 **Internship Report**

Data Science Virtual Internship

At

**NULLCLASS EDTECH PRIVATE LIMITED**

From 19-11-2024 to 19-12-2024

Submitted By

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**Introduction:**

During this internship, I worked on five different project to enhance my skills. Each Project was focused on leverage my technical and problem-solving skills in machine learning. These projects are aimed to solve real-world problems, from natural language processing to real-time voice translation

**Background**

The internship provided an opportunity to work on these innovative projects including machine learning and GUI. My focus was on building models and systems to process and translate text, audio, and images, emphasizing ease of use. These projects were designed to solve a unique problem, providing exposure to different aspects of programming, model training, and user interaction.

**Learning Objectives:**

Followings are can be described as my learning objective during this internship-

1. Develop a strong foundation in machine learning techniques.
2. Enhance programming skills, especially in Python.
3. Learn to design and implement GUIs for better user interaction.
4. Build models capable of handling real-time audio and image processing

**Activities and Tasks**

**Project 1: Creating Basic Tokenizer**

* **Task:** Developed a Python function to tokenize text for a selected language.
* **Activities:**

1. Researched tokenization algorithms.
2. Implemented a custom tokenizer.
3. Tested the function with multiple datasets to ensure accuracy.

**Project 2: Translation from Image**

* **Task:** Built a model to extract English text from images/videos and translate it into a chosen language.
* **Activities:**

1. Trained a machine learning model using OCR (Optical Character Recognition).
2. Integrated a translation API for text conversion.
3. Designed a GUI with upload and display functionalities

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**Project 3: Voice Translator**

* **Task:** Created a feature to translate English audio to Hindi within a specific time frame.
* **Activities:**

1. Trained a model for speech-to-text conversion.
2. Integrated text-to-text translation for English to Hindi.
3. Developed a GUI with a timer and feedback messages.

**Project 4: Real-Time Conversation with Voice Translation**

* **Task:** Enabled real-time conversation between English and Spanish speakers.
* **Activities:**

1. Implemented speech-to-text and text-to-speech modules.
2. Built a model for real-time translation.
3. Ensured smooth interaction without a GUI.

**Project 5: Logic Building Task**

* **Task:** Designed a feature to translate English words into Hindi, excluding words starting with vowels.
* **Activities:**

1. Developed logic to filter vowel-starting words.
2. Added time-based functionality for active translation.
3. Created a GUI for user input and output.

**Skills and Competencies**

1. **Technical Skills:**
   * Proficiency in Python and libraries such as TensorFlow, PyTorch, and Pyttsx3.
   * Experience with APIs like Google Translate and OCR tools.
2. **Problem-Solving Skills:**
   * Tackling challenges such as time-based activation and real-time processing.
   * Debugging issues in GUI and model integration.
3. **Communication Skills:**
   * Documenting projects
4. **Time Management:**
   * Completing tasks within deadlines while balancing complexity.

**Feedback and Evidence**

Feedback from mentors emphasized:

* **Strengths:** Effective problem-solving, creative approach to challenges, and attention to user-friendly designs.
* **Improvement Areas:** Focusing more on optimizing model accuracy and efficiency.

Evidence of progress includes:

* Documentation of code and algorithms.

**Challenges and Solutions:** Since I started my internship I faced few challenges and learned a lot from it.

The first challenge was when I working on Translation task. I used googletrans library in my program and my python version was 3.13.1., while executing program there was an error showing ‘no import cgi module’. When I researched it came to know to cgi module was deprecated from python 3.10. So then I searched on internet and with the help of my friends I replace gooletrans by deeptranslator.

I also faced few challenges with version of python and supporting libraries, however I had been able to resolve problems.

**Outcomes and Impact**

1. Successfully delivered five functional projects demonstrating diverse applications of machine learning.
2. Gained hands-on experience in building and deploying ML models.
3. Enhanced confidence in tackling complex programming challenges.
4. Contributed to the development of practical tools for translation and conversation support.

**Conclusion**

This internship provided me valuable insights into machine learning and software development. Each project presented unique challenges, enabling me to grow technically and professionally. The skills and knowledge gained will be instrumental in my future in the field of AI and machine learning.