Section: K19GK Roll No.: 45

REPORT

Title: RAILWAY ANNOUNCEMENT SOFTWARE

**PYTHON PROGRAMMING (INT-213)**

A black sign with white text

Description automatically generated

**Submitted To: Mr. Sagar Pande, Assistant Professor**

Faculty of Computer Science Department

Lovely Professional University

Jalandhar, Punjab, India

ABSTRACT

Increasing use of science & technology over physical activities is leading to widespread application software development. At the same time, the proliferation of different technologies such as Artificial Intelligence, Machine Learning, software making has consolidated the major market share of software-based technologies, making a wholesale migration to personal internet services unlikely in the near future. Support by applications programs of multiple services such as railway-based applications, chatting applications, e-mail services, reservation services etc. therefore, becomes attractive to ensure the widest possible customer access.

This report describes the design, implementation and evaluation of a software, Railway Announcement Software for application control by many different stations and railway sectors. Several specific solutions already exist for announcement purpose on railway stations. However, these software are growing rapidly with the widespread uptake on different stations just by using details of trains. This auto announcement generator software also used for time saving and also for better understanding such as if you are in southern part of India then some people do not understand Hindi language so, by the help of this software we can easily made an announcements in any language.

The project uses python programming language for execution and to made project little easier to understand. Access to the software via IDLE (visual studio code, PyCharm etc. your choice). For announcements, add the trains data on excel sheet (min. 2 trains & max. 1000+), after adding the data trains announcement audio generated as per the serial number. Further work has led to the implementation of a better vocal quality of an auto-generated audio for us, enabling effective use of better audios.

ACKNOWLEDGEMENTS

This project has taken a considerable amount of time and resources and I would like to acknowledge the help of all of those who have made the project possible. In particular, I would like to thank my supervisor Sagar Pande for his time, patience and guidance, and also for allowing the idea to be pursued originally and make it full proof success his suggestions and his instructions has served as the major contributor towards the completion of the project.

Then I would like to thank my parents and friends who have helped me with their valuable suggestions and guidance has been helped in various phases of the completion of the project.

Last but not the least I would like to thank my classmates who have helped me a lot.

Tushar Maheshwari

CONTENTS

Abstract 2

Acknowledgements 3

Contents 4

1. Introductions……………………………………………………… 5
   1. Aims and objectives of this project……………………………………….
   2. Overview of the project progress………………………………………….
   3. Overview of this report…………………………………………………...
2. Background Research……………………………………………… 7
   1. Requirements………………………………………………………………
3. Why you need python?..................................................................... 7
4. Importance of python……………………………………………… 8
5. Different modules which used……………………………………… 9
   1. PyAudio………………………………………………………….
   2. Pydub…………………………………………………………….
   3. gTTS………………………………………………………………
   4. Pandas…………………………………………………………….
6. List of tables/Charts………………………………………………… 10
   1. Table………………………………………………………………

7 Conclusions…………………………………………………………… 11

8 References……………………………………………………………. 12

**1 INTRODUCTIONS**

As we all know Indian Railways is one of the biggest train systems in the world. And IR operates more than 13,000 Passenger train daily.

So, they need a good announcement system for such a huge no. of trains at every Station.

Announcement system in Indian Railways is operated by computer at every Station-by-station master.

We can organize the announcement in two categories-

(1) Pre-recorded announcement

(2) Spontaneous announcement.

**1.1 AIMS AND OBJECTIVES**

Pre-recorded announcement are those announcement which are recorded earlier and can be used later. In this type of announcement all of the phrases are not recorded.

Only the variable phases which changes for every train and platform are recorded separately and the phrases which changes regularly are recorded separately.

**May I have your attention please, train no. \_\_\_\_\_\_\_\_ with destination to \_\_\_\_\_\_\_\_\_\_\_ started from \_\_\_\_\_\_\_\_\_\_\_\_\_ station via \_\_\_\_\_\_\_\_\_\_\_\_ station \_\_\_\_\_\_(time)** **is going to depart/arrive from/at platform no.\_\_\_\_\_\_**

The above statement is recorded separately as these phrases are common in every announcement as shown in table 6.1.

And the dashes can be recorded later with Station name and different numbers.

**May I have your attention please, train no. *12345 Samjauta Express* with destination to *Lahore Junction* started from *New* *Delhi Railway* *station* via *Amritsar station, Attari station* is going to arrive at platform no. *1*.**

We can auto-generated this announcement by using python programming language and its modules like PyAudio, PyDub, Pandas & gTTS.

**1.2 OVERVIEW OF THIS PROJECT**

AUTO ANNOUNCEMENT SYSTEM (PC Based Announcement System by python programming-based software)

(1) It is an integrated system to work as Auto Announcement PA System, Display system & Coach Guidance announcing system. The system shall be capable of automatic announcement with pre-recorded voice prompt, which shall be stored in the hard disk of the system.

(2) The Data is entered by the data entry operator/Station Master by entering Train number, arrival/departure time and status of the train in the excel sheet or screen format.

(3) The selected massage is scrolled on the monitor so that the operator can know the announcement/Display being made on platform PA system and display boards.

**1.3 OVERVIEW OF THIS REPORT**

This report fully describes the project undertaken. However, in order to control the length of the report, the reader is on occasion referred to a bibliographical reference if particular details are required in an area. The report is split into main sections:

1. Introduction - This gives an introduction to the project, its aims, an overview of the work undertaken in the project and an overview of this report.

2. Background Research - Analysis of current projects available in this area and an attempt to define what is the “state of the art”. It also contains 8 analysis of the design issues for implementation of a possible solution to the problems raised, and a discussion of the technologies behind each of the proposed access device methods. Further, possible extensions to the basic design requirements are proposed.

3. Implementation - Discussion of the implementation choices taken and the software that was developed. Detailed reports are given for the implementation of the API and the implementation of the modules which manages different facilities along with a sample application which uses the API (Pandas) and analysis of each of the implemented part access methods. In addition, an example is given for converting an existing application to use the API and the subsequent development of a dynamic-link library which allows more effective use of the API by third parties is discussed.

4. Conclusions - Analysis of the successes and failures of the project, and discussion of the advances made. A discussion of the commercial viability of the implementation is also given. Possible extensions and further work that could be undertaken are then discussed.

**2 BACKGROUND RESEARCH**

**2.1 REQUIREMENTS**

For creating railway announcement software, we will be using a bunch of modules like**pyaudio**, **pydub**, and **gTTS** to process audio and get the announcing status of thousands of trains. By using **PyAudio module**, we can easily use Python to play and record audio on a variety of platforms. **Pydub**is a simple and well-designed Python module for audio manipulation and **gTTS** (which stands for Google Text-to-Speech) is a Python library and CLI tool to interface with**Google Translate text-to-speech API**.

**3 WHY YOU NEED PYTHON?**

Python is great for building micro-project to macro enterprise web services as well as on supporting other types of programming languages. Although it's a high-level language and can-do complex tasks, Python is easy to learn and has a clean syntax.

It has fewer steps when compared to Java and C. It was founded in 1991 by developer Guido Van Rossum. It is used in many organizations as it supports multiple programming paradigms. It also performs automatic memory management.

**4 IMPORTANCE OF PYTHON**

**Advantages-**

1. Presence of third-party modules.
2. Extensive support libraries (NumPy for numerical calculations, Pandas for data analytics etc.)
3. Open source and community development.
4. Easy to learn.
5. User-friendly data structures.
6. High-level language.
7. Dynamically typed language (No need to mention data type based on value assigned, it takes data type)

**5 DIFFERENT MODULES WHICH USED**

**5.1 PyAudio**

**PyAudio** provides Python bindings for Port Audio, the cross-platform audio I/O library. With **PyAudio**, you can easily use Python to play and record audio on a variety of platforms.

In this project, PyAudio is used to play different trains announcements and record these announcements on your system. PyAudio is easy to understand and has a clean syntax.

**5.2 Pydub**

Audio files are a widespread means of transferring information. So let’s see how to work with audio files using Python. Python provides a module called **Pydub** to work with audio files. **Pydub** is a Python library to work with **only .wav** files. By using this library we can play, split, merge, edit our**.**wav audio files.

In this project, Pydub is used to merge the audios of different announcements and to make them a single announcement. It is easy to understand and well-designed python module and it also used for audio manipulation and has a clean syntax.

**5.2.1 Installation**

This module does not come built-in with Python. To install it type the below command in the terminal.

pip install Pydub

Following are some functionalities that can be performed by pydub:

1. Playing audio file.
2. We can get certain information of file like length channels.
3. Increase/Decrease volume of given .wav file.
4. Merging two or more audio files.
5. Exporting an audio file.
6. Splitting an audio file.

**5.2.2 Audio Segment**

Wrapper for pydub.AudioSegment for additional high level methods.

**5.3 gTTS (Google-text-to-speech API)**

**gTTS** (Google Text-to-Speech), a Python library and CLI tool to interface with Google Translate's text-to-speech API. Write spoken mp3 data to a file, a file-like object (bytestring) for further audio manipulation, or stdout. Or simply pre-generate Google Translate TTS request URLs to feed to an external program. <http://gtts.readthedocs.org/>

## **5.3.1 Features**

* Customizable speech-specific sentence tokenizer that allows for unlimited lengths of text to be read, all while keeping proper intonation, abbreviations, decimals and more.
* Customizable text pre-processors which can, for example, provide pronunciation corrections.
* Automatic retrieval of supported languages.

### 5.3.2 Installation

$ pip install gTTS

**5.4 Pandas**

Pandas is a software library written for the Python programming language for data manipulation and analysis. In particular, it offers data structures and operations for manipulating numerical tables and time series. It is free software released under the three-clause BSD license.

**it** is a Python package that provides fast, flexible, and expressive data structures designed to make working with structured (tabular, multidimensional, potentially heterogeneous) and time series data both easy and intuitive. It aims to be the fundamental high-level building block for doing practical, **real world** data analysis in Python. Additionally, it has the broader goal of becoming **the most powerful and flexible open source data analysis / manipulation tool available in any language**. It is already well on its way toward this goal.

pandas is well suited for many different kinds of data:

* Tabular data with heterogeneously-typed columns, as in an SQL table or Excel spreadsheet
* Ordered and unordered (not necessarily fixed-frequency) time series data.
* Arbitrary matrix data (homogeneously typed or heterogeneous) with row and column labels
* Any other form of observational / statistical data sets. The data actually need not be labeled at all to be placed into a pandas data structure.

**6 List of Tables/ Charts**

**Table 6.1**

A picture containing graphical user interface

Description automatically generated

**Note** - Above table shown that these are the train details (train no., train name, from station to station and platform no.) which uses in project.

Through this, we can manage our audios as per train details. In railway, they also use that type of software so that they can generate announcements as per the train details.

**7 CONCLUSION**

Analysis of the successes and failures of the project, and discussion of the advances made. A discussion of the commercial viability of the implementation is also given. Possible extensions and further work that could be undertaken are then discussed.

It was a wonderful and learning experience for me while working on this project. This project took me through the various phases of project development and gave me real insight into the different modules of python. The joy of work and the thrill involved while tackling the various problems and challenges gave me a feel of developers industry. I enjoyed each and every bit of work I had put into this project and after completing the project, it makes me feel better with the proper output.

**8 REFERENCES**

* [**https://www.python.org/**](https://www.python.org/)
* [**https://visualstudio.microsoft.com/**](https://visualstudio.microsoft.com/)
* [**https://docs.python.org/3/py-modindex.html**](https://docs.python.org/3/py-modindex.html)
* [**https://pypi.org/project/gTTS/**](https://pypi.org/project/gTTS/)
* [**https://pandas.pydata.org/**](https://pandas.pydata.org/)
* [**https://pypi.org/project/ffmpeg-python/**](https://pypi.org/project/ffmpeg-python/)
* [**https://pypi.org/project/pydub/**](https://pypi.org/project/pydub/)
* [**https://pypi.org/project/PyAudio/**](https://pypi.org/project/PyAudio/)