CLASSIFICATION OF SOUND USING MACHINE LEARNING

AN INTERNSHIP REPORT

Submitted by:

Mr. ASHUTOSH PATIL - 20211CIT0139

Under the guidance of,

Mrs. STERLIN MINISH TN

In partial fulfilment for the award of the degree of

BACHELOR OF TECHNOLOGY

in

COMPUTER SCIENCE AND ENGINEERING,
INTERNET OF THINGS

at

PRESIDENCY UNIVERSITY

BENGALURU

MAY 2025

PRESIDENCY UNIVERSITY

PRESIDENCY UNIVERSITY

PRESIDENCY SCHOOL OF COMPUTER SCIENCE AND ENGINEERING

CERTIFICATE

This is to certify that the Internship/Project report **"CLASSIFICATION OF SOUND USING MACHINE LEARNING"** being submitted by "ASHUTOSH PATIL" bearing roll number "20211CIT0139" in partial fulfillment of the requirement for the award of the degree of Bachelor of Technology in Computer Science and Engineering is a bonafide work carried out under my supervision.

14/05/2025

Mrs. STERLIN MINISH,
Assistant Professor,
School of CSE,
Presidency University.

Dr. S P Anandaraj
Professor & HoD
PSCS
Presidency University

Dr. MYDHILI NAIR
Associate Dean
PSCS
Presidency University

Dr. SAMEERUDDIN KHAN
Pro-Vice Chancellor - Engineering
Dean –PSCS / PSIS
Presidency University

PRESIDENCY UNIVERSITY

PRESIDENCY SCHOOL OF COMPUTER SCIENCE AND ENGINEERING

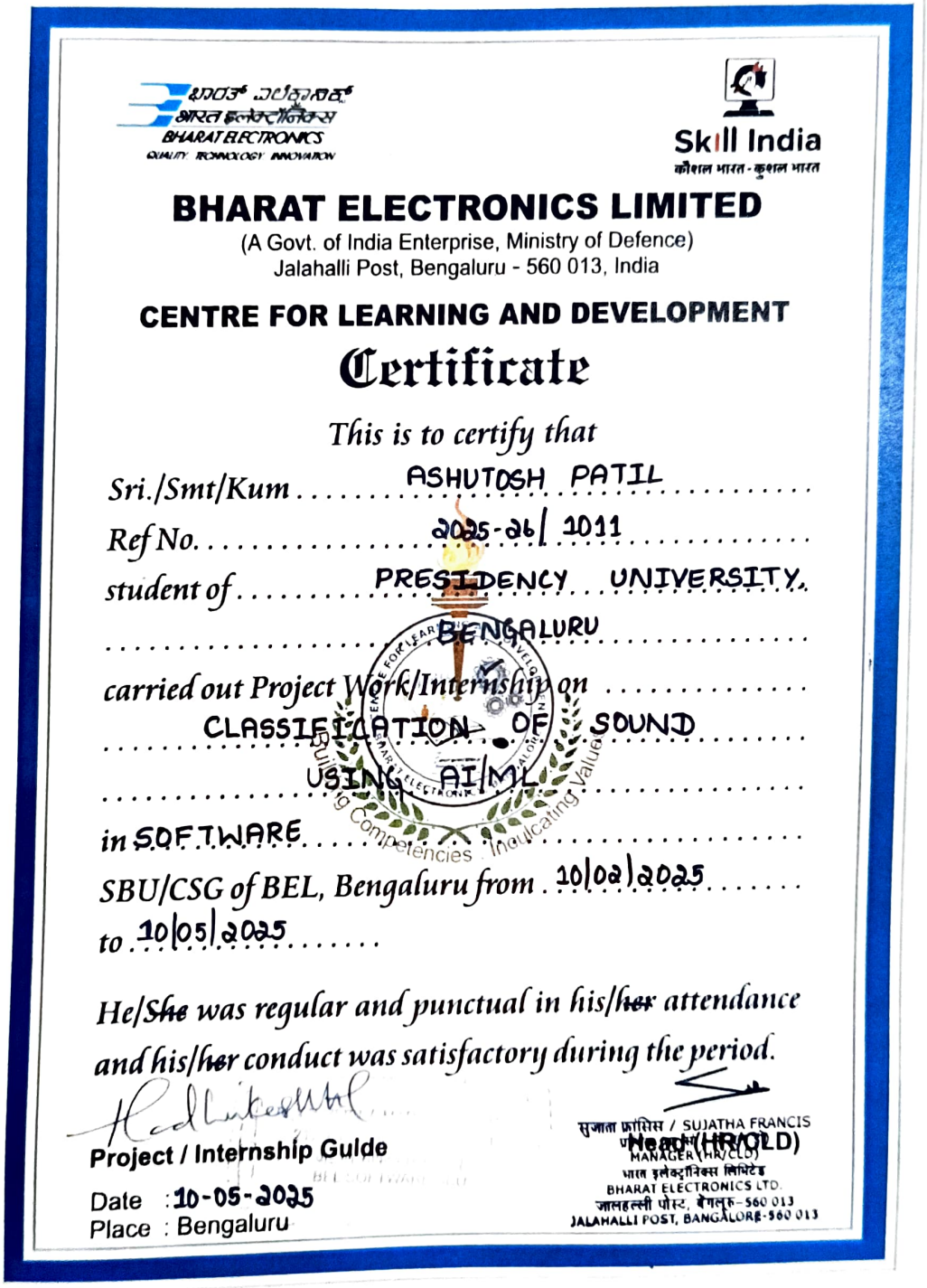
DECLARATION

I hereby declare that the work, which is being presented in the report entitled "**CLASSIFICATION OF SOUND USING MACHINE LEARNING**" in partial fulfillment for the award of Degree of **Bachelor of Technology** in **Computer Science and Engineering**, is a record of my own investigations carried under the guidance of **Mrs Sterlin Minish T N, Presidency School of Computer Science and Engineering, Presidency University, Bengaluru.**

I have not submitted the matter presented in this report anywhere for the award of any other Degree.

S.NO	NAME	ROLL NO	SIGNATURE
1.	ASHUTOSH PATIL	20211CIT0139	

INTERNSHIP COMPLETION CERTIFICATE



ಭಾರತ್ ಎಲೆಕ್ಟ್ರಾನಿಕ್ಸ್
भारत इलेक्ट्रॉनिक्स
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BHARAT ELECTRONICS LIMITED

(A Govt. of India Enterprise, Ministry of Defence)
Jalahalli Post, Bengaluru - 560 013, India

CENTRE FOR LEARNING AND DEVELOPMENT

Certificate

This is to certify that

Sri./Smt/Kum ASHUTOSH PATIL

Ref No. 2025-26/ 1011

student of PRESIDENCY UNIVERSITY, BENGALURU

carried out Project Work/Internship on CLASSIFICATION OF SOUND USING AI/ML

in SOFTWARE

SBU/CSG of BEL, Bengaluru from 10/02/2025 *to* 10/05/2025

He/~~She~~ was regular and punctual in his/~~her~~ attendance and his/~~her~~ conduct was satisfactory during the period.

Building Competencies Inculcating Values

Project / Internship Guide

Date : 10-05-2025
Place : Bengaluru

सुजाता फ्रांसिस / SUJATHA FRANCIS
MANAGER (HR/CLD)
Head (HR/CLD)
भारत इलेक्ट्रॉनिक्स लिमिटेड
BHARAT ELECTRONICS LTD.
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ABSTRACT

This project introduces an intelligent Sound Classification System that leverages machine learning techniques to recognize and categorize diverse environmental and situational sounds in real time. Designed for flexibility and extensibility, the system supports various urban and industrial applications including public safety, surveillance, assistive technology, and environmental monitoring.

The system is built upon a machine learning pipeline that processes raw audio signals through feature extraction techniques such as MFCC (Mel-Frequency Cepstral Coefficients), followed by classification using supervised learning models like Convolutional Neural Networks (CNNs) or other audio-optimized classifiers. The model is trained on a curated dataset of labeled audio samples spanning categories such as sirens, dog barks, footsteps, alarms, vehicle horns, and crowd noise.

The architecture supports modular design principles, allowing for components such as real-time audio capture, preprocessing, feature extraction, and inference to be independently updated or scaled. The system also facilitates live sound input through microphones or audio feeds, and outputs the classified sound category with an associated confidence score.

The system may be extended to integrate with edge computing devices or IoT-based sensor nodes in smart city infrastructure. By classifying sounds on the fly, it can trigger context-specific alerts or actions—like sending notifications for emergency sounds, or recording anomalies for further analysis. With additional training data and model optimization, the system can be fine-tuned for specific domains such as healthcare (e.g., detecting coughs or breathing irregularities), transportation, or disaster response.

By combining audio signal processing, machine learning, and scalable deployment options, this system provides a robust and intelligent framework for sound-aware applications in modern urban and industrial environments.

ACKNOWLEDGEMENT

First of all, we indebted to the **GOD ALMIGHTY** for giving me an opportunity to excel in our efforts to complete this project on time.

We express our sincere thanks to our respected dean **Dr. Md. Sameeruddin Khan**, Pro-VC - Engineering and Dean, Presidency School of Computer Science and Engineering & Presidency School of Information Science, Presidency University for getting us permission to undergo the project.

We express our heartfelt gratitude to our beloved Associate Dean **Dr. Mydhili Nair,** Presidency School of Computer Science and Engineering, Presidency University, and Dr. S P Anandaraj, Head of the Department, Presidency School of Computer Science and Engineering, Presidency University, for rendering timely help in completing this project successfully.

We are greatly indebted to our guide **Mrs Sterlin Minish T N, Associate Prof.** and Reviewer **Ms. Soumya, Associate Prof**, Presidency School of Computer Science and Engineering, Presidency University for his inspirational guidance, and valuable suggestions and for providing us a chance to express our technical capabilities in every respect for the completion of the internship work.

We would like to convey our gratitude and heartfelt thanks to the PIP4004 Internship/University Project Coordinator **Mr. Md Ziaur Rahman and Dr. Sampath A K,** department Project Coordinators **Dr. Sharmasth Vali Y** and Git hub coordinator **Mr. Muthuraj.**

We thank our family and friends for the strong support and inspiration they have provided us in bringing out this project.

Mr. ASHUTOSH PATIL