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Enhanced Virtual Assistant (EVA)

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Abstract:- Students can obtain individualized and knowledgeable guidance via personal AI desktop assistants, which can help them succeed academically and advance equity and inclusion. However, building usable user interfaces, assuring correct speech recognition, and creating effective job execution modules are all difficulties in the development of such assistants. This paper proposes a Python-based personal AI desktop helper. A highly accurate speech recognition module, a task execution module, and a user interface designed with people with visual impairments in mind are all included in the assistant. The task execution module can do a range of tasks, including reading textbooks, taking notes, and finishing assignments. This research has the potential to lead to the creation of powerful personal AI desktop assistant - EVA for students using Python. These aides can provide a more inclusive learning environment and help level the playing field for students with impairments.

The necessity for specialized technical solutions to address the particular academic needs of students has never been more urgent in an era of growing digital connectedness. In especially for those with visual impairments, this research addresses current concerns about data privacy, reliable speech recognition technologies, and accessible user interfaces. Through this project, we hope to promote a more welcoming and encouraging learning atmosphere in addition to improving academic performance. The assistant makes sure that visually impaired users have a seamless encounter by utilizing clear voice-guided navigation and other input options. We want to create a more inclusive and encouraging learning environment in addition to improving academic success through this project. Additionally, to the subject of educational technology, this research contributes to broader concerns on inclusivity and accessibility in digital applications.

Keywords:- *Intelligent Personal Assistant(IPA), Virtual Assistant, Artificial Intelligence(AI), Text-to-Speech(TTS), Graphical User Interface(GUI), Speech-too-Text(STT), Enhanced VirtualAssistant(EVA).*

I. INTRODUCTION

The field of education is ready to undergo change in an era marked by unheard-of technological growth. A more inclusive and individualized learning environment is promised by the fusion of cutting-edge digital solutions and the pedagogical landscape. But this project is not without its difficulties.

As the digital environment grows, worries about data privacy have become of the utmost significance, needing strong safeguards for sensitive data. A growing public concern for privacy and high-profile breaches highlight the need for immediate implementation of strict security measures in all digital applications. This study tackles a number of current problems that touch on accessibility, technology, and education. The pursuit of highly accurate speech recognition technology, a necessary component for the efficiency of the suggested Personal AI Desktop Assistant, lies at its foundation. This project is ready to set sail for a more fluid and natural connection between users and their AI counterparts, recognizing the possible frustrations resulting from erroneous detection.

In this ever-evolving environment, our research serves as a reflection on the pressing contemporary challenges at the interface between education, technology and accessibility. At the core of our investigation is the search for highly precise speech recognition technology as a foundation for the efficacy of the proposed PDA. To close gaps in educational equity and diversity, the initiative proposes an Enhanced Virtual Assistant. The assistant emphasizes stringent privacy safeguards and cutting-edge speech recognition, providing students with specialized

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support for activities like reading textbooks and grasping difficult ideas. We understand the significant implications of inaccurate recognition on user experience, and our project is well-positioned to chart a path towards a smoother and more intuitive connection between users and AI.

The project also faces the difficulty of creating an inclusive user experience that is especially suitable for those with visual impairments. A group of students with and without impairments rated the helper. The evaluation's findings demonstrated how precise, effective, and user-friendly the helper was. Additionally, it was discovered that the helper helped students with impairments access and complete their academic work more independently. We work to remove accessibility obstacles by offering different forms of engagement and making sure the assistant efficiently conveys information to people who rely on auditory or tactile feedback. This project also deals with a second urgent problem, which is the requirement for educational technologies that promote equity and inclusion.

Personal AI desktop assistants offer tailored and knowledgeable support to students with impairments and are designed as educational equalizers. The assistant's potential to facilitate academic performance and act as a catalyst for a more welcoming learning environment is enormous.

Table 1 AI Desktop Assistant Stats

Feature	Data
Number of users	1 billion+
Students using AI desktop assistants	50%+
Physically disabled people using AIdesktop assistant	30%+
Productivity increase for students	15%+
Productivity increase for physicallydisabled people	20%+
Average number of features offered	10+
Average number of languagessupported	5+

This initiative is poised to break down traditional barriers to communication by utilizing cutting-edge speech recognition technology. We will demonstrate how a EVA can be a transforming force, empowering students with a range of skills to confidently negotiate challenging educational terrain through case studies and examples. In order to reshape the educational landscape into one that is not only technologically cutting-edge but also inclusive, egalitarian, and accessible to everyone, this paper sets out on a journey across the intersection of technology, education, and accessibility.

II. LITERATURE REVIEW

➢ *Below are the following Publications which are Dealing withthe AI Desktop Assistant.*

- Varoka-Chatbot: An Artificial Intelligence Based Desktop Partner [2023] – by Penaka Sai Varshita Reddy. This paper discusses the creation of VAROKA, a system that uses voice commands to provide user's desktop control. We cover the significance of artificial intelligence and the advantages of Python development with the PyCharm IDE. The primary shortcoming of this study is the absence of comparative research with other virtual personal assistants or related systems that are already in use.
- AI based Desktop Voice Assistant for Visually Impaired Persons [2023] – by Ankit Lal Sinha. The goal of this paper is to create a desktop voice assistant using AI technology that can help people with visual impairments. This paper follows a modular approach to the development of a voice assistant called SKYE. The only downside is that the voice assistant created in this paper is only available in English.
- Voice Recognition System for Desktop Assistant [2023] – by Sudhanshu Gonge. The goal of this research is to facilitate a natural and efficient connection between a user and their computer through spoken language. To achieve this, the authors collect a wide range of audio recordings and corresponding transcriptions from a variety of sources, including user interactions with the integrated Chat GPT. This data can be used to train and test the system, as voice recognition systems may struggle to accurately transcribe spoken language, particularly in noisy environments or with non-standard accents and dialects.
- Voice Assistant Integrated with Chat GPT [2023] – by Ilman Shazhaev. The main focus of the research is to investigate the integration of Chat GPT with voice assistant technology and its application in a digital gaming environment. The research paper uses a combination of qualitative and quantitative research methods to achieve its objectives. The authors collect data from a variety of sources, including user interactions with the integrated Chat GPT. The research is based on data collected from user interactions, which may be limited in scope and duration. Furthermore, long-term user behavior and trends may not be fully captured.
- "JARVIS" - AI Voice Assistant [2023] – by Priya Dalal. The goal is to develop an Artificial Intelligence (AI) voice assistant that can perform a variety of tasks and functions to support users in their daily lives. Currently, AI voice assistants struggle to comprehend the context of conversations, and often lack the capacity to recall past interactions or maintain a cohesive dialogue.
- AI Based Virtual Assistant [2023] – by Arun Kumar. The aim is to improve user convenience and accessibility by enabling Artificial Intelligence to respond effectively to human interactions. Building an effective AI-based virtual assistant is a continuous process that requires continuous improvement based on user feedback and changing requirements. It requires a multi-disciplinary

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team withexperience in AI, Natural Language Processing (NLP), andsoftware development, depending on the use cases of the assistant. Virtual assistants have a hard time keeping track of what's going on during long conversations, which makes it hard for them to understand complicated requests or keep conversations organized.

- AI Driven Voice Command Henchman [2022] – by Harshit Saluja. The purpose of the study is to evaluate the effects of intelligent and sustainable technologies on energy and power. This methodology involved conducting a literature review to gain an understanding of the current state of research and to identify any areas of knowledge deficiency. Data was sourced from a variety of journals. This paper is subject to limitations due to its limited sample size and potential biases in the data collection process.
- Automated Sinhala Voice Assistant to Manage Tasks using Natural Language Processing Voice [2022] – by K.H.I.R. Senarathne, This paper is all about creating an automatic Sinhala voice assistant that can take care of tasks using natural language processing. It uses machine learning and natural language processing technologies to make it happen. The voice assistant is trained using a computer vision-based algorithm for face detection. The accuracy of the voice assistant will depend on the quality of the speech recognition and NLP models used, so it's likely that it'll only make a few mistakes.
- The Creation of an AI-Powered Virtual Assistant by and for Students – [2020] by Donald Ipperciel. The goal of this article is to explore how a focus on 'student centeredness' can lead to innovation and how innovation can improve student centeredness. In the student services field, professionals use various creative methods to improve service and student engagement. These methods include student journey mapping, and pain points, developing student personae, and a student centered perspective. The paper does not provide a detailed analysis of the social and ethical implications of SVA technology.

III. METHODOLOGY

The user utilizing the AI desktop assistant is referred to as the user. Voice commands, text-based input, or a combination of the two may be used for this exchange. The user gives directions, poses queries, or designates particular jobs for the assistant to complete. EVA is developed and operated within the Python software environment. It consists of frameworks, libraries, and tools that make it possible to implement a range of functionalities, including natural language processing, voice recognition, and communication with outside services. With the use of voice recognition technology, spoken words can be translated into written text. It makes it possible for the AI desktop assistant to comprehend and execute user voice commands. This technology analyzes audio signals using algorithms to determine the words that correspond to them. Natural Language Processing (NLP) is a subfield of artificial intelligence that studies how computers and human language interact. It makes it possible for the enhanced virtual assistant to comprehend, decipher, and react to user input in natural language. Language translation, named entity recognition, and sentiment analysis are examples of tasks that fall under NLP.

Fig 1 Flow Chart

The fundamental collection of formulas and guidelines thatcontrol the AI desktop assistant's actions is known as the assistant logic. It establishes how the assistant processes requests, understands input from the user, and produces pertinent answers. Conversation flow control, state management, and decision-making algorithms are a few examples of this logic.

Managing tasks entails setting priorities and arranging the different requests and tasks that the assistant can complete. This part makes sure that tasks are completed and that user requests are handled effectively. Getting information or content from outside sources, like databases, web APIs, or online services, is known as information retrieval. With the help of this part, the EVA can collect pertinent data in order to respond appropriately to user inquiries or fulfill requests. User interaction includes all of the means by which the user and the AI desktop assistant communicate. This can involve responding verbally using voice synthesis, producing text- based responses, or even offering visual feedback. Any third- party resources or APIs that EVA uses to carry out particular operations or obtain data are referred to as external services. Examples include search engines for online queries, mapping services for location-based tasks, and weather APIs for weatherdata. The series of actions and procedures that take place inside the assistant when a user interacts with it is referred to as the execution flow. This process entails taking in user input, processing it using NLP and voice recognition, carrying out tasks, getting data, and producing a response that will be shownto the user.

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IV. OBJECTIVES

The primary goal of this project, which aims to develop a personal AI desktop assistant, is to improve accessibility and inclusivity for students, especially those with different abilities. The creation of a user-friendly interface with functionalities catered to the requirements of people with disabilities is essential to this attempt. The assistant will specifically be made to offer vital assistance to kids who have vision problems. To ensure that all users can communicate with the assistant naturally and independently, this includes integrating accurate speech recognition, screen reader compatibility, and alternate interaction techniques. This goal aims to empower visually impaired students by developing a seamless interactive experience that will enable them to navigate instructional information on their own.

Create cutting-edge tech solutions that are suited to the academic requirements of students in an era where digital connectivity is growing. Heightened public awareness of privacy rights and high-profile data breaches have led to a major concern for data privacy. Create speech recognition technology that is incredibly accurate. Put in place strong data privacy safeguards. Create a user interface that is accessible to those who are visually impaired. Make that the screen readeris compatible.

Provide a voice-guided navigation system that is easy to use and effective to enable smooth communication. Include alternate input techniques for people who are blind or visually impaired, such as keyboard shortcuts. Engage in thorough user testing and actively solicit input from users who areblind or visually impaired to improve the user interface and interaction model. Maintain a committed focus on tracking and quickly resolving any new privacy-related problems or vulnerabilities. By regularly updating the project and making technological improvements that are in line with changing standards and user requirements, the project's long-term viability is ensured. Promote accessibility for everybody, helping to create a more welcoming online space for people with visual impairments.

By developing precise speech recognition technology, putting in place strong data privacy, and creating an accessible user interface for people with visual impairments, you may produce a digital assistant that is truly inclusive. To help create a more open and secure digital space for everyone, engage with users and uphold a diligent attitude onprivacy.

Additionally, regardless of a student's aptitude, the project aims to enhance academic success for all of them. The tutor will be prepared to help students with a variety of academic duties, from reading textbooks and taking notes to finishing assignments and understanding challenging material. With alternative explanations and engaging learning opportunities, this extensive assistance system will be an essential tool for kids with learning impairments. Alongside this, strict privacy controls would be put in place to allay users' worries about data security and their right to privacy. The project seeks to develop a strong and useful tool that not only satisfies the unique demands of students with disabilities but also helps to a more inclusive and equitable educational environment.

V. DESIGN FLOW

Python-based personal AI desktop assistant development requires a methodical approach. Determine the range of duties the assistant will carry out by first specifying its goals and domain. Python's vast library system makes it the perfect choice for development. Python and other necessary programs to be installed to set up your development environment. Create a user interface with text or voice input fields and a space for responses. Use natural language processing techniques like spaCy or NLTK to translate spoken commands into text and integrate speech recognition using libraries like Speech Recognition. Use a text-to-speech program to provide vocal feedback. Create a command processing system that utilizes NLP to recognize anddecipher user inquiries. Utilize Python libraries and APIs to incorporate numerous capabilities such as scheduling, web searching, and entertainment. Use machine learning to develop continuously while protecting user and data security. Create user profiles and customized settings, offer users help with onboarding and guides, and collect user feedback. To ensure security and relevancy, it is crucial to do thorough testing before deployment and dissemination. In accordance with data protection laws and moral AI principles, address legal and ethical issues.

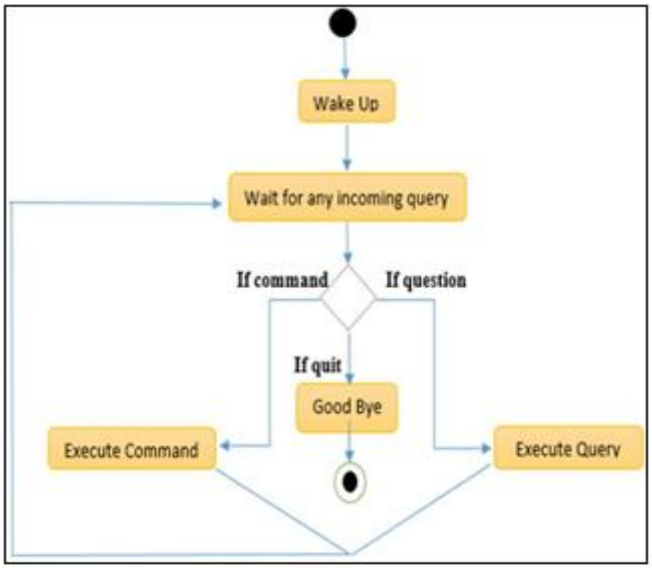

Fig 2 Design Flow for Query Execution

This all-inclusive strategy will aid in the development of a Python-based personal AI desktop assistant that is useful and approachable. The duration of the system's constant listening can be changed in accordance with the needs and preferences of the user. To accommodate various user needs, the system offers flexibility in modifying the listening time. Depending on the user's option, the system can have a male or female voice. The system's current version supports a number of features, including playing music, accessing email and SMS, searching Wikipedia and

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reading results aloud, startinginstalled applications, opening web browsers, and more. Python-based personal AI desktop assistant design requires a careful and thorough process to effectively satisfy user expectations. The interface should be simple to use and provide both voice and text inputs for flexibility. It should be equipped with natural language processing capabilities to efficiently comprehend and address customer inquiries.

```python
chatStr = ""
def chat(query):
    global chatStr
    print(chatStr)
    openai.api_key = apikey
    chatStr += f"Harry: {query}\n Jarvis: "
    response = openai.Completion.create(
        model="text-davinci-003",
        prompt=chatStr,
        temperature=0.7,
        max_tokens=256,
        top_p=1,
        frequency_penalty=0,
        presence_penalty=0
    )
    # todo: Wrap this inside of a  try catch block
    say(response["choices"][0]["text"])
    chatStr += f"{response['choices'][0]['text']}\n"
    return response["choices"][0]["text"]
```

Fig 3 Code Implementation (i)

A graphical user interface (GUI) that allows users to speak ortype commands could be created to enable seamless interaction. Making sure that user interactions and data are secure is important, especially if your assistant handles sensitive information. To improve the performance and accuracy of the helper, extensive testing and iteration are necessary. Select a distribution strategy, such as building a stand-alone desktop application or putting it in the cloud for remote access, and offer user guides to show people how to use your assistant efficiently. These instructions will show you how to use Python to build a strong and useful personal AI desktop helper. The assistant must receive regular upkeep and updates to remain effective. The EVA is user-focused, adaptable, and always evolving to meet a variety of userneeds.

A task management system, knowledge base, and user interface are all features of our assistant. The user interface can be either a graphical user interface (GUI) or a command- line interface (CLI), and it allows us to schedule and carryout tasks. Use a package like PyAudio to record voice input if you want to include voice interaction. Depending on how itwill be used, integrate your assistant with third-party APIs and services like Google Calendar or weather. Create conversational logic to enable context-aware interactions and error handling to handle situations where the assistant is unable to understand or complete a task.

```
es > clap_detection.py > ...
#clap detection
import pyaudio
import struct
import math

INITIAL_TAP_THRESHOLD = 0.1
FORMAT = pyaudio.paInt16
SHORT_NORMALIZE = (1.0/32768.0)
CHANNELS = 2
RATE = 44100
INPUT_BLOCK_TIME = 0.05
INPUT_FRAMES_PER_BLOCK = int(RATE*INPUT_BLOCK_TIME)
OVERSENSITIVE = 15.0/INPUT_BLOCK_TIME
UNDERSENSITIVE = 120.0/INPUT_BLOCK_TIME
MAX_TAP_BLOCKS = 0.15/INPUT_BLOCK_TIME
```

Fig 4 Code Implementation (ii)

VI. RESULT

As we consider the potential outcomes of this research project, a number of exciting avenues come to light, all of which have the capacity to have a substantial influence on the field of educational technology and accessibility. The project's fundamental focus on accurate speech recognition technology and its steadfast dedication to diversity constitute the foundation for these projected outcomes:

- Better Academic Support: It is anticipated that the personal AI desktop assistant (EVA) will improve academic support for students, particularly those with disabilities. Better academic achievement and grades could result from this.
- Enhanced Accessibility: It is projected that the assistant's features, including inclusive user interfaces and precise speech recognition, will improve the usability of educational materials for students with visual impairments. A more inclusive learning environment might arise from this.
- Effective Task Execution: Reading textbooks, making notes, and finishing assignments are just a few of the tasks that the task execution module can handle. It is anticipated that users will be more productive and efficient with this functionality.
- Positive User Feedback: It is projected that users, with and without impairments, will provide the assistant with positive feedback based on the evaluation described in the paper. The assistance may prove to be precise, efficient, and easy to use for users.
- Increased Independence for Users with Visual Impairments: According to the evaluation's findings, users with visual impairments will interact with the assistant more naturally. This might result in more autonomy when it comes to finishing schoolwork.
- Improved Data Privacy Measures: Users should feel more confident about the security of their information thanks to the project's strong data privacy measures.
- Developments in Speech Recognition Technology: The project's emphasis on precise speech recognition technology is probably going to result in a lot of progress in this field, which could have wider applications.

- Encouragement of Inclusivity in Educational Technology: The project adds to the ongoing discussion about digital applications' accessibility and inclusivity, especially in thecontext of education.
- Contribution to Universal Accessibility: The project aims to promote universal accessibility by developing an inclusive AI desktop assistant, thereby fostering a more inclusive digital environment for people with visual impairments.
- Technological Developments in Speech Recognition: The project's emphasis on extremely precise speech recognition technology could lead to significant developments in this area. This may have repercussions that go beyond the project's parameters and could advancespeech technology in a variety of contexts.

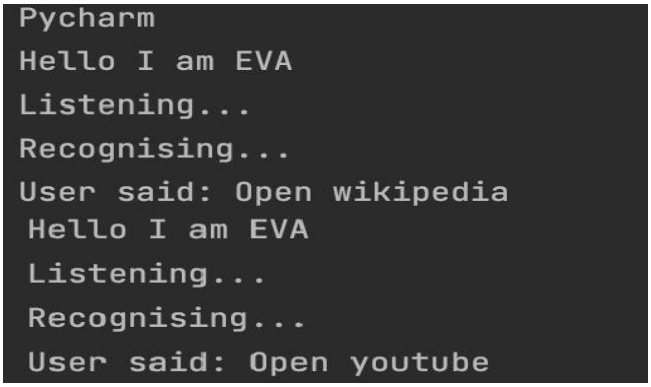

Fig 5 Output

VII. CONCLUSION

To sum up, in an age of rapidly advancing technology, this study initiative represents a forward-thinking strategy to meeting the urgent requirements of students, especially those with visual impairments. Through the project's emphasis on developing solid data protection controls and extremely accurate speech recognition technologies, a foundation for a breakthrough personal AI desktop assistant called EVA is laid. The possible consequences have ramifications for inclusive educational practices and voice technologies in general, far beyond the immediate area. The focus on accessibility and diversity in educational technology is in line with the broader conversation in the sector. Through customization of solutions to address the unique academic needs of a diverse student body, this project promotes a more inclusive learning environment.

- A rise in productivity: Repetitive tasks like email management, appointment scheduling, and reminders can be automated by AI assistants. People can now devote more of their time and mental energy to meaningful and creative endeavors as a result.
- Institution: AI assistants are capable of organizing and prioritizing documents, emails, and tasks. This facilitates finding information quickly when needed.
- Customization: AI assistants get to know users' preferences and suggest things based on their exchanges with them. This implies that users' AI assistants get more helpful and customised to meet their needs the more they engage with them.
- Repeated upgrades and technical developments: AI assistants are always receiving updates with new functionalities. This guarantees their continued relevance and usefulness over time.
- Design with the user in mind: The project's design prioritizes user needs. This indicates that it is user-friendly and suitable for individuals with disabilities.
- Serious consideration of privacy issues: The project gives careful thought to privacy issues. Users can therefore feel secure knowing that their data is protected.

In conclusion, this study project is evidence of how technology has the ability to completely transform learning environments. A new era of accessible learning is made possible by the combination of inclusive design, data privacy, and precise speech recognition. In the future, this project's influence might extend much beyond its local surroundings, promoting breakthroughs in speech technology.

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