

SILVERUS - PERSONAL VOICEASSISTANT

A Project Work

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DECLARATION

I, **TAMANNA SHORI**, student of **Bachelor of Engineering in CSE-Big Data, session: 2019/2023**, Department of Computer Science and Engineering, Apex Institute of Technology, Chandigarh University, Punjab, hereby declare that the work presented in this Project Work entitled **SILVERUS-PERSONALVOICE ASSISTANT** is the outcome of our own bona fide work and is correct to the best of our knowledge and this work has been undertaken taking care of Engineering Ethics. It contains no material previously published or written by another person nor material which has been accepted for the award of any other degree or diploma of the university or other institute of higher learning, except where due acknowledgment has been made in the text.

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Abstract

Voice assistants are programs on digital devices that listen and respond to verbal commands. A user can say, "What's the weather?" and the voice assistant will answer with the weather report for that day and location. They could say, "Tell me a story," and the assistant will jump into a tale. The user could even say, "Order my favourite pizza," and dinner will be on its way! Voice assistants are so easy to use that many people forget to stop and WONDER how they work. How do voice assistants understand us? Is it magic? A complex system of codes? An actual person listening on the other end? The answer is less complicated than you might think. The application works like Siri, Google Assistant etc. The U.I of the application is self-explainable and very minimum. It takes voice as input. The system is being designed in such a way that all the services provided by the mobile devices are accessible by the end user on the user's voice commands.

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INTRODUCTION

1. Problem Definition

We are all well aware about Cortana, Siri, Google Assistant and many other virtual assistants which are designed to aid the tasks of users in Windows, Android and iOS platforms. But to our surprise, there's no such virtual assistant available for the paradise of Developers i.e. Linux platform. And it Works on Windows too

As a personal assistant, SILVERUS assists the end-user with day-to-day activities like general human conversation, searching queries in various search engines like Google, Bing or Yahoo, searching for videos, retrieving images, live weather conditions, word meanings, searching for medicine details, health recommendations based on symptoms and reminding the user about the scheduled events and tasks. The user statements/commands are analysed to give an optimal solution.

2. Project Overview and Specifications

As technology evolves, the ways people interact with it also changes. Think about how internet searches have become easier. It wasn't long ago that an internet search had to be very specific and would often yield strange and unrelated results. Now, it seems like search engines, such as Google, can almost read your mind and know exactly what you are looking for. Engines understand context and the intent of your search.

Artificial intelligence assistants have also evolved. Early on, text was the only way to interact with an assistant app (typing in a phrase triggered a response). Now, voice has taken over.

Voice assistants don't really "understand" what you're saying — they just listen for their wake word and then begin communicating with a server to complete a task. NLP is a form of artificial intelligence that helps technology interpret human language.

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Literature Review

M. A. Jawale (2019) et al. proposed in today's world, many artificial intelligence applications developed using programming languages like Python, R and so on. Each language comes with its own programming structure and syntactical forms. Programmers are broadly classified into three categories namely, novice users, knowledge intermittent and expert one. For novice users, it is always a challenge to write a code without typographic errors though users know theoretical knowledge of Programming language, its structure and syntax as well as logic of program. Therefore, this paper explores use of voice recognition technique in the field of programming, specifically for writing program with Python programming language. In experimental analysis, it found helpful for new Python programmers and provide new learning curve for programmers wherein beginner can experience hassle free program writing. This paper adds new way of creating interest in beginners for judging their coding paradigm understanding and explore one of the area for user experience field for better programming Integrated Development Environment Development (IDE).

Dr.Kshama V. Kulhalli (2017) et al. proposed the Most famous application of iPhone is "SIRI" which helps the end user to communicate end user mobile with voice and it also responds to the voice commands of the user. Same kind of application is also developed by the Google that is "Google Voice Search" which is used for in Android Phones. But this Application mostly works with Internet Connections. But our Proposed System has capability to work with and without Internet Connectivity. It is named as Personal Assistant with Voice Recognition Intelligence, which takes the user input in form of voice or text and process it and returns the output in various forms like action to be performed or the search result is dictated to the end user. In addition, this proposed system can change the way of interactions between end user and the mobile devices. The system is being designed in such a way that all the services provided by the mobile devices are accessible by the end user on the user's voice commands.

Speech recognition has a long history with several waves of major innovations. Speech recognition for dictation, search, and voice commands has become a standard feature on smartphones and wearable devices.

Design of a compact large vocabulary speech recognition system that can run efficiently on mobile devices, accurately and with low latency. [1] This is achieved by using a CTC- based LSTM acoustic model which predicts context- independent phones and is compressed to a tenth of its original size using a combination of SVD-based compression and quantization. Quantized deep neural networks (DNNs) and on-the-fly language model rescoring to achieve real-time performance on modern smartphones.

The ASR and Search components perform speech recognition and search tasks. In addition to ASR and Search, we also integrate a query parsing module between ASR and Search for a number of reasons. [3] Set of techniques for improving the performance of automated voice search services intended for mobile users accessing these services over a range of portable devices. Voice search is implemented as a two stage search procedure where string candidates generated by an automatic speech recognition (ASR) system are re-scored in order to identify the best matching entry from a potentially very large application specific database. Study provides a good example of how additional domain specific knowledge sources can be used with a domain independent ASR system to facilitate voice access to online search indices.

As more data becomes available for a given speech recognition task, the natural way to improve recognition accuracy is to train larger acoustic models. There are a non-parametric empirical model that exploits abundant training data to directly learn pronunciation variation. Interpolating the empirical model with a parametric model yields the best performance, with a relative improvement of 5.2% in WER over the baseline. [2] There are a number of ways in which this work could be extended. First, closer integration with acoustic model training is likely to yield sharper distributions and a tighter fit to the data. Second, estimating word- pronunciation co-occurrence counts in semi-supervised fashion (e.g. through word recognition instead of forced alignment) would broaden its applicability to a wide range of speech genres and tasks. Finally, it would be of interest to modify our models to factor out the distinct phenomena that affect pronunciation (e.g. accent, dialect, recognition errors). This paper focuses on the development and advances in automatic speech recognition for the AT&T Speak4it R voice search application [5]. With Speak4it as real-life example, we show the effectiveness of acoustic model (AM) and language model (LM) estimation (adaptation and training) on relatively small amounts of application field-data.

Methods are investigated for identifying the most likely database entry associated with the decoded utterance. An experimental study is presented describing the

characteristics of actual user utterances obtained from a prototype voice search service. The impact of these methods on word error rate is presented.

This Voice Recognizer works offline and performs various operations as per the user commands and requirements. This is the first activity that's opens whenever we starts SILVERUS and it directly can be opened by pressing Power Button of the mobile devices.

This feature is specially design for Blind Persons who wish to use the Android Smart Phones but are unable to connect this technology. Also Native user who barely knows to unlock their smart phones can easily open this application and using voice commands in their local languages as per need.

SILVERUS responds to basic commands like, Open Applications, Close Applications, Connect Calls To respective person/contacts, send text SMS to respective person or contact, Capture Photos from camera (Front Camera/ Back Camera), Add/Delete/Update Contacts, Run any media file, Start various services like Hotspot, Wi-Fi, Bluetooth, and various Services from the respective Notification Panel. All this can be performed on the voice commands of the end user without internet connectivity.

Operations such as Browsing or Searching for any topic, using Applications that need internet connections example "Send message to ABC, Hi I'm PQR sending message to you. Using WhatsApp". All these basic operations are performed by the voice commands of the end user.

Google did quietly enable offline recognition in that Search update, but there is no API or additional parameters available within the Speech Recongizer Class. The functionality is available with no additional coding, however the user's device will need to be configured correctly for it to begin working and this is where the problem.

SYSTEM ANALYSIS

Problem Statement

The voice assistant is design to make the work easier of the user. As user can give command to them without making visual access to the screen. The biggest disadvantage of this system is that confidential data can be accessed by unauthorised user so the privacy can be breached. Due to this, the confidentiality, integrity and availability (CIA) of user data is affected. Looking to this problem We made a voice assistant Which do not Store users personal Data .

Proposed System Feature

1. Python provides a large standard library which includes areas like internet protocols, string operations, web services tools and operating system interfaces. Many high use programming tasks have already been scripted into the standard library which reduces the length of code to be written significantly.
2. Python has clean object-oriented design, provides enhanced process control capabilities, and possesses strong integration and text processing capabilities and its own unit testing framework, all of which contribute to the increase in its speed and productivity. Python is considered a viable option for building complex multiprotocol network applications.
3. A text-to-speech (TTS) system converts normal language text into speech. Synthesized speech can be created by concatenating pieces of recorded speech that are stored in a database. The output is given in the form of speech.
4. This Voice Assistant can benefit large number of users with universal eyes free and hands free voice control of their mobile devices. Its framework may help to shape future voice control devices.

Hardware Specifications:

- 1.A Computer
- 2.A Mic
- 3.A Speaker

Software Specifications:

1. A graphicalOS.
2. Python With Modules

TECHNOLOGIESUSED

The basic requirement for this project. You'll need Python 3.6. We'll be using the pyttsx3 package which is a text-to-speech library for Python. The basic reason why we use this is because it works offline. Another basic requirement of this project will be Python's Speech Recognition library

FRONTEND FRAMEWORK

- **Tkinter**

Tkinter is the standard GUI library for Python. Python when combined with Tkinter provides a fast and easy way to create GUI applications. Tkinter provides a powerful object-oriented interface to the Tk GUI toolkit.

BACKEND STACK

- **Python**

Python is an interpreted, object-oriented, high-level programming language with dynamic semantics. Its high-level built in data structures, combined with dynamic typing and dynamic binding, make it very attractive for Rapid Application Development, as well as for use as a scripting or glue language to connect existing components together. Python's simple, easy to learn syntax emphasizes readability and therefore reduces the cost of program maintenance. Python supports modules and packages, which encourages program modularity and code reuse. The Python interpreter and the extensive standard library are available in source or binary form without charge for all major platforms, and can be freely distributed.

METHODOLOGY

The overall system design consists of following phases:

- (a) Data collection in the form of user's voice
- (b) Voice analysis and conversion to text
- (c) Data processing
- (d) Generating the task to be done from the processed text output

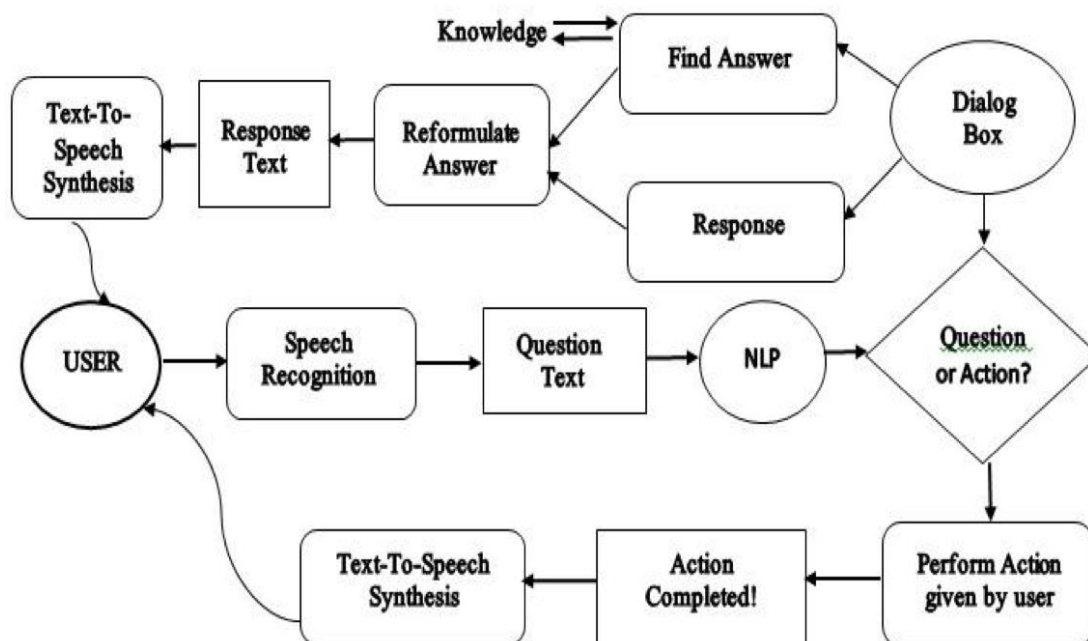
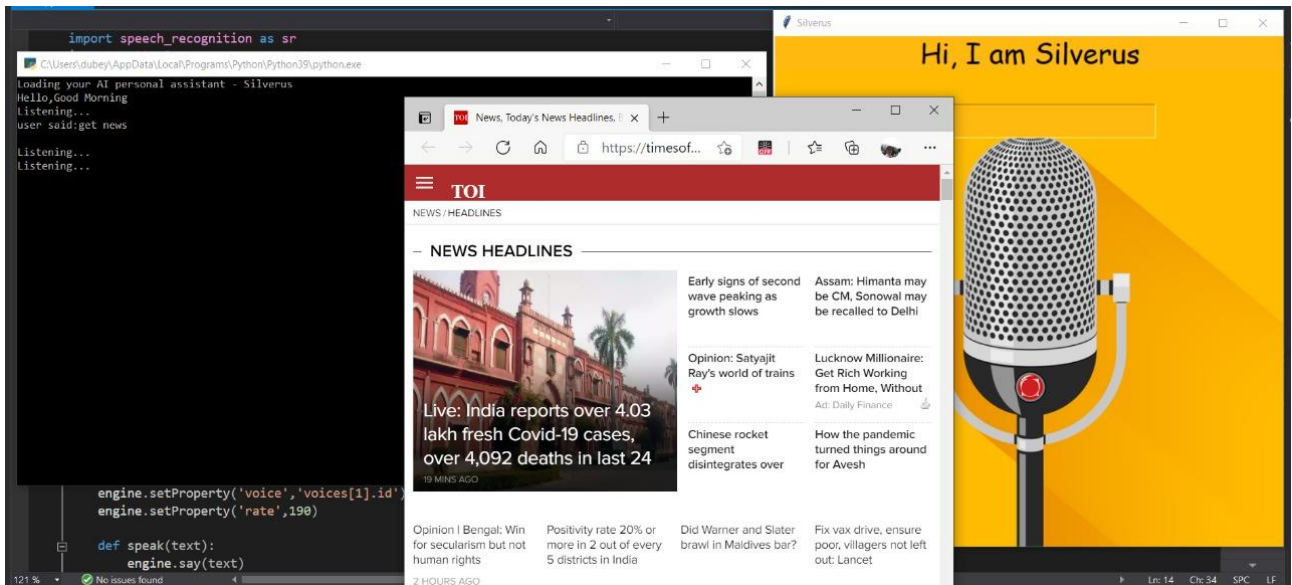
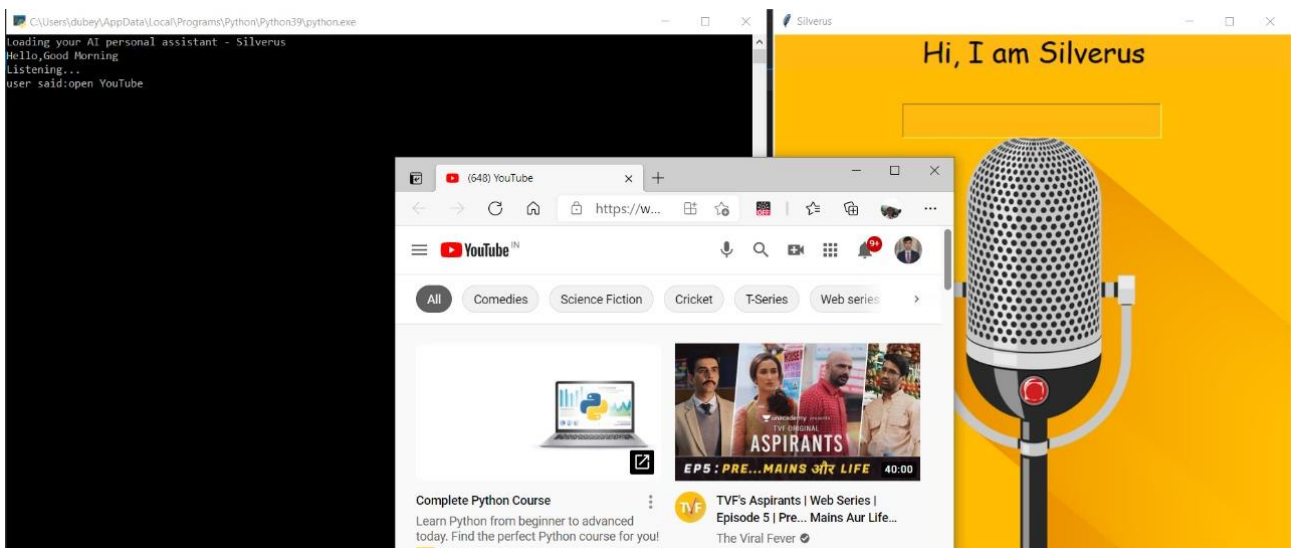


Fig -1: Proposed Model of SILVERUSVoice Assistant

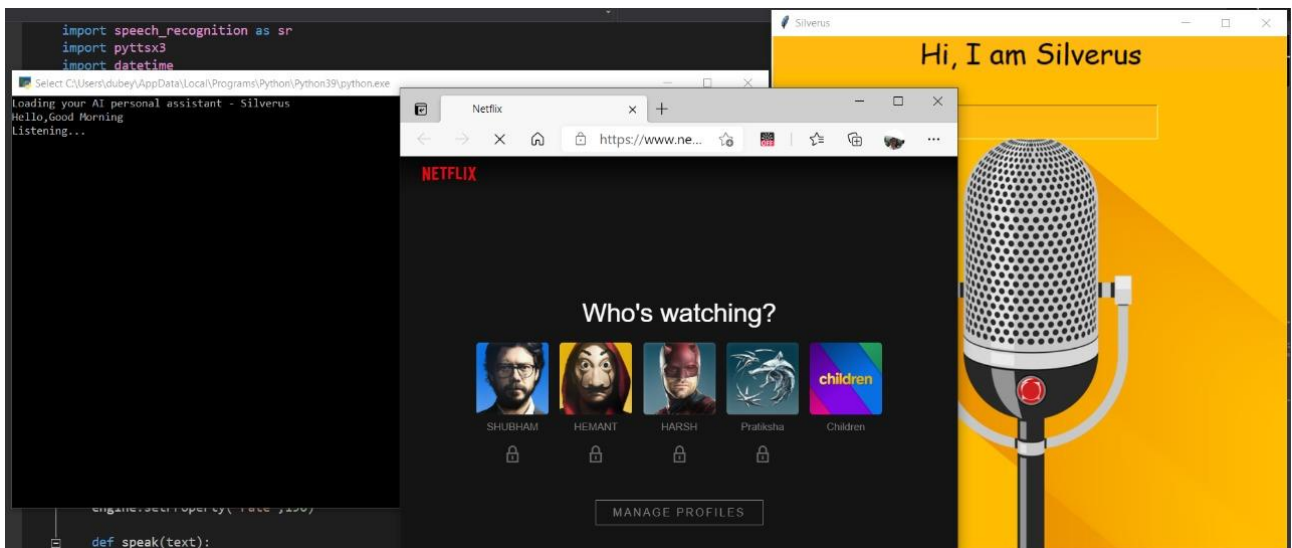
If the user gives voice command “NEWS”, the SILVERUS results with



If the user gives voice command “open Youtube”, the SILVERUS results with



If the user gives voice command “Open Netflix”, the SILVERUS results with



Similarly, the assistant SILVERUS is able to do the following tasks:

1. Open any website in the browser.
2. Send an email to your contacts.
3. Launch any system application.
4. Tells you present time.
5. Play you a song.
6. Stream Youtube
7. Tells you latest news.
8. Tells you Weather Report
9. Many

More

FUTURE SCOPE

Presently, SILVERUS is being developed as an automation tool and virtual assistant. Among the Various roles played by Jarvis are:

1. SearchEnginewithvoiceinteractions
2. Medical diagnosis with Medicine aid
3. Reminder and To-Do application.
4. Vocabulary App to show meanings and correct spelling errors.
5. Weather Forecasting Application.

There shall be proper Documentation available on its Official Github repository for making further development easy and we aim to release our virtual assistant as an Open Source Software where modifications and contributions by the community are warmly welcomed.

RESULTS AND DISCUSSION

This system is designed in such a method wherein the user can accommodate to it effortlessly. Our proposed system SILVERUS – The A.I. a personal voice assistant can be implemented using speech recognition module that makes the system more secure and robust. It is the voice control application that provides enhancements to all applications running on a system by synthesising commands set from on- screen context. SILVERUS can benefit large number of users with universal eyes free and hands free voice control of their system. Speech recognition technology is a key technology which will provide a new way of human interaction with machine or tools. The advantage of voice commands over multi-touch when interacting with a screen non-visually is that it does not require targets to be located and thus avoids the problems with pointing, it saves time. The sending of E- mail, and reading of News can be possible by the blind people also. This can do variety of tasks like tell you the time, open application, organised files, can gives updates of matches, play game, tell you the location, tell some jokes, open hackathon, do calculation, updates about the stock and the-endless tasks for the user. Thus making one's life comfortable and at the same time remotely accessible via voice commands. Due to support of NLP user can ask queries in very formal way. No need ask queries in very strict and specific way. The user should aware of general rules of English Language. The goal is to provide people a quick and easy way to have their questions answered.

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