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A Financial Voice Assistant

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Abstract: - Voice technology is rapidly transforming the way users interact with digital financial services. This paper presents the development of a Financial Voice Assistant using the Kivy module in Python, a versatile framework for building multi-touch applications. The assistant allows users to manage personal finances through voice commands, providing an intuitive, hands-free experience. The Kivy's capabilities enable the creation of a dynamic, cross-platform graphical user interface (GUI) to complement voice interactions. The financial voice assistant supports a range of features, including checking account balances, tracking expenses, setting budget goals, and retrieving financial reports. By integrating speech recognition and Natural Language Processing (NLP), the assistant accurately interprets complex financial commands, offering personalized and real-time responses. Kivy facilitates the seamless integration of these functionalities into a user-friendly and interactive interface, allowing for smooth transitions between voice commands and visual displays of financial data.

Keywords*: Voice Assistant, Renko chart intent, Market capital intent*

1. Introduction

A voice assistant is a piece of software that can understand and react to spoken instructions. It is an interface that responds to voice requests and performs the corresponding action. Because they let consumers use their gadgets and apps hands-free, voice assistants are growing in popularity.

Some of the benefits of using a voice assistant:

Convenience: Voice assistants allow users to control their devices and applications hands-free, which can be helpful for people who are busy or have partial mobility.

Efficiency: Voice assistants can help users to be more capable by automating tasks and providing information quickly.

Personalization: Voice assistants can be personalized according to the preferences of the user(s) and habits, which can make them more helpful and engaging.

Entertainment: Voice assistants can be used to play music, tell jokes, and provide other forms of entertainment.

Some of the most popular voice assistants:

Amazon Alexa: Amazon Alexa is a voice assistant that is available on Amazon Echo devices, as well as a variety of other devices. Alexa can be used to control smart home devices, obtain information from the web, and it can also play music.

Google Assistant: A voice assistant called Google Assistant is accessible on a number of devices, including Google Home devices. Setting alarms, retrieving information from the internet, and controlling smart home appliances are all possible with the Google Assistant.

Apple Siri: The Apple Siri is a voice assistant that may be found on Apple products, including the iPad, iPhone, and Apple Watch. Siri is capable of controlling music playing, retrieving site information, and making phone calls.

Samsung Bixby: Samsung Bixby is a voice assistant that is available on Samsung devices, such as the Galaxy

S22 and Galaxy Tab S8. Bixby can be used to control smart home devices, get information from the web, and can also be used to set alarms.

Although they have only just begun to develop, voice assistants have the potential to completely change how the technology can be used. Voice assistants may eventually become an indispensable aspect of our daily lives as they develop in sophistication.

Python: The Python programming language consists of several libraries that make application development simpler. It is a popular programming language that works well for creating voice assistants. With its extensive array of modules for text-to-speech, voice recognition, and natural language processing, it is simple to use and learn.

Kivy: It is an open-source framework for creating graphical user interfaces (GUIs) that work on a variety of platforms, including Linux, Raspberry, iOS, Windows, and Android, among many others. In addition to being entirely free, it is simple for developers to use for the creation of any commercial product. It is entirely built on top of the Python programming language, which is incredibly strong and facilitates the creation of applications quickly. The primary benefit of utilizing the Kivy platform is that code only has to be created once, and it can then be utilized for publishing more apps. By using the Kivy library in application development, it facilitates the creation of interactive apps with an intuitive, basic graphical user interface.

2. LITERATURE SURVEY

Deepak Shende and et al. [1] in this paper cited the latest findings on natural human-machine interaction, which would teach robots to comprehend human language. It also discussed the fundamentals of how voice assistants work, their primary drawbacks and restrictions, and how to build local voice assistants without utilizing cloud services, which enables a major increase in the future application of such devices.

S. Subhash and et.al [2] cited in this paper a voice assistant that gathers the audio from the microphone and gets converted into text. Later it was sent through GTTS (Google Text To Speech.). The GTTS engine will convert text into audio file in English language, then that audio sound is played using the play sound package of python programming language.

Abeed Sayyed and et.al [3] cited in this paper that the main task of a voice assistant is to minimize the use of input devices like keyboard, mouse, touch pens, etc. This will reduce both the hardware cost and space taken by it. The Most famous application is the iPhone “SIRI” which helps the end user to communicate with the end user mobile with voice and it also responds to the voice commands of the user. Same kind of application is also developed by Google that is “Google Voice Search” which is used for Android Phones. It is named as Personal Assistant with Voice Recognition Intelligence, which takes the user input in form of voice or text and processes it and returns the output in various forms like action to be performed or the search result is dictated to the end user. In this paper, the system can change the way of interactions between end users and the mobile devices.

Abeed Sayyed et al. [3] in this paper cited that the primary goal of a voice assistant is to reduce the amount of time spent using input devices such as keyboards, mice, touch pens, etc. As a result, it will use less room and cost less money. "SIRI" is the most well-known program for the iPhone, which enables voice communication between the user and their device and reacts to voice instructions. The same type of program, called "Google Voice Search," which is also created by Google and is available for Android phones, it is also referred to as a Personal Assistant with speech Recognition Intelligence. It processes user input in the form of text or speech and provides a variety of output formats.

Manjusha Jadhav and et.al [4] cited in this paper that a voice assistant system may serve as a smart buddy, daily schedule manager, writer, calculator, and search engine. It uses speech input to produce output in the form of text and speech on the screen.

The user can get the results they need by using this aid to connect to the Internet. An algorithm for natural language processing enables robots to communicate in a variety of ways using genuine human language. Dr. Vasudha and et.al [5] cited in this paper that machine learning (ML) and artificial intelligence (AI) have

advanced technologically in recent years. It seems certain that robotics will play a significant role in technology in the future. Natural Language Processing (NLP) is among the most practical uses of artificial intelligence. One of the best inventions ever made is the voice assistant. It alters the lifestyles of people in a variety of ways. Essentially, it was initially included in smartphones before gaining traction on its own. Cloud computing is being used by voice assistants to communicate with people. It is mostly used in homes to operate several technologically linked items.

Pooja C. Goutam and et.al [6] cited in this paper that in the early days, there were only computer systems capable of doing a limited number of functions. But in the modern day, new technologies like deep learning, artificial intelligence, and machine learning, among others, have advanced computer systems to the point where they can do any kind of work. In the last several years, artificial intelligence (AI) has advanced significantly, and its capabilities are growing daily. NLP, or natural language processing, is one use of AI. Natural language processing, or NLP, enables people to speak their native tongue to computer systems. There have been several voice assistants created, and they are always being enhanced to function better.

Pranav Ambhore and et al. [7] cited in this paper the possibility of employing new technologies to create an intelligent virtual assistant that can use user-based data and natural language processing. It looks at current intelligent programs with various support categories and assesses how beneficial a certain piece of software might be as a virtual assistant. The suggested virtual assistant should be able to store and analyze user data, interact socially using natural language processing, and function without programming or human interaction. In the future, it is evident that the development of virtual personal assistants may become a reality as technology advances.

Kaustubh Lakade and et.al. [8] cited in this paper that voice control is a significant emerging element that modifies the lifestyle of the people. Voice assistants are frequently found in laptops and cell phones. Operating systems that can identify human speech and react with integrated voices are known as AI-based voice assistants. This voice assistant will record audio from the microphone, use speech recognition software to turn it into text, then send it over Google Text to Speech (GTTS). The GTTS engine will turn text into an English-language audio file, which will then be the Python computer language's play sound module. The primary responsibility of a voice assistant is to reduce the amount of time spent using input devices like keyboards, mouse, touch screens etc.

P. Pooja and et al. [9] cited in this paper about a personal assistant for Windows that is built on Python. A personal assistant is a piece of software that, when given instructions, completes tasks or responds to inquiries. It uses the command line interface to carry out a variety of operations and grasp voice commands. Without using a keyboard, a user can send and read emails, download images, browse the Internet, open and close various applications, get product reports, track products, get weather and news updates, check trending topics on Twitter. As technology has developed, the reliance of people on computers has grown drastically, because they want their assistants to be more intelligent. Because of this, the users have shifted from text input to vocal input.

Indrajit Roy and et.al. [10] cited in this paper that AVATAR (AI Virtual Assistant Technology for Automatic Response) is a cutting-edge voice assistant that combines Python and Artificial Intelligence (AI) to provide interactions that are similar to those of a human. It does a variety of tasks with ease, like sending emails and searching Wikipedia. Ultrasonic sensors for face identification and object detection are incorporated into the system's design, along with necessary Python libraries. It is implemented using Python language due to its large library and simple syntax. The security features of AVATAR include password protection and biometric authentication. Although internet access is essential for optimum performance, the system consistently functions within its specified input range. This work improves user experience and efficiency by marking a significant advancement in AI-driven apps.

Usha Dhankar and et al. [11], cited in this paper, An Intelligent Desktop Assistant (IDA) or AI-based Assistant (AIA) is generally a software program that performs certain tasks or operations on private and direct command. Generally, the word "chatbot" is used to describe certain virtual assistants that are particularly accessible through online chat. These days, there are certain internet chatbots that are only there for pleasure and

amusement. A number of virtual assistants are sufficiently advanced to grasp, assess, and decode human speech.

Apart from the above tasks, these assistants have computerized voices that are programmed to react accordingly. Customers can ask the desktop assistants questions or give them instructions to play media on their devices automatically. With easy voice instructions, these assistants facilitate users to control a number of other fundamental tasks, like calendars, emails, and to-do lists.

Anmol Sharma and et.al [12] cited in this paper how to integrate a virtual assistant framework with Selenium automation to retrieve Google search results in real time. By utilizing Selenium's capabilities, the virtual assistant improves responsiveness and user experience by providing timely, accurate responses. With a focus on individualized support, the assistant uses machine learning algorithms to adjust to user preferences and gradually increase efficacy. In order to ensure a secure interaction process, privacy and data security are crucial. The assistant keeps accuracy and dependability through ongoing improvement and feedback systems. It uses AI and NLP to understand and interact with natural language because it is built with extensions for Python. Gemini AI's capabilities are further enhanced by ChatGPT's integration, which provides contextually rich and tailored responses. This combination of AI technologies enables the assistant to support a range of user requirements, including from decision support to information retrieval, virtual assistant technologies are being revolutionized for increased user satisfaction and engagement.

Rishabh singh and et.al [13] cited in this paper that the Virtual assistants (VAs) are computer programs that can serve as useful companions by carrying out chores and providing information on behalf of a user. The voice commands or chat interfaces are regularly used to reach these complicated systems. The potential of VAs is examined by considering visually impaired people by encouraging increased independence and social inclusion. The study investigates the fundamental elements of a virtual assistant system as well as the many kinds of virtual assistants. Interfaces for virtual assistants that are accessible to those with visual impairments are given special attention. The research demonstrates how VAs can be useful in many facets of daily life and discusses possible uses for them in this context. Different tasks that fall under this category are making calendars, sending reminders to read texts aloud etc. The virtual assistants have the authority to develop the lives of those who are blind or visually impaired by encouraging improved freedom and social interaction.

3. Proposed System

The voice assistants are gadgets or applications that react to people by using artificial intelligence, natural language processing, and speech recognition technologies. The device uses the technology to synthesize, deconstruct, assess, and provide a relevant response to the user's message. There are several different voice assistants on the market right now that provide a wealth of functionality for customers. Since few virtual assistants specialize in the financial industry, the suggested method primarily targets this sector. Facilitating the user’s easy and convenient interpretation of financial data is the system’s primary goal. The flowchart for the proposed system can be represented in the figure below:

Novelty of Proposed System

The proposed solution has better performance than the solutions that were documented in earlier works [1] to [13] in the following ways:

- **Enhanced User Experience Through Voice Integration:** The users no longer need to utilize a keyboard and mouse to engage with the system. For those users, who are multitasking or would rather not interact with conventional interfaces, this makes it convenient. Users can ask questions like "What is the last trading price of Tesla?" and the assistant will provide them with a voice reply right away, making the procedure easier. For users who might not be familiar with certain financial lingo or procedures, the system's ability to comprehend commands in normal language makes it easier to operate. Voice recognition technology improves overall usability by allowing users to express inquiries in a conversational way.

- **Real time Stock and Portfolio Monitoring:** To guarantee that consumers always have the most recent information, the voice assistant gives real-time stock prices, trends, and financial indicators. Without having to

go through intricate financial websites or programs, this capability enables investors to make well-informed selections fast. The users of the system can keep an eye on the performance, gains, and losses of their portfolio at all times. This gives people a clear image of the real-time performance of their assets. Users can easily monitor their investments on a daily, weekly, or monthly basis by receiving real-time data on portfolio performance.

- **Increased accessibility and convenience**: For people with disabilities, such as eye impairment or limited mobility, who might find it challenging to use standard web-based interfaces, voice assistants provide a more accessible interface. Users with different technical skill levels can interact with complicated financial systems more easily because of the voice-driven method. While managing their investments, the users can work on other projects. For example, a user can receive stock updates or make adjustments to their portfolio while cooking, commuting, or performing home tasks without interfering with their productivity. Busy professionals that require rapid updates or changes while on the fly will find this hands-free operation especially helpful.

- **Trend Visualization**: The assistant assists users in visualizing their financial status and the performance of their investments over time by presenting graphs and charts of historical data and market patterns. For inexperienced investors in particular, visual aids like pie charts and line graphs simplify the interpretation of intricate financial data and patterns.

- **Faster Decision Making**: Compared to using standard interfaces, voice commands enable users to get information and make decisions more quickly. Users don't have to wait for pages to load or intricate reports to be prepared in order to obtain real-time data on the stock market and their portfolio. Particularly for traders or investors who must act swiftly in a market that moves quickly, this efficiency saves a significant amount of time.

4. Results

The basic input screen

It acts as the primary interface between the user and the system. It serves as the entry point to the assistant's features, allowing users to easily access financial statistics, stock forecasts, and current prices by text or speech. It is essential to provide a seamless and intuitive experience when predicting shares or retrieving financial data.

It is depicted in the fig. 4.1.

Fig. 4.1 Basic Input Screen

Last Trading price of stock

This screen helps the user to view real-time information on the most recent market prices for equities they are interested in. It is a crucial part which provides current stock prices, historical trends, and other relevant market information in an easy-to-use interface. By integrating real-time data, graphs, voice feedback, and refresh functionality, this interface ensures that users have immediate access to the most recent stock market information. It is depicted in the fig. 4.2.

Fig. 4.2 Last trading price of stock

Market capital intent

It shows the current market capitalization information for different stocks. It helps the user to make well-informed investment decisions by providing real-time updates, historical trends, and comparisons with other financial measures. It is depicted in the fig. 4.3

Fig. 4.3 Market Capital Intent

45 days candlesticks chart intent

This screen offers an engaging and dynamic representation of a stock's price changes over the previous forty-five days. It provides users with useful stock market insights to assist them in making well-informed financial decisions by combining dynamic updates, historical comparisons, and interactive features. It is depicted in the fig. 4.4.

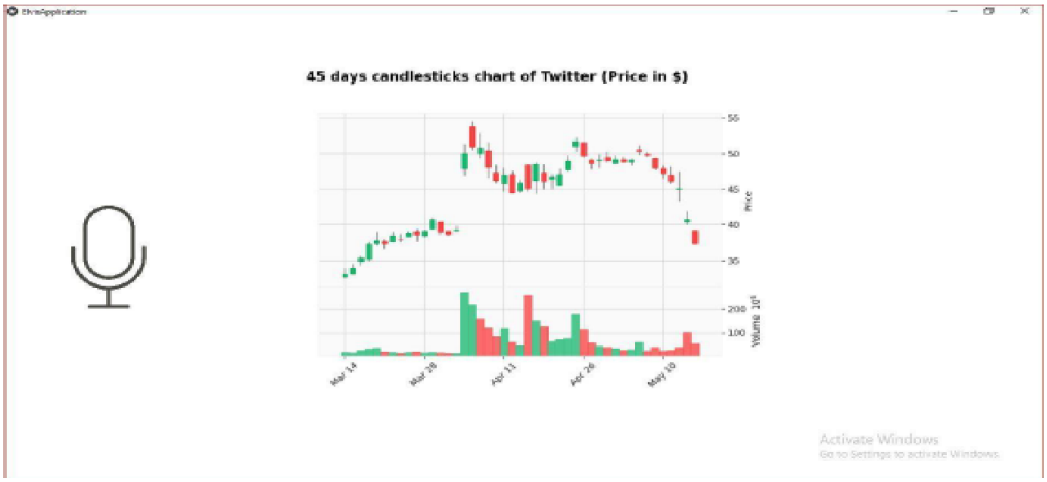

Fig. 4.4 45 days candlesticks chart intent

Maxline chart intent

The Maxline Chart, which shows the highest price a stock hits over a specified time period (such as 45, 90, etc.), assists users in determining whether a stock is approaching, surpassing, or dropping below its previous highs. It facilitates identifying pricing trends. In particular, this kind of chart helps with market mood.

Fig. 4.5 Maxline chart intent

Renko chart intent

This screen helps the users to observe changes in stock prices, identify patterns, and improve their investment choices with the aid of this screen. The combination of the Renko chart, voice feedback, and interactive features like brick size adjustment and data refresh may help users to comprehend stock movement more precisely and clearly. It is depicted in the fig. 4.6.

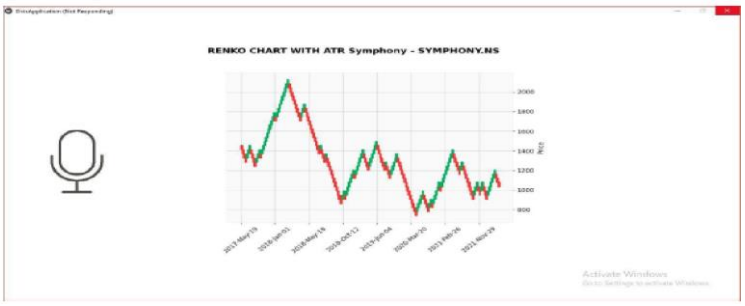

Fig. 4.6 Renko chart intent

Show Watchlist intent

This screen helps the customers to easily monitor and manage a personalized stock list. By offering features like stock addition and deletion, data updating, and voice feedback, it enhances the user experience and enables users to better manage their assets. It is depicted in the fig. 4.7.

Fig. 4.7 Show Watchlist intent

50 day moving average intent

It allows users to interact with and track the performance of stocks. By displaying the 50 DMA on a chart and providing audio commentary, the assistant assists users in identifying trends, understanding market movements, and making informed decisions regarding the purchase or sale of stocks. This feature enhances the financial decision-making process by combining voice interaction, real-time data retrieval, and the strength of technical analysis. It is depicted in the fig. 4.8.

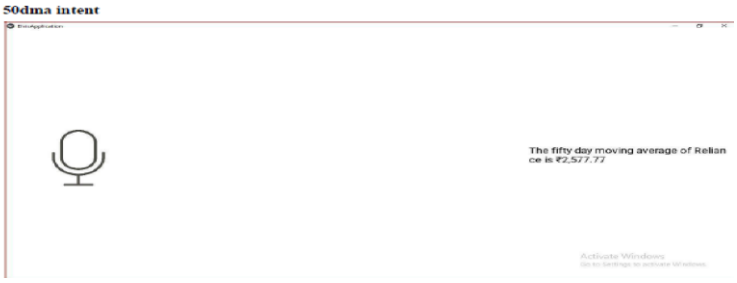

Fig. 4.8 50 day moving average intent

5. Future Enhancement and Conclusion

5.1 Future Enhancement

A variety of dimensions can be used to parameterize the future of voice assistants. There is still much work to be done in terms of compatibility and integration with other things. The unnecessary wake words that are used at the start of every order would be another dimension. One major issue is the distinctiveness of the findings. Generally speaking, however, these technologies have a promising future. With advancements in it and associated technologies (such as search procedures), voice assistants may now perform increasingly more complicated jobs, such as making reservations for events. The Artificial Neural Networks could be implemented

in the present system to give more individualized experiences that are distinctive to each user. It is possible to add more functions like price prediction and live portfolio management. Additionally, the system can be developed to support several platforms by creating distinct websites, mobile apps, etc.

5.2 Conclusion

The user's interactions with the technologies built into their gadgets have changed radically as a result of voice assistants. Like any other technology of the size, they have changed the essential structure of the field they work in. Although previously uninformed about technical advancements, this has considerably improved the world and benefited communities. But, it has brought new risks to user security and privacy. A systematic overview of the design and construction of a voice-activated personal assistant for a PC using the Python programming language is provided by the system. User-friendliness is the key design element of this personal assistant. The Assistant functions well when the user assigns it duties. Moreover, this assistant has a wide range of capabilities. The primary focus is on the financial aspect; with a single voice command, the user can get the most recent market prices, charts, and trends.

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