VISVESVARAYA TECHNOLOGICAL UNIVERSITY,

BELAGAVI

Internship Report

on

"CONVERSION OF ENGLISH AUDIO TO ENGLISH BRAILLE"

A report submitted in partial fulfillment of the requirements for the award a degree of

BACHELOR OF ENGINEERING

in

COMPUTER SCIENCE AND ENGINEERING

Submitted by

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DEPARTMENT OF COMPUTER SCIENCE & ENGINEERING

ALVA'S INSTITUTE OF ENGINEERING AND TECHNOLOGY

MOODBIDRI-574225, KARNATAKA

2023 – 2024

ALVA'S INSTITUTE OF ENGINEERING AND TECHNOLOGY

MOODBIDRI-574225, KARNATAKA

DEPARTMENT OF COMPUTER SCIENCE & ENGINEERING

CERTIFICATE

This is to certify that the Internship report on "CONVERSION OF ENGLISH AUDIO TO ENGLISH BRAILLE" submitted by C SHWETHA (4AL20CS032) is work done by him and submitted during the academic year 2023–24, in partial fulfilment of the requirements for the award of the degree of BACHELOR OF ENGINEERING in COMPUTER SCIENCE AND ENGINEERING

BP. 7/5/24

Internship Mentor
Department of CSE

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Internship Coordinator
Department of CSE

Head of the Department
Department of CSE

Examiners

Name	Signature
1)	
2)	

Acknowledgement

First I would like to thank **QSpiders** for giving me the opportunity to do an internship within the organization.

I also would like all the people that worked along with me in **QSpiders** with their patience and openness they created an enjoyable working environment.

It is indeed with a great sense of pleasure and immense sense of gratitude that I acknowledge the help of these individuals.

I am highly indebted to Managing Trustee **Mr. Vivek Alva** and Principal **Dr. Peter Fernandes, Alva' Institute of Engineering and Technology, Mijar** for the facilities provided to accomplish this internship.

I would like to thank my Head of the Department **Dr. Manjunath Kotari, Professor, Department of Computer Science and Engineering** for his constructive criticism throughout my internship.

I would like to thank my internship Coordinator **Dr. Madhusudhan S, Associate Professor, Department of Computer Science and Engineering** for his guidance throughout my internship.

I am extremely grateful to my department staff members and friends who helped me in successful completion of this internship.

C SHWETHA

4AL20CS032

INTERNSHIP CERTIFICATE

ABSTRACT

QSpiders is a best-in-class learning solutions organization headquartered in India's IT capital, Bangalore. It offers a wide range of courses in the area of software testing and are official partners of the ISTQB. A "finishing school" in many ways, the institute provides young job aspirants the perfect launch-pad to build a rewarding career in the growing IT sector. From its humble beginnings, QSpiders has exponentially grown to be the world's largest software testing training organization spread across countries. At QSpiders, It ensure training is imparted by specialists with proven subject matter expertise and who have spent over a decade in their area of specialization. Its faculty are highly competent, skilled and dedicated to giving their best towards the professional development of students.Besides training, It also provide placement assistance to our students and most of the big corporates in the corporate world hire our trained talent. It is indeed our pleasure to have placed over thousands of job-seekers in various IT firms across India over the years with an aim to place thousands more! Building competency into over 5000 students a month, QSpiders is where talent meets opportunity andwe believe your search for the dream job or the dream professional ends here.

DAILY LOGS

DAY	DATE	TOPICS COVERED
Day 1-Day10	15/11/2022 – 25/11/2022	Core Python
Day 11-Day 16	01/09/2023 – 05/09/2023	Advanced python concept
Day 17-Day 20	06/09/2023 – 09/09/2023	HTML, CSS, JavaScript
Day 21-Day 25	10/09/2023 – 15/09/2023	Data Structure and Algorithm
Day 26- Day 32	08/10/2023 – 14/10/2023	Artificial Intelligence and Machine Learning
Day 33-Day 45	15/10/2023 – 28/10/2023	MySQL

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INTERNSHIP OBJECTIVES

The main objective of this internship is to lean both backend and fronted technologies so that workers can work in any field of software development. To maximize the quality of work in the field of software development. It has been provided to impart practical problem-solving skills which in turn will enhance prospects of career growth. It has provided hands-on Experience which aim to gain practical, real-world experience in software development, testing, or related areas. They get the opportunity to work on actual projects and tasks, applying the knowledge they've gained in academic settings to real-world scenarios. Internships provide opportunities for interns to develop and enhance their technical skills, such as programming languages, software development methodologies, version control systems, etc. They may also improve their soft skills like communication, teamwork, problem-solving, and time management.

CHAPTER 1

INTRODUCTION

QSpiders is the world's ace software training organization with an aim to bridge the gap between the demands of the industry and the curriculum of educational institutions. With centers across the Globe, the institute is a platform where young minds are given the opportunity to build successful careers. The company vision is to build an employee fit for agileworkspace and provides more software related course which will help us to enlighteningour carrier. The company is mainly focusing on Software Development, Software Testing, CoreJava and Selenium, API Testing, Java Full Stack Development etc. The company will providethe sufficient training which will be helpful to crack the interview offered by other companies.It also provides placement opportunities for both graduates as well as students in different MNC's. QSpiders, JSpiders and PySpiders hold the record of supplying the highest number ofindustry-ready technical resources. They can supply over 3500 technical resources at any timeto meet the industry's demand.

Fig-1.1 Logo of QSpiders

CONTACT DETAILS:

Websites: https://www.qspiders.com/

Headquarters:

Bangalore

Year Founded:

2003

Company Type:

QSpiders is a private company based in Bangalore, India that provides training and placement services in software testing and other related fields. The company has several branches across India and offers courses in manual testing, automation testing, mobile testing, and more.

QSpiders has gained a reputation for providing quality training and has placed many of its students in top IT companies in India. The company has a team of experienced trainers who provide hands-on training to the students and help them build their skills in software testing.

While QSpiders has received positive reviews from many of its students and clients, it's important to note that individual experiences may vary. It's always a good idea to do your own research and read reviews before choosing a training provider.

Address:

01, Hayavadana Rao Rd, Basappa Layout, Gavipuram Extention, Kempegowda Nagar, Bengaluru, Karnataka 560019
Email - enquiry@qspiders.com
Phone - 8951965854

CHAPTER 2

PROJECT DETAILS

2.1 PROJECT AREA/DOMAIN:

The goal of this internship is to develop a project named conversion of English audio to Kannada braille using Python, HTML, CSS and JavaScript.

2.2 PROBLEM STATEMENT:

The problem statement for this project is to focus on building Automatic Speech Recognition (ASR) system by recognise the audio file given by the user as the input and converted the audio file into English text. The English text is further processed to produce the Braille script patterns which aims to enable visually impaired individuals.

2.3 PROPOSED IDEA:

The Automatic Speech Recognition with conversion to Braille(ASR) is a web based application that canbe accessed over the web. This system can be used to help the blind people to understand, coney and pass the information easily with other blind people.

ASR is a web-based application which enables machines to recognize and transcribe spoken language into text and convert the text to Kannada Braille.

The implementation of Automatic speech recognition with conversion to Braille Script involves running the code in PyCharm or visual studio code. The main focus of this project is to address the challenges faced by the blind community people, particularly in the area of writing and understanding it.

In our project, the audio file of mp3 or WAV format is given as the input. Firstly the language is chosen by the user and then audio file is converted or translated to corresponding language as text.

These text is processed again to produce the Braille Script of the given or chosen language by mapping the specialized font family of Braille script known as SimBraille or ArialFont.

After mapping the text with Braille Neue for the chosen language the braille text is displayed and the user can now download the Braille script as the image.

CHAPTER 3

METHODOLOGY

The methodology involves conversion of audio file into text and further the text is converted into corresponding Braille Script.

Firstly, the audio is pre-recorded by the user and is given as the input to the program either in mp3 format or WAV format. The program will convert the given audio file into WAV format if the audio file is in mp3 format.

Secondly, by using the pre-trained datasets from the facebook, the audio file which is given as the input by the user is tokenized and converted to English text.

English text is mapped to Braille Script. Usually English fonts are generally understood by the system directly without any need of external files to display the text, but in order to display the braille text which is not possible for system to generate the text without any external files in which it requires a specific true type font file for the corresponding Braille text to be displayed by the system. Thereby an external true type font file named SimBraille.ttf file which was developed by Google has been feeded into the program or implemented in the program.

For reading, writing, and communicating, people with vision impairments utilize Braille language. Visually challenged persons use their fingers to identify the six dots organized in two column cells and three rows that make up the fundamental framework of the Braille language. But learning the dot pattern that makes up the Braille letters is not easy. This study offers a revolutionary method for automatically recognizing Braille letters. The planned method operates in two primary phases. Several image preprocessing techniques are used in the initial step to accomplish image alignment and enhancement. In the second step, a lightweight convolution neural network is suggested to do character recognition.

Particularly when it comes to publicly accessible tools and modules, Python usage in data science has increased to previously unheard-of heights.

Importing Libraries

- **Flask:**

  Flask is a web framework for Python. It simplifies the process of building web applications by providing tools and utilities to handle tasks like routing, request handling, and templating. It includes a development server for testing and debugging, and it supports extensions for additional functionality.

- **Render_template:**

  render_template is a function provided by Flask for rendering HTML templates. It allows you to use HTML files with placeholders for dynamic content, which can be filled in by the Flask application.

- **Request:**

  request is an object provided by Flask that contains information about the current HTTP request sent by the client. It allows you to access data such as form input, query parameters, and more.

- **Send_file:**

  send_file is a function in Flask used to send files to the client as a response. It allows you to serve files dynamically, such as images, PDFs, or any other type of file.

- **Librosa:**

  Librosa is a Python library for analyzing and processing audio and music signals. It provides a broad selection of tools and functions for tasks such as loading audio files, extracting features from audio signals, and performing various audio analysis operations.

- **PyTorch:**

  The torch library, short for PyTorch, is a powerful open-source machine learning library for Python. It is generally applied for the applications of deep learning and research. PyTorch provides a flexible and dynamic computational graph, making it particularly popular in the deep learning community.

- **Soundfile:**

  The soundfile library in Python is a library for reading and writing sound files. It gives a simple interface to interact with audio files, allowing users to load, manipulate, and save audio data.

- **Pydub:**

  The pydub library is a Python library for audio processing. It offers a simple and high-level interface for the working of audio files. pydub supports a variety of audio formats and allows users to perform various operations on audio data, such as conversion, manipulation, and exporting.

CHAPTER 4

IMPLEMENTATION

4.1 SOURCE CODE

```
import cProfile
import pstats
import shutil
from memory_profiler import profile
from flask import Flask, render_template, request, send_file
import os
import librosa
import torch
from transformers import Wav2Vec2ForCTC, Wav2Vec2Tokenizer
from PIL import Image, ImageDraw, ImageFont
import soundfile as sf
from mtranslate import translate
from pydub import AudioSegment

# Function to generate alphabet name mapping

def generate_alphabet_name_mapping():
    alphabet_mapping = {}
    names = ["⠁", "⠃", "⠉", "⠙", "⠑", "⠋", "⠛", "⠓", "⠊", "⠚", "⠅", "⠇", "⠍",
             "⠝", "⠕", "⠏", "⠟", "⠗", "⠎", "⠞", "⠥", "⠧", "⠺", "⠭", "⠽", "⠵"]
    for char, name in zip(range(97, 123), names):  # ASCII values for lowercase alphabets
        alphabet_mapping[chr(char)] = name
    return alphabet_mapping
def translate_to_braille(kannada_text):
        braille_text = ""
        for char in kannada_text:
            braille_text += kannada_to_braille_mapping.get(char, char) + " "
    return braille_text.strip()
```

```
def translate_to_kannada(text):
    translation = translate(text,'kn')
    return translation
app = Flask(__name__)
# Load pre-trained model and tokenizer
tokenizer = Wav2Vec2Tokenizer.from_pretrained("facebook/wav2vec2-base-960h")
model = Wav2Vec2ForCTC.from_pretrained("facebook/wav2vec2-base-960h")
# Define alphabet mapping globally
alphabet_mapping = generate_alphabet_name_mapping()
def convert_to_wav(input_file, output_file):
    # Load the audio using librosa
    speech, rate = librosa.load(input_file, sr=None)
    sf.write(output_file, speech, rate)
    print(f"Converted {input_file} to {output_file}"
# Function to convert terminal output to image
def terminal_output_to_image(output_text, image_path, font_size=50, font_color=(0, 0, 0),
                             background_color=(255, 255, 255), line_spacing=1.2):
  lines = output_text.split('\n')
  num_lines = len(lines)
  # Calculate image size based on text size
  font = ImageFont.truetype("SimBraille.ttf", font_size)
  max_width = max(font.getsize(line)[0] for line in lines)
  total_height = int(font_size * line_spacing * num_lines)
  # Create image with desired background color
  image = Image.new('RGB', (max_width, total_height), background_color)
  draw = ImageDraw.Draw(image)
  # Draw text onto image
  y = 0
  for line in lines:
    draw.text((0, y), line, font=font, fill=font_color)
    y += int(font_size * line_spacing)
```

```
image.save(image_path)
# Route to the home page
@app.route('/', methods=['GET', 'POST'])
def index():
    if request.method == 'POST':
        # Get the uploaded file
        audio_file = request.files['audio']
        if audio_file:
            # Save the uploaded file
            audio_path = 'static/' + audio_file.filename
             audio_file.save(audio_path)
             print(f"Saved {audio_path}")
            wav_path = 'static/converted.wav'
            convert_to_wav(audio_path, wav_path)
            speech, rate = librosa.load(wav_path, sr=16000)
            input_values = tokenizer(speech, return_tensors='pt').input_values
            logits = model(input_values).logits
            predicted_ids = torch.argmax(logits, dim=-1)
            transcription = tokenizer.decode(predicted_ids[0])
            print (transcription)
            output = ""
            for char in transcription.lower():
                if char.isalpha():
                    output += alphabet_mapping[char] + " "
            output_text = "Output: " + output.strip()
            # Generate and save the image
            image_path = 'static/output_image.png'
            selection=request.form.get('language')
            if selection == 'english':
                terminal_output_to_image(output_text, image_path)
                return render_template('result.html', image_path=image_path, transcription=transcription);
if __name__ == '__main__':
    cProfile.Profile().run('app.run(debug=True)').dump_stats('profile.txt')
```

index.html

```
<!DOCTYPE html>
<html lang="en">
<head>
  <meta charset="UTF-8">
  <meta name="viewport" content="width=device-width, initial-scale=1.0">
  <title>Audio to Braille</title>
  <style>
body {
        font-family: 'Arial', sans-serif;
        background-color: #f5f5f5;
        color: #333;
        margin: 0;
        padding: 0;
        display: flex;
        flex-direction: column;
        align-items: center;
        justify-content: center;
        height: 100vh;
    }
  </style>
</head>
<body>
  <h1>Audio to Braille Converter</h1>
  <form action="/" method="post" enctype="multipart/form-data">
    <label for="audio">Upload an audio file:</label>
    <input type="file" name="audio" accept=".mp3, .wav"> <br>
    <label for="language">Select language:</label>
    <select name="language" id="language">
      <option value="english">English</option>
    </select><br>
    <input type="submit" value="Convert and Download">
  </form>
</body>
</html>
```

CHAPTER 5

SNAPSHOTS

Fig 5.1.1 Home Page

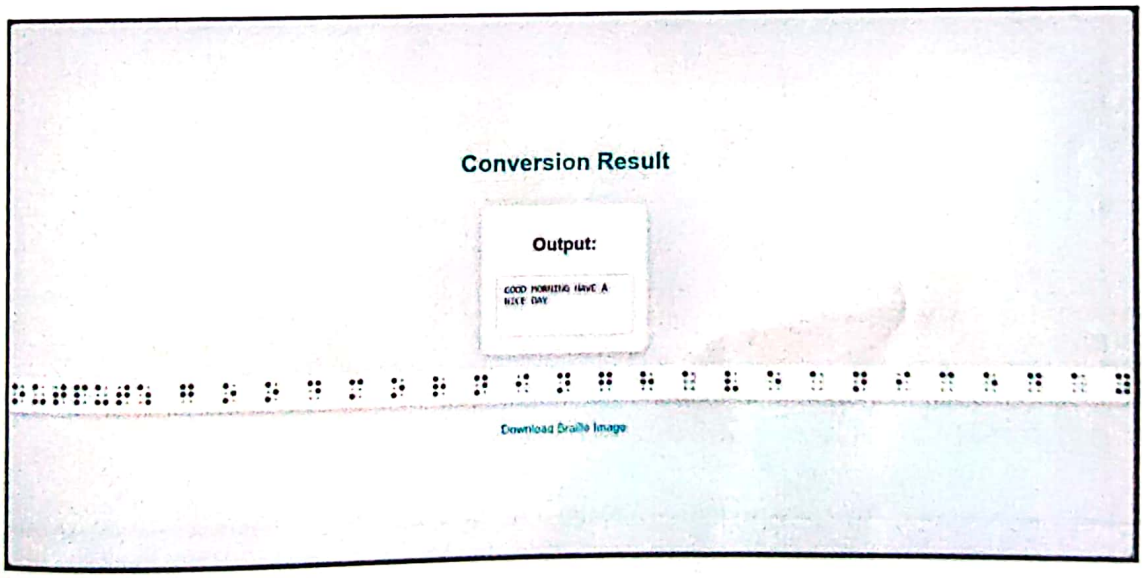

Fig 5.1.2 Conversion of Audio to Text In English

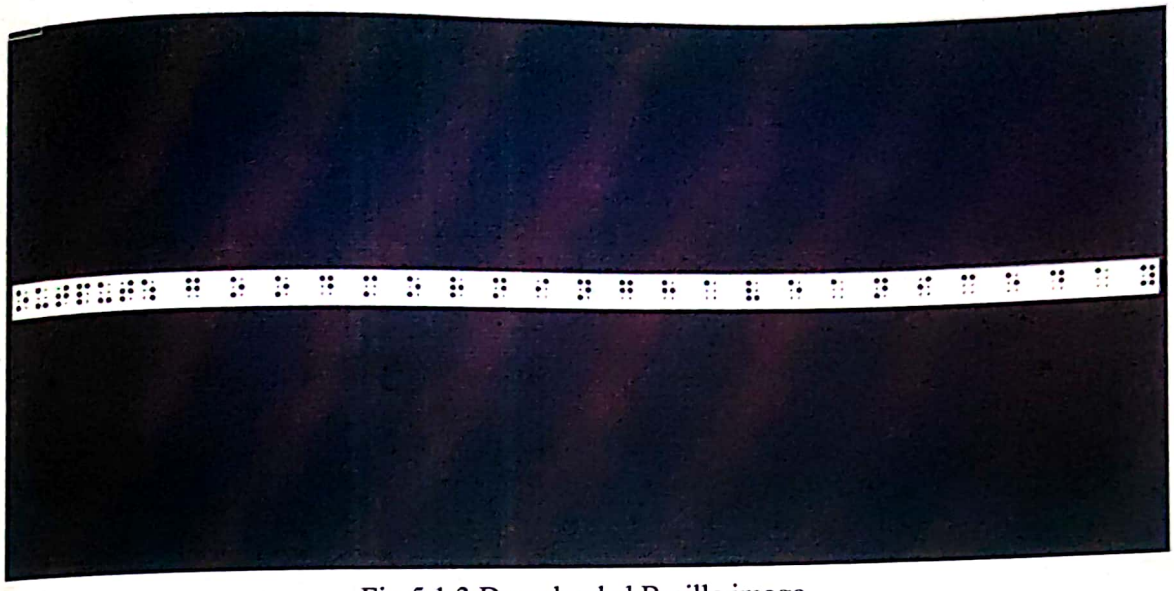

Fig 5.1.3 Downloaded Braille image

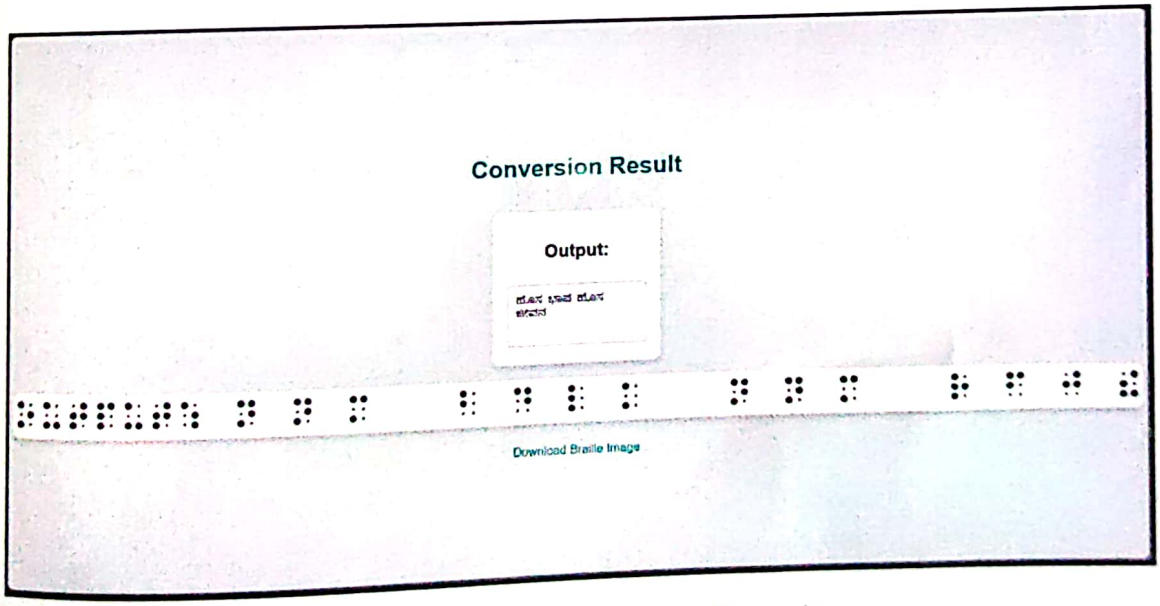

Fig 5.1.4 Conversion of Audio to Text In Kannada

CHAPTER 6

INTERNSHIP BENEFITS

After Completing 90 days of internship in QSpiders Bangalore ,I have got idea about different python frameworks, technologies in various IT field for real time application development. This internship help us to overcome the gap between the industrial needs. In these 30 days of internship I learnt lot of python technologies and framework like PyTorch, Numpy, TensorFlow, Flask etc. It help me to learn basic knowledge of HTML, CSS, JavaScript and Database like MySQL and Oracle. Provides much knowledge about real time application development using software development practices. Learned to debugging the code to fix the error. Able to work with team and learned how to be a part of team during work. Learnt both frontend and backend technologies for efficient application. Internship has enhanced the technical skills in Python programming, web development (HTML, CSS, JavaScript), data structures, algorithms, AI/ML concepts, and database management (MySQL) and learnt industry best practices and methodologies directly from experienced professionals.

CONCLUSION

A visually impaired individuals can only understand the text written in Braille Script, through which the speech that is not audible mainly for deaf and not visible by the blind people can easily understand through Braille Script. The main objective of our project is to implement a system which is capable of converting voice to text, and these text is further processed to produce the Braille Script. This system or project deals with converting English audio file to English. As the resource for mapping of Braille script in the native language is very low, we have implemented it in Kannada language as well. Further these text is mapped to corresponding language of Braille Script. The primary work in our project involves conversion of pre-recorded audio file into Braille, used audio translator to convert English audio to native language Kannada, audio input file is pre-recorded and output file can be downloaded and stored in image format.

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