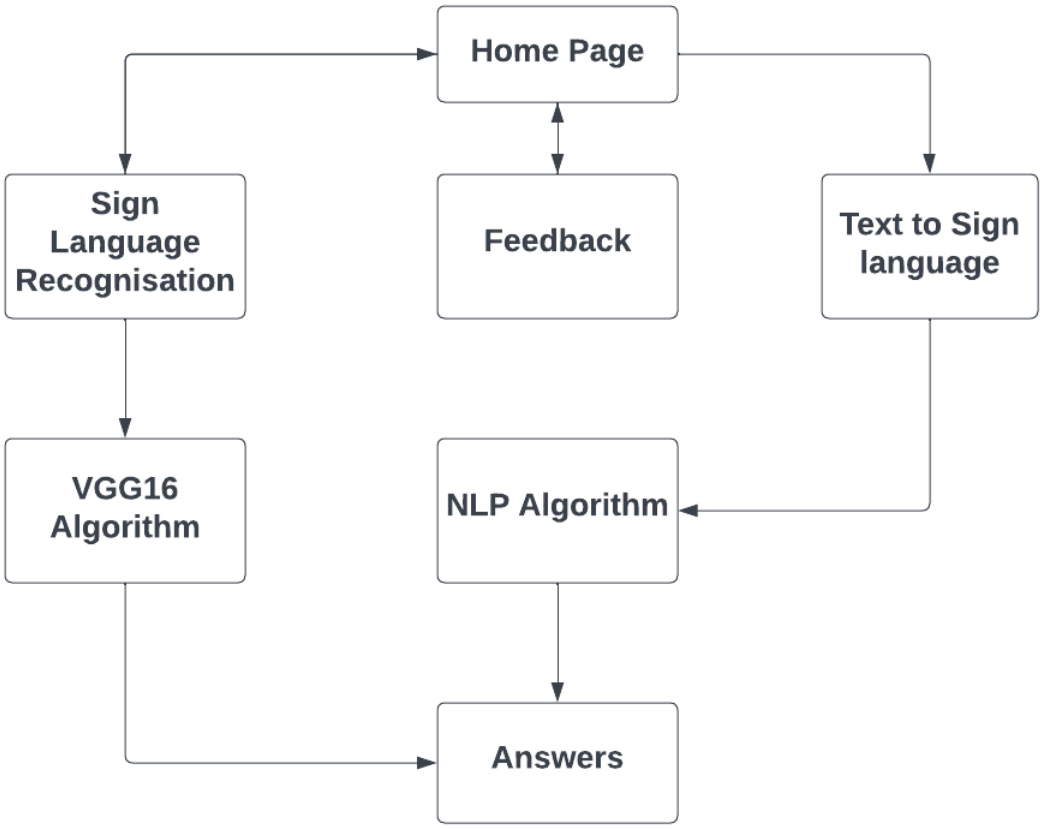


Fig. 5.2.2. DFD Level 1

- The user gains access to sign language recognition by selecting the appropriate system feature.
- The user will demonstrate the sign language in front of the camera that he or she wishes to learn about.
- After capturing the image, it is processed using the CNN algorithm, which includes convolution, maximum pooling, flattening, and full connection.
- When the system recognizes the sign, the result is displayed on the user's screen.

5. 3. System Architecture



5.3.1. Flow Diagram for ISLRT

- When the user accesses the system then they are taken to the home page first.
- The user can go to the sign language recognition page from the home page and perform signs for the camera.
- The camera captures the user's image and uses the VGG16 algorithm to recognize the sign language that the user is performing and return the result to the user.
- If the user wants to know how the words are pronounced in sign language, they can go to the text translation page.
- The user gives the text as the input to the system which is later converted into sign language through the NLP algorithm and the user receives the result.
- The user can also provide feedback to help improve the website.

Chapter 6

Technical Specification

Front End: HTML, CSS, JavaScript.

Back End: Python.

Algorithm: CNN, NLP.

Front End:

HTML:

The Hypertext Markup Language or HTML is the standard markup language for documents designed to be displayed in a web browser. It can be assisted by technologies such as Cascading Style Sheets (CSS) and scripting languages such as JavaScript.

Web browsers receive HTML documents from a web server or local storage and render the documents into multimedia web pages. HTML describes the structure of a web page semantically and originally included cues for the appearance of the document.

HTML elements are the building blocks of HTML pages. With HTML constructs, images and other objects such as interactive forms may be embedded into the rendered page. HTML provides a means to create structured documents by denoting structural semantics for text such as headings, paragraphs, lists, links, quotes, and other items.

In our Project, we have used HTML as our main language for creating a website. Designing the pages are done by using HTML.

CSS:

Cascading Style Sheets (CSS) is a style sheet language used for describing the presentation of a document written in a markup language such as HTML or XML. CSS is a cornerstone technology of the World Wide Web, alongside HTML and JavaScript.

CSS is designed to enable the separation of presentation and content, including layout, colors, and fonts. This separation can improve content accessibility; provide more flexibility and control in the specification of presentation characteristics; enable multiple web pages to share formatting by specifying the relevant CSS in a separate .css file, which reduces complexity and repetition in

the structural content; and enable the .css file to be cached to improve the page load speed between the pages that share the file and its formatting.

In our project, we used CSS to style all the pages and link the CSS file to the respective HTML file.

JavaScript:

JavaScript (JS) is a lightweight object-oriented programming language that is used by several websites for scripting webpages. It is an interpreted, full-fledged programming language that enables dynamic interactivity on websites when applied to an HTML document. It was introduced in the year 1995 for adding programs to the webpages in the Netscape Navigator browser. Since then, it has been adopted by all other graphical web browsers. With JavaScript, users can build modern web applications to interact directly without reloading the page every time.

Although, JavaScript has no connectivity with Java programming language. The name was suggested and provided the times when Java was gaining popularity in the market. In addition to web browsers, databases such as CouchDB and MongoDB uses JavaScript as their scripting and query language.

In our project, we used JavaScript to make the pages more responsive and interactive.

<u>Back End:</u>

Python:

Python is a high-level, general-purpose, and very popular programming language. Python programming language (latest Python 3) is being used in web development, Machine Learning applications, along with all cutting-edge technology in Software Industry. Python is currently the most widely used multi-purpose, high-level programming language. Python language is being used by almost all tech-giant companies like – Google, Amazon, Facebook, Instagram, Dropbox, Uber… etc.

The biggest strength of Python is its huge collection of standard libraries which can be used for the following:

- Machine Learning
- Web frameworks like Django (used by YouTube, Instagram, and Dropbox)

- Image processing (like OpenCV, Pillow)
- Text processing and many more.
- Test frameworks

In our project, we have used Python because of its availability in libraries of artificial intelligence and machine learning. The reorganization and translator system are made by using Python libraries.

Algorithm:

VGG16:

The VGG16 algorithm is a convolutional neural network architecture developed by the Visual Geometry Group at the University of Oxford in 2014 for image classification tasks. The model consists of 16 convolutional layers, followed by 3 fully connected layers, with a fixed kernel size of 3x3 and a stride of 1 pixel. Max-pooling layers are included between each pair of convolutional layers to reduce the spatial dimensions of the feature maps and create translational invariance. The model is trained using backpropagation with SGD and cross-entropy loss.

The VGG16 model achieved state-of-the-art performance on several benchmarks and is widely used for image classification tasks. The pre-trained weights of the network can be used as a starting point for fine-tuning the model on a new dataset, which can improve performance and speed up the training process.

Natural language processing (NLP):

Natural language processing (NLP) is a subfield of Artificial Intelligence (AI). This technology works on the speech provided by the user, breaks it down for proper understanding, and processes accordingly. This is a very recent and effective approach due to which it has a high demand in today's market. Natural Language Processing is an upcoming field where already many transitions such as compatibility with smart devices, and interactive talks with a human have been made possible.

In the last decade, a significant change in NLP research has resulted in the widespread use of statistical approaches such as machine learning and data mining on a massive scale. Natural

Language Processing (NLP) is a field that combines computer science, linguistics, and machine learning to study how computers and humans communicate in natural language. The goal of NLP is for computers to be able to interpret and generate human language. This not only improves the efficiency of work done by humans but also helps in interacting with the machine. NLP bridges the gap of interaction between humans and electronic devices.

Chapter 7

Project Scheduling

Sr. No	Group Member	Time duration	Work to be done
1	Pooja Sharma, Nainisha Sharma, Disha Bendale	1st week of January	Implementing 1st module/ functionality Group Formation and topic selection GUI Design of Sign Language Recognition and Translator
		2nd week of January	Testing 1st module GUI Design of Sign Language Recognition and Translator
2	Pooja Sharma, Nainisha Sharma, Disha Bendale	3rd week of January	Implementing 2nd module/ functionality Sign Language Recognition using the VGG16 algorithm and its GUI
3	Pooja Sharma, Nainisha Sharma, Disha Bendale	By the end of March month	Implementing 3rd module/ functionality Text to Sign Language using the NLP algorithm and its GUI

Chapter 8

Implementation

Sign Language Recognition:

1. First, the dataset for training and testing the model is collected. This dataset consists of images of different hand gestures representing letters or words in ISL.
2. Next, the VGG16 model is imported and initialized in Python using the Keras library. This model is pre-trained on the ImageNet dataset, which includes millions of images.
3. After initializing the VGG16 model, the dataset is pre-processed by resizing the images to a fixed size and normalizing the pixel values.
4. Then, the dataset is split into training and testing sets. The training set is used to train the VGG16 model on the ISL images, while the testing set is used to evaluate the performance of the model.
5. The VGG16 model is then trained using the training set of ISL images. The model is trained using a process called backpropagation, which adjusts the weights of the model based on the errors made during training.
6. Once the VGG16 model is trained, it is used to predict the ISL gestures from the testing set of images. The accuracy of the model is evaluated by comparing the predicted labels to the actual labels of the testing set.
7. Finally, the trained VGG16 model can be used to recognize ISL gestures in real-time using a webcam or other input devices. The model takes in the input images and predicts the corresponding ISL gesture in real time. In summary, the implementation of the project that uses VGG16 for recognizing ISL through Python and its libraries involves data collection, pre-processing, model initialization and training, evaluation, and real-time recognition.

Text To Sign Language:

1. Data Collection: We first collected images containing the gesture regarding the sign and named the image accordingly.
2. GUI: Using Tkinter we then created a window that contains a text field and a button that will help the user translate the text into sign language.
3. NLP: The entered text will then be processed through NLP
4. Fetch: The processed text will then read and then find the image name similar to the input text.
5. Display: The most similar image will then be displayed to the user as the output.

Chapter 9

Result and Discussion

1. Home Page GUI

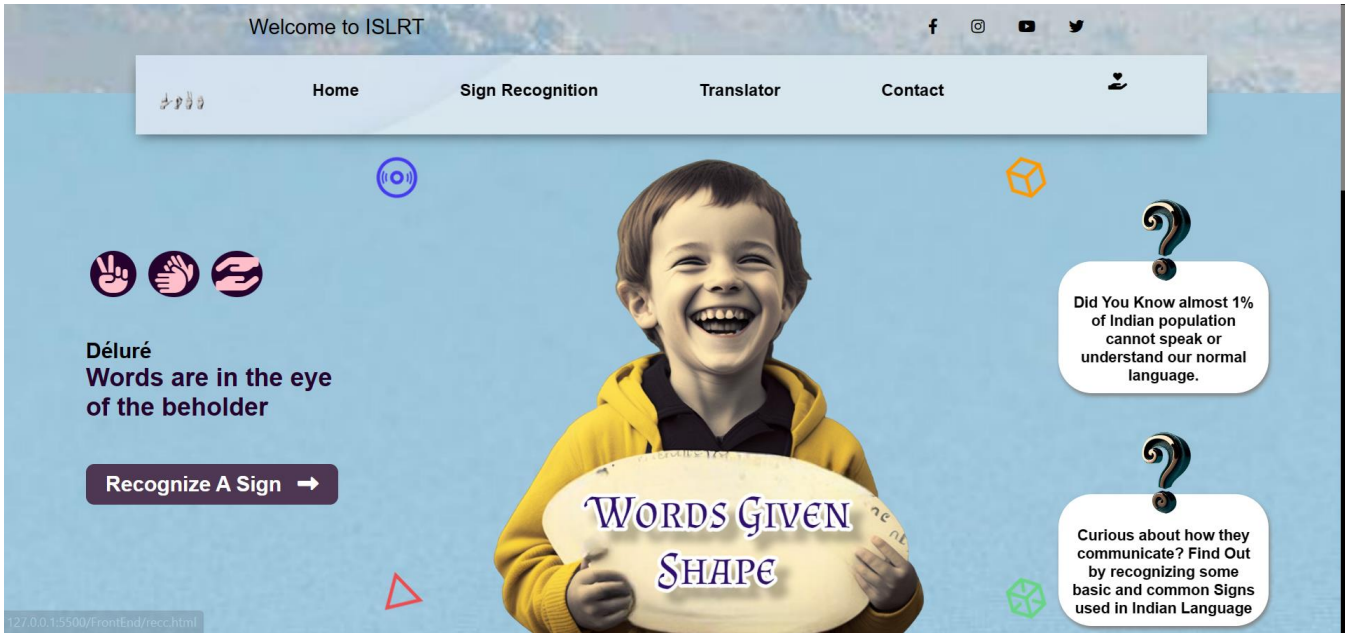


Fig 9.1 Home Page GUI

2. Recognizing the number

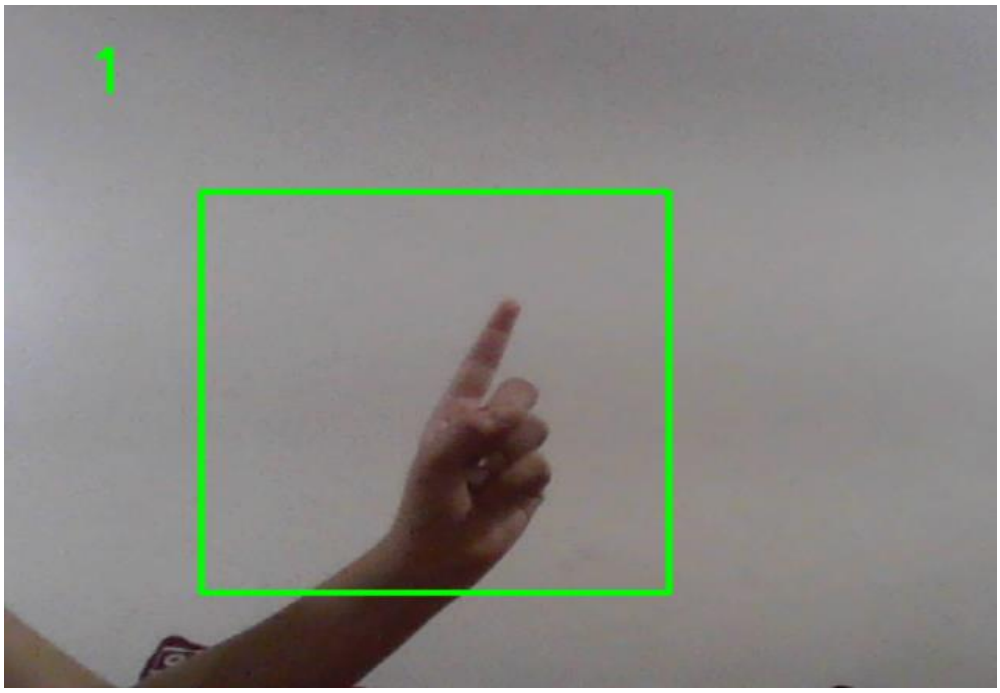


Fig 9.2 Recognizing number

3. Recognizing the alphabet

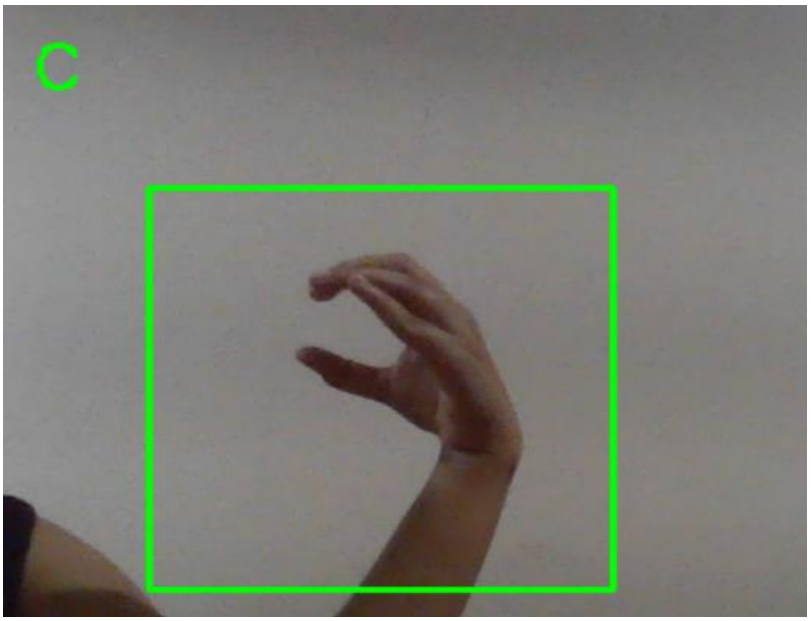


Fig 9.3 Recognizing alphabet

4. Translate text into Indian Sign Language

Fig 9.4 Translating text into ISL

Chapter 10

10.1 Conclusion

To sum up, the project to convert text into Indian Sign Language (ISL) using NLP and Python libraries is a promising solution to bridge the communication gap between people who are deaf or mute and those who are not. The project involves several key components, including data collection, text preprocessing, feature extraction, model training, ISL gesture conversion, visualization, and deployment.

By leveraging NLP and machine learning techniques, the project can accurately predict the ISL gestures corresponding to a given text input. This can help deaf or mute people to communicate more effectively with non-signers, thereby improving their quality of life and social interactions.

However, the project is not without its challenges. One of the main challenges is the lack of a standardized ISL gesture dictionary, which can lead to inconsistencies in the predicted gestures across different regions or dialects. Additionally, the accuracy of the model may be affected by the quality and quantity of the training data.

Altogether, the project shows great potential and can be further improved and expanded upon in the future with more data, advanced algorithms, and better visualization techniques. It is a positive step towards creating a more inclusive and accessible society for all, regardless of their abilities.

Future Scope

The future scope of the project includes several potential avenues for improvement and expansion. Firstly, the system can be further enhanced by incorporating more advanced algorithms for better accuracy and robustness. Additionally, the system can be expanded to cover a wider range of sign languages and dialects.

Furthermore, the project can be transformed into an online free course to educate individuals on sign language recognition and translation. This course can include theoretical and practical components, including explanations of NLP and computer vision techniques, hands-on exercises, and interactive sessions with experts in the field.

Moreover, the project can be integrated with mobile applications to enable easy access and usage by a wider audience. This can further enhance communication and inclusivity in society, particularly in areas with limited resources and infrastructure.

Overall, the future scope of the project is vast and offers numerous possibilities for advancement, education, and societal impact.

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