PROJECT REPORT

on

VOICE TO TEXT AND VICA VERSA SYSTEM FOR INDIAN LANGUAGES USING PYTHON

(CSE IIIrd Semester Mini project)

2023-2024

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CERTIFICATE

Certified that MR. SHRIYANSH (Roll No.- 2219687) has developed mini project on "VOICE TO TEXT AND TEXT TO VOICE SYSTEM FOR INDIAN LANGUAGES" for the CS IIIrd Semester Mini Project Lab in Graphic Era Hill University, Dehradun. The project carried out by Students is their own work as best of my knowledge.

Date: 10.jan.2024

ACKNOWLEDGMENT

I would like to express my special thanks of gratitude to my teachers who gave me the golden opportunity to do this wonderful project on the topic 'VOICE TO TEXT AND TEXT TO VOICE SYSTEM FOR INDIAN LANGUAGES', which also helped me in doing a lot of Research and i came to know about so many new things I am really thankful to them.

Secondly i would also like to thank my parents and friends who helped me a lot in finalizing this project within the limited time frame.

At last but not the least i greatly indebted to all other persons who directly or indirectly helped us during this work.

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INTRODUCTION TO PYTHON

What is Python?

Python is a popular programming language. It was created by Guido van Rossum, and released in 1991.

It is used for:

- web development (server-side),
- software development,
- mathematics,
- system scripting.

What can Python do?

- Python can be used on a server to create web applications.
- Python can be used alongside software to create workflows.
- Python can connect to database systems. It can also read and modify files.
- Python can be used to handle big data and perform complex mathematics.
- Python can be used for rapid prototyping, or for production-ready software development.

Why Python?

- Python works on different platforms (Windows, Mac, Linux, Raspberry Pi, etc).
- Python has a simple syntax similar to the English language.
- Python has syntax that allows developers to write programs with fewer lines than some other programming languages.
- Python runs on an interpreter system, meaning that code can be executed as soon as it is written. This means that prototyping can be very quick.
- Python can be treated in a procedural way, an object-oriented way or a functional way.

Good to know

- The most recent major version of Python is Python 3, which we shall be using in this tutorial. However, Python 2, although not being updated with anything other than security updates, is still quite popular.
- In this tutorial Python will be written in a text editor. It is possible to write Python in an Integrated Development Environment, such as Thonny, Pycharm, Netbeans or Eclipse which are particularly useful when managing larger collections of Python files.

Python Syntax compared to other programming languages

- Python was designed for readability, and has some similarities to the English language with influence from mathematics.
- Python uses new lines to complete a command, as opposed to other programming languages which often use semicolons or parentheses.
- Python relies on indentation, using whitespace, to define scope; such as the scope of loops, functions and classes. Other programming languages often use curly-brackets for this purpose.

HOW TO INSTALL PYTHON TO YOUR SYSTEM???

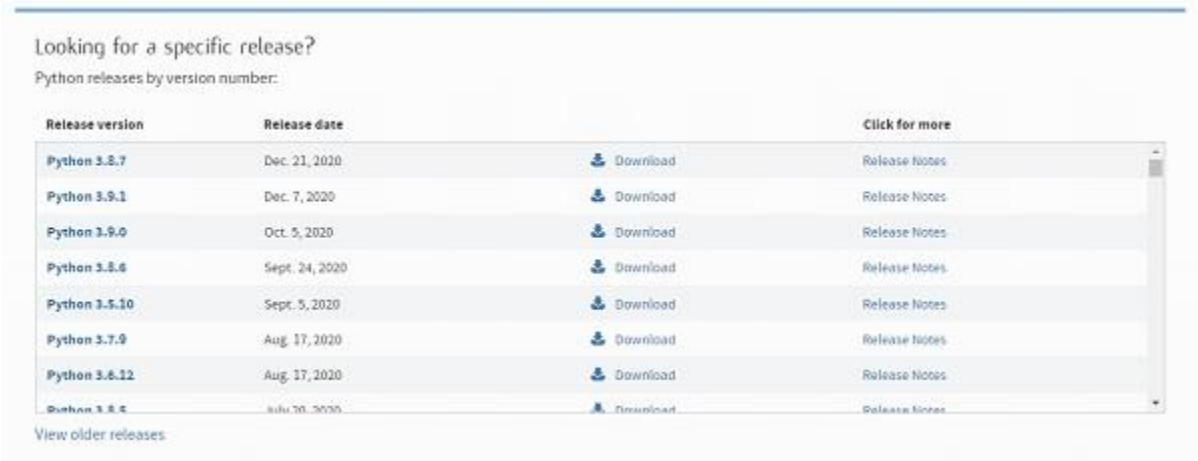
Step 1 – Select Version of Python to Install

Python has various versions available with differences between the syntax and working of different versions of the language. We need to choose the version which we want to use or need. There are different versions of Python 2 and Python 3 available.

Step 2 – Download Python Executable Installer

On the web browser, in the official site of python (**www.python.org**), move to the Download for Windows section.

All the available versions of Python will be listed. Select the version required by you and click on Download. Let suppose, we chose the Python 3.9.1 version.



On clicking download, various available executable installers shall be visible with different operating system specifications. Choose the installer which suits your system operating system and download the instlaller. Let suppose, we select the Windows installer(64 bits).

The download size is less than 30MB.

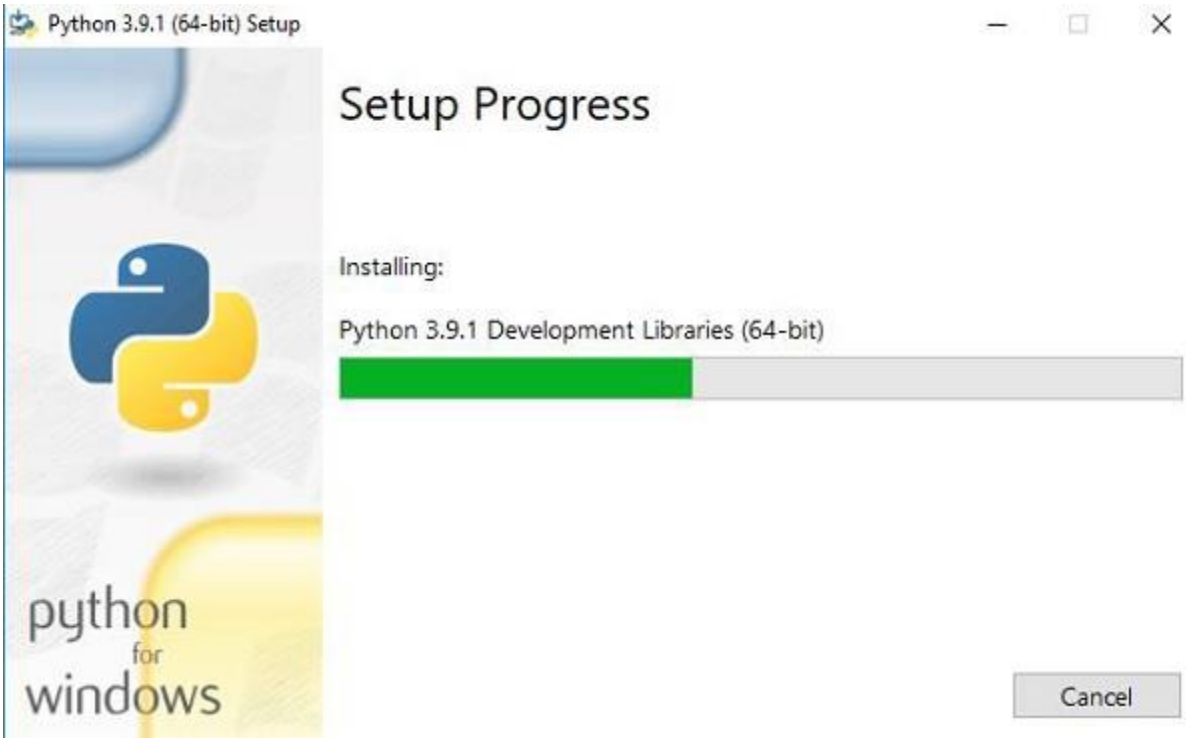
Version	Operating System	Description	MD5 Sum	File Size	GPG
Gzipped source tarball	Source release		429ae95d24227f8fa1560684fad6fca7	25372998	SIG
XZ compressed source tarball	Source release		61981498e75ac8f00adcb908281fadb6	18897104	SIG
macOS 64-bit Intel installer	Mac OS X	for macOS 10.9 and later	74f5cc5b5783ce8fb2ca55f11f3f0699	29795899	SIG
macOS 64-bit universal2 installer	Mac OS X	for macOS 10.9 and later, including macOS 11 Big Sur on Apple Silicon (experimental)	8b19748473609241e60aa3618bbaf3ed	37451735	SIG
Windows embeddable package (32-bit)	Windows		96c6fa81fe8b650e68c3dd41258ae317	7571141	SIG
Windows embeddable package (64-bit)	Windows		e70e5c22432d8f57a497cde5ec2e5ce2	8402333	SIG
Windows help file	Windows		c49d9b6ef88c0831ed0e2d39bc42b316	8787443	SIG
Windows installer (32-bit)	Windows		dde210ea04a31c27488605a9e7cd297a	27126136	SIG
Windows installer (64-bit)	Windows	Recommended	b3fce2ed8bc315ad2bc49eae48a94487	28204528	SIG

Step 3 − Run Executable Installer

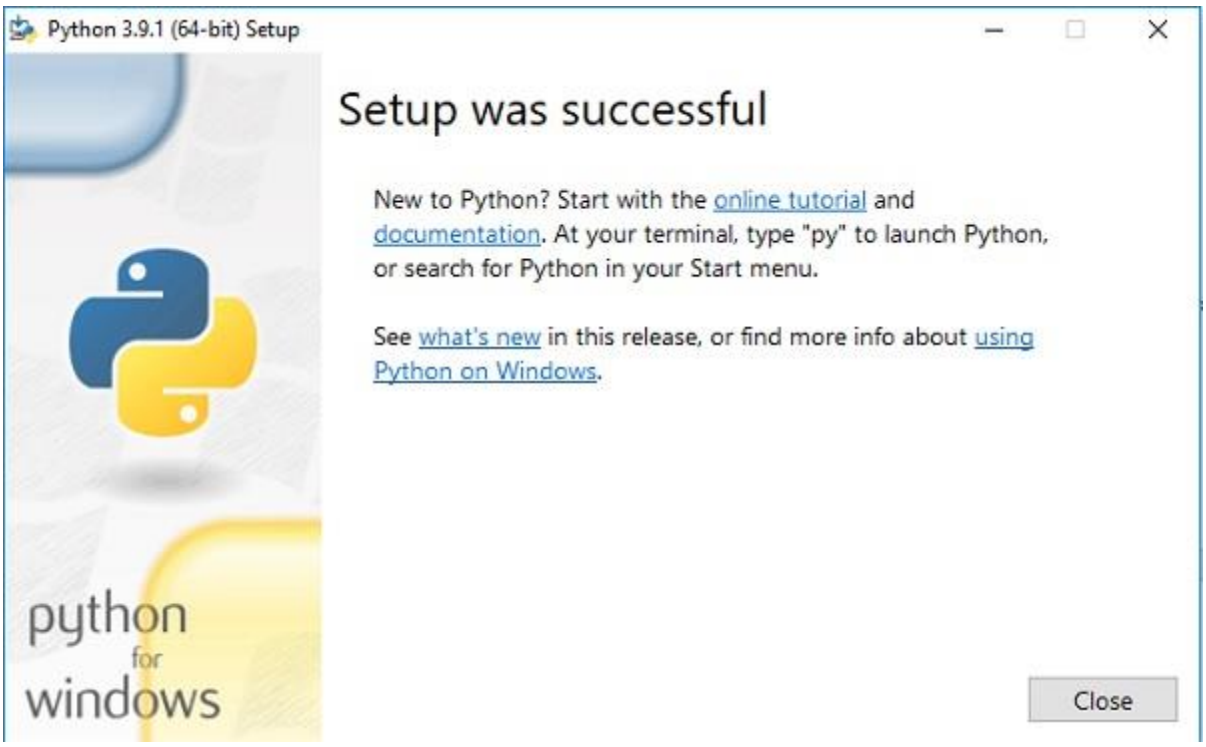
We downloaded the Python 3.9.1 Windows 64 bit installer.

Run the installer. Make sure to select both the checkboxes at the bottom and then click Install New.

On clicking the Install Now, The installation process starts.



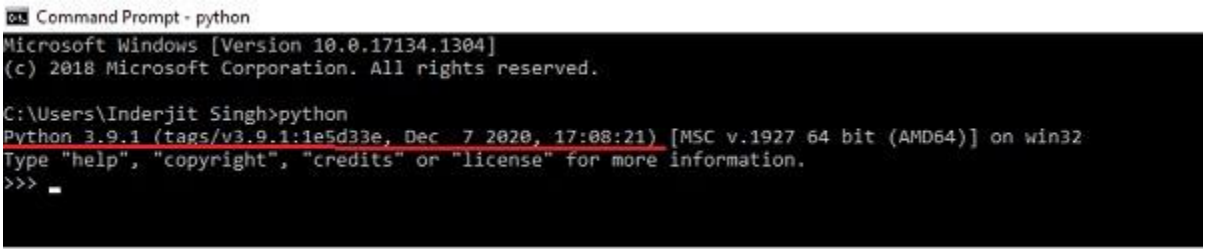
The installation process will take few minutes to complete and once the installation is successful, the following screen is displayed.



Step 4 – Verify Python is installed on Windows

To ensure if Python is succesfully installed on your system. Follow the given steps –

- Open the command prompt.
- Type 'python' and press enter.
- The version of the python which you have installed will be displayed if the python is successfully installed on your windows.



Step 5 − Verify Pip was installed

Pip is a powerful package management system for Python software packages. Thus, make sure that you have it installed.

To verify if pip was installed, follow the given steps −

- Open the command prompt.
- Enter pip –V to check if pip was installed.
- The following output appears if pip is installed successfully.

BASIC TERMINOLOGIES OF PYTHON

Here are some common terminologies in Python that you should be familiar with:

- **Interpreter** — Python is an interpreted programming language. This means that it needs a different program (called an interpreter) to read and execute the source code. Interpreters run through each line of the program and execute all the commands on the fly. They also verify each line of code to ensure it's written correctly. If the interpreter encounters any errors in the code, it will show a message that includes the type of an error and the place in the code where it occurred.
- **Program** — A program is a set of instructions that a computer uses to perform a specific action. Sometimes it's compared to a recipe with variables as ingredients and functions as instructions. Applications (like your browser) are a type of program.
- **Variable** — A variable is a container that holds a value. You can assign a value to a variable using the = operator.
- **Function** -A function is a self-contained block of code that executes a particular task. In Python, you can create your own functions using the def keyword followed by a function name and a set of parentheses.
- **Class** — In object-oriented programming, a class represents a template or blueprint used for creating instances of objects with similar attributes and methods.

It defines the attributes and methods that an object will have. You can define your own classes using the class keyword.

- **Loop** — A loop is a control structure that allows you to repeat a block of code.

Python offers two main types of loops for iteration:

the for loop

the while loop.

- **Conditional statement** — A conditional statement is a control structure that allows you to execute different code based on a condition.

There are two types of conditional statements in Python:

the if statement

the elif statement.

Exception — An exception is an error that occurs during program execution. In Python, you can use try-except blocks to handle exceptions and prevent your program from crashing.

- **Namespace** — A namespace is a container for a set of identifiers (such as variables and functions) that are used to organize code and prevent naming conflicts.

In Python, every module possesses its own namespace, which functions as a container for the names of objects such as variables, functions, and classes defined within the module.

- **Module** — In Python, a module refers to a file that contains code used to define variables, functions, classes, and other constructs that can be imported and utilized in other Python programs.You can use modules to organize your code into reusable blocks.
- **Package** — A package is a collection of related modules. You can use packages to organize your code into logical groups.

BASIC LIBERARIES OF PYTHON AND THEIR USE

LIBRARIES:-

Libraries, in, the context of programming languages, are collections of pre-written code or modules that provide specific functionality. These libraries are designed to be reused and can be integrated into your programssaving you the effort of writing everything from scratch.

1. **Reusability:** Libraries allow developers to reuse code that has already been written and tested. This promotes efficiency and consistency across different projects.
2. **Abstraction:** Libraries often provide a level of abstraction, hiding the complexity of certain tasks behind a well-defined interface. This makes it easier for developers to use the functionality without needing an in-depth understanding of the underlying implementation.
3. **Functionality:** Libraries cover a wide range of functionalities, from handling network communication to working with databases, processing data, creating graphical user interfaces, and more.
4. **Community Contributions:** Many libraries are open source and maintained by communities of developers. This means that developers around the world can contribute to and improve these libraries, ensuring that they stay up-to-date and reliable.
5. **Integration:** Libraries can be seamlessly integrated into programming languages. They are typically imported or included in the code, allowing developers to use their functions and classes.
6. **Examples of Libraries:** In Python, you have libraries like NumPy for numerical computing, requests for handling HTTP requests, and TensorFlow for machine learning. In JavaScript, there's jQuery for DOM manipulation, Axios for HTTP requests, and many others.
7. **Standard Libraries:** Programming languages often come with a set of standard libraries that are part of the language itself. These libraries provide essential functionalities and are available by default.

SOME FAMOUS LIBRARIES ARE:-

- **MATH** :- This module provides functions that are useful in number theory as well as in representation theory, a related field. It is built in module mode for mathematical tasks.

  The math module has a set of method and constants.

- **PANDAS:-** Pandas are an important library for data scientists. It is an open-source machine learning library that provides flexible high-level data structures and a variety of analysis tools. It eases data analysis, data manipulation, and cleaning of data. Pandas support operations like Sorting, Re-indexing, Iteration, Concatenation, Conversion of data, Visualizations, Aggregations, etc.

- **NUMPY**:- The name "Numpy" stands for "Numerical Python". It is the commonly used library. It is a popular machine learning library that supports large matrices and multi-dimensional data. It consists of in-built mathematical functions for easy computations. Even libraries like TensorFlow use Numpy internally to perform several operations on tensors. Array Interface is one of the key features of this library.

- **GOOGLE TRANSLATOR**:- This library is used for translating in text which is store in variable after taken from the user to another language. By passing two parameter in it.

  After importing this function, it take two parameter in it to proceed the function.

- **PLAYSOUND** :- This library commonly used to speak the text which is store in any variable.

- **Scrapy:** It is an open-source library that is used for extracting data from websites. It provides very fast web crawling and high-level screen scraping. It can also be used for data mining and automated testing of data.

CREATING PROJECT USING PYTHON

- Using Python Programming Language, we can easily create a system which is use to convert a text to speech and speech to text for any Indian language.
- Before doing anything our first step is to prepare a mind map/route map for what we are going to do in our project.
- Then accordingly we need to import various Python libraries which can easy up our task.
- Libraries which are to be included are:- gTTS, google_translator, playsound, speech_recognition,etc.
- Then we need to declare some variable of recognizer type which can store the message given by the user and if we want to convert it into any other language then using choice we want convert it into another one.
- Then after converting it into another one store it in another variable and give it format for storing.
- Then push converted text out using playsound.

REFERENCES

- https://www.w3schools.com/python/python_intro.asp#gsc.tab=0&gsc.q=how%20to%20install%20python%20to%20your%20system
- https://www.geeksforgeeks.org/libraries-in-python/
- https://www.digitalocean.com/community/tutorials/install-python-windows-10
- https://www.youtube.com/watch?v=KEIvXwUm8iE
- https://www.youtube.com/watch?v=9GJ6XeB-vMg
- https://techvidvan.com/tutorials/python-language-translator/