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BRAILLE LANGUAGE TRANSLATOR USING MACHINE LEARNING

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ABSTRACT

The primary objective of this project is to create a web platform that can seamlessly translate Braille language from images into text, subsequently rendering it into audible form using text to-speech technology. Additionally, the website offers a text translation functionality, making content accessible to a global audience by breaking down language barriers. The motivation behind this project stems from the limited availability of comprehensive and user-friendly tools for visually impaired individuals to access information, particularly when it is presented in non-textual formats. The project leverages machine learning algorithms to recognize and translate Braille text from images, opening a pathway for users to explore digital content that was previously inaccessible. By integrating text-to-speech and text translation features, this project not only empowers the visually impaired community but also enhances the overall inclusivity of digital information for all users.

Keywords: Braille Language, Machine Learning Algorithm, Text Translation, Text To Speech Technology, Visually Impaired, User Friendly Tool, Technology Evolution.

I. INTRODUCTION

The World Wide Web has transformed the way we access and share information, making it an essential part of our daily lives. However, for individuals with visual impairments, accessing online content can be a significant challenge. Braille, a tactile writing system, is a vital tool for the visually impaired to read and write, but it remains underutilized in the digital realm. This project aims to bridge the accessibility gap by introducing a website that serves as a Braille Language Image Translator into Text using advanced Machine Learning algorithms, coupled with text-to-speech and text translation functionalities. People with visual impairments face significant challenges when it comes to accessing and understanding information in a world primarily designed for sighted individuals. Braille is a tactile writing system that has long been used to facilitate reading and writing for the blind. However, the availability and accessibility of Braille materials and tools are limited, making it difficult for visually impaired individuals to access a wide range of content. The system retrieves the document and matches it to the original document. The system also helps detect forged or forged documents in use. This system helps reduce the use of fake documents. In order to reduce the time spent on manual verification and prevent fraud, we are also developing a state-of-the-art system that not only speeds up the verification process but also detects forged and forged documents. Use the electronic signature verification function to authenticate the electronic signature of submitted documents.

II. METHODOLOGY

The research problem that motivated the conduction of this study was to highlight the usability issues faced by visually impaired people while using the latest technologies for Braille writing. ,is study also highlights a deeper understanding of which methods are in use for converting Braille into natural languages to enhance the scope of work performed in Braille language the complex process.

This Braille character recognition scheme is composed of two main stages. In the first stage, image alignment & enhancement is performed using a series of image preprocessing techniques and then in next stage, characters' recognition is performed with proposed convolution neural network. The flow diagram of Braille character recognition.

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III. MODELING AND ANALYSIS

1. System Architecture

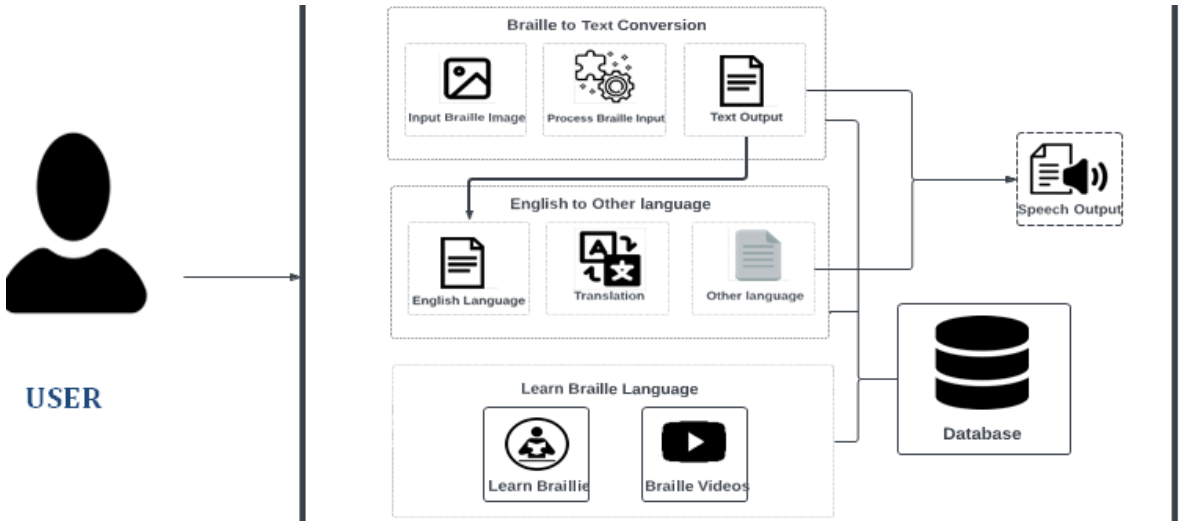

Figure 1: System Architecture

The system features a robust and modular architecture designed to facilitate the seamless conversion of Braille to English text, language translation, text-to-speech synthesis, and access to Braille learning resources. The system's architectural design encompasses several key modules, each tailored to specific functions, and is underpinned by a robust database for data storage and retrieval

2. DFD Level 0:

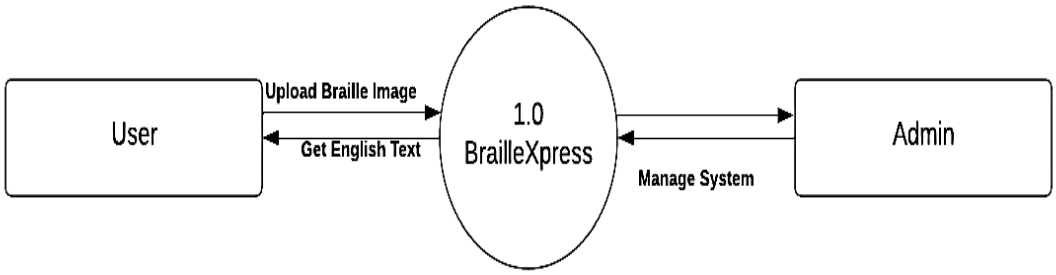

Figure 2: DFD Level 0

At Level 0 of the Data Flow Diagram (DFD) for we provide an overarching view of the system without delving into the specifics of its internal workings. In this high-level representation, the system's key components are depicted as black boxes, simplifying their complexity. The primary entities include the "User," System," and the "Database."

The "User" initiates interactions with the system, such as uploading Braille images requesting translations, accessing learning resources, and more. The “System" serves as the central hub that processes these requests and interactions, coordinating the data flow. The "Database" is responsible for storing and retrieving data, maintaining a record of user interactions and converted content. While Level 0 provides a bird's-eye view of the system, it sets the stage for further elaboration in the Level 1 DFD.

3. DFD Level 1:

Users Moving to Level 1 of the DFD, we delve into the subsystems and processes within the system with greater detail. Each black box from Level 0 is expanded into more specific components, representing the subsystems and processes that make up the system. For instance, the system is dissected into distinct modules, including "Braille to Text Conversion," "Translation," "Text to Speech," and "Learning Resources." Each module has its interactions and interfaces. The "User" remains the primary external entity, engaging with these modules. The "Database" continues to be the central repository for data storage and retrieval. Level 1 DFD provides a more comprehensive view of the system's functional components, allowing for a deeper understanding of how user requests are processed and data is managed within the system.

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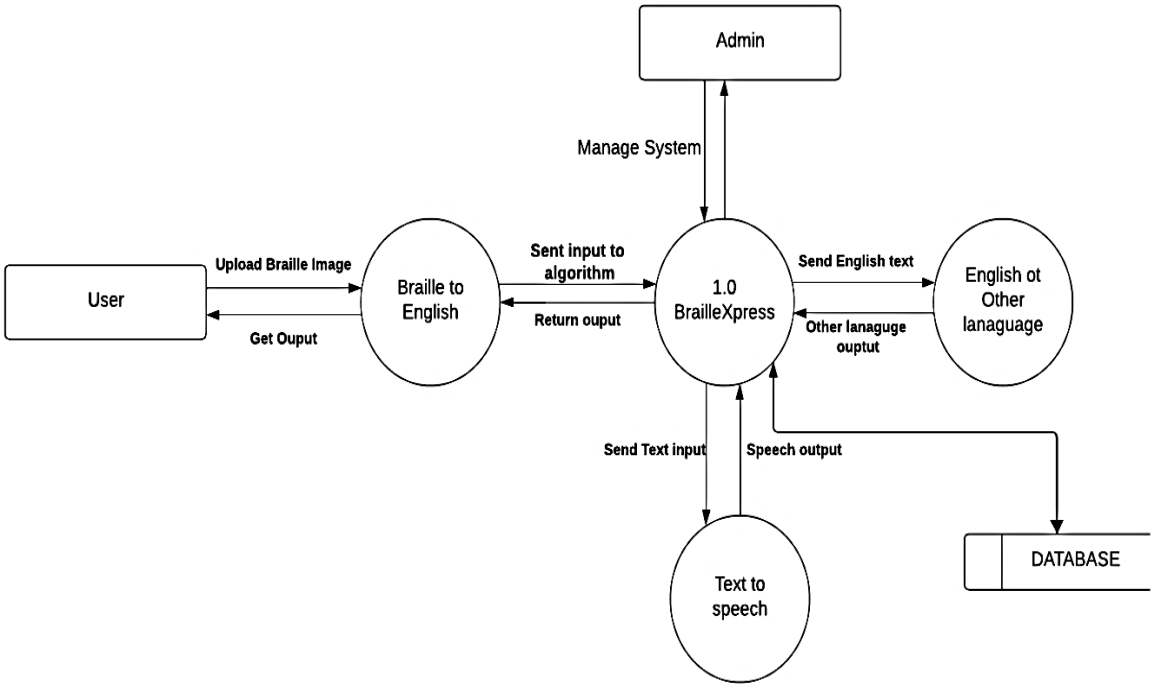

Figure 3: DFD Level 1

IV. CONCLUSION

Project will successfully develop a system that converts Braille language images into English text, aiming to improve accessibility for visually impaired individuals. Through a combination of algorithms and techniques, our system will accurately recognize and convert Braille text, making it available through various output methods. While our project has its advantages, including enhanced accessibility, it is important to address limitations like accuracy and speed in future iterations.

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