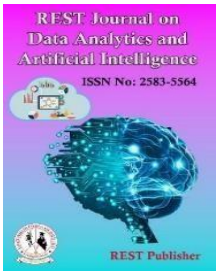
REST Journal on Data Analytics and Artificial Intelligence
Vol: 4(1), March 2025
REST Publisher; ISSN: 2583-5564
Website: http://restpublisher.com/journals/jdaai/
DOI: https://doi.org/10.46632/jdaai/4/1/92



AI-Powered Voice Assistant for Web Automation and App Review Analysis

Pradnesh Deshpande, Afisu Hrushikesh, Sai Krishna Gudipati, M. Srinadh Swamy
Anurag University, Hyderabad, Telangana, India.
*Corresponding Author Email: 21eg107b40@anurag.edu.in

1. INTRODUCTION

In recent years, voice-controlled assistants have become an integral part of daily life, enabling users to interact with devices through voice commands. However, existing voice assistants often lack personalization, contextual understanding, and the ability to perform complex tasks such as app review analysis and website summarization. This project, named Phoenix, aims to bridge this gap by leveraging Python's speech recognition and text-to-speech (TTS) capabilities, Selenium for web automation, and advanced Natural Language Processing (NLP) for app review analysis. The integration of Large Language Models (LLMs) and the Google Generative AI Gemini API further enhances the system's ability to provide personalized insights and optimized app summaries [1-6].

2. BACK GROUND

The primary objective of this project is to develop an automated solution that efficiently analyzes and categorizes user reviews from mobile apps, such as those on the Google Play Store, while enabling users to interact with devices through voice commands [7-9]. The system integrates Google Generative AI Gemini API for natural language processing and Hugging Face Transformers for website summarization and optimized app review analysis [10-16]. The key challenges addressed in this project include:

- High-Quality App Reviews: With the increasing volume of app reviews, extracting meaningful insights require advanced NLP techniques [17].
- Scalability: The system must process large datasets efficiently, especially in real-world applications [18].
- Real-Time Analysis: The system must provide real-time or near real-time responses to user queries [19].
- Dataset Diversity: The system must generalize well across different types of app reviews and user inputs [20].

3. LITERATURE REVIEW

TABLE 1. Literature Review

S. no.	Author(s)	Title	Published	Proposed System	Advantages	Limitations
1.	Nasirian, F., Ahmadian, M. and Lee, O.K.D	AI-based voice assistant systems	(2017).	Develop and communicate clear, user-friendly privacy protocols that explain how data is collected, stored, and used, increasing user trust and encouraging	AI-based voice assistants enhance user experience by enabling natural, conversational interactions, making it easier and more intuitive for users	The privacy and security of their personal data, potentially leading to a lack of trust in voice assistant systems, especially when sensitive information is involved.
2.	Patil, Jaydeep, Atharva Shewale, Ekta Bhushan, Alister Fernandes, and Rucha Khartadkar.	"A voice based assistant using Google Dialogflow and machine learning."	2021	Combine cloud-based services like Google Dialogflow with local machine learning models to reduce dependency on external platforms, enhancing customization, privacy	By leveraging Google Dialogflow and machine learning, the voice assistant can offer more accurate and dynamic natural language processing, enabling better interaction with users	The system's reliance on Google Dialogflow means it is subject to limitations and changes made by the platform
3.	Klein, Andreas M., Andreas Hinderks, Maria Rauschenberger, and Jörg Thomaschewski.	"Exploring Voice Assistant Risks and Potential with Technology -based Users."	2020	Implement iterative feedback mechanisms that include non-technical users to capture a wider range of concerns, ensuring that future voice assistant	The study helps in identifying key risks, such as data privacy and misuse, while highlighting potential benefits of voice assistants	The focus on technology-based users may overlook the needs and concerns of non-technical users, leading to a limited understanding

These studies show the potential of voice assistants to revolutionize user-device interaction while also addressing important challenges such as security and privacy.

4. METHODOLOGY

The Phoenix voice assistant is designed using a combination of Python libraries and external APIs to provide a wide range of functionalities. The core components include:

- Speech Recognition: Uses Python's speech recognition library to convert spoken commands into text.
- Text-to-Speech (TTS): Employs pyttsx3 to generate voice responses.
- Information Retrieval:
- Wikipedia: Custom module inflow fetches and summarizes information.
- YouTube: Custom module YouTube Video automates video playback.
- App Review Analysis:
- Uses Google Play Scraper to fetch app reviews.
- Analyzes reviews using NLTK for keyword-based categorization.
- Ranks apps based on security, UI, accessibility, response time, and personalization scores.
- NLP Integration:
- Google Generative AI Gemini API: Handles complex queries and generates context-aware responses.
- Hugging Face Transformers: Optimizes website summarization and app review analysis.

5. IMPLEMENTATION

The system is implemented through a series of structured steps:

1. Speech Recognition and Command Detection: The assistant listens for user commands through a microphone and

processes the input using the speech recognition library.

Information Retrieval:

- For information requests, the system uses the inflow module to search Wikipedia and provides a verbal summary.
- For YouTube-related queries, the YouTube Video module fetches and plays the requested videos.

2. App Review and Recommendation: The App Review Analyzer module analyzes app reviews and recommends the best apps based on sentiment analysis.
3. Google Generative AI Integration: The Gemini API enhances the assistant's ability to handle complex queries, generating detailed and contextually appropriate responses.

6. RESULTS

Best App Analysis:

- The system analyzes app reviews and ranks apps based on criteria such as security score, UI score, accessibility/empathy score, response time score, and personalization score.

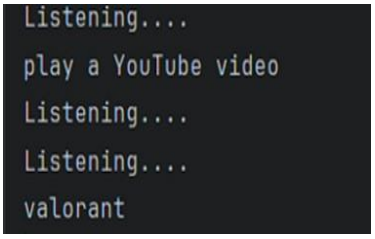
Example:

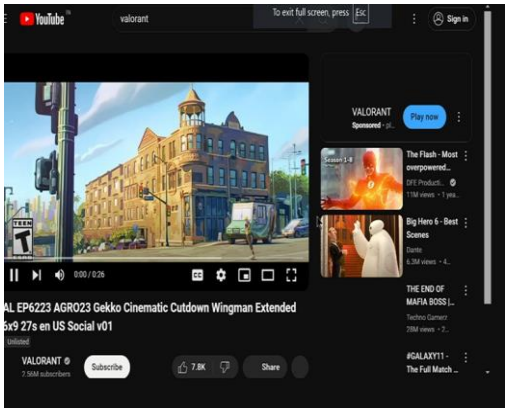
App Name: Height Increase Workout Total Rank (lower is better):
23.00
Strong Areas: Accessibility/Empathy, UI, Convenience Weak Areas: Quality, Security, Personalization

YouTube Query Automation:

The system listens to user commands and plays requested YouTube videos.

- Ex:





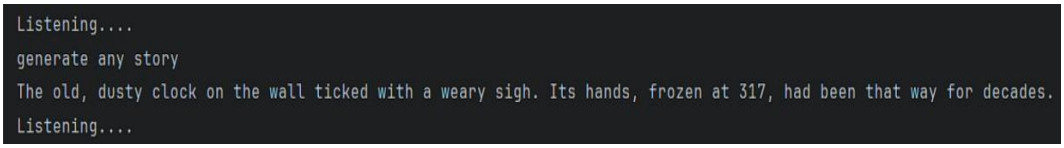


FIGURE 1. YouTube Query Automation

7. CONCLUSION

The Phoenix Voice Assistant demonstrates the creation of an intelligent, multi-functional system capable of performing various tasks using Python and APIs. By incorporating state-of-the-art speech recognition, NLP, and LLMs, Phoenix offers a personalized and responsive user experience. The integration of Google Generative AI Gemini API and Hugging Face Transformers ensures advanced conversational interactions, making it an effective tool for everyday tasks such as retrieving information, playing videos, and recommending apps with optimized summaries.

8. FUTURE SCOPE

- Improved Conversational AI: Enhance the assistant's ability to handle more complex queries.
- Deeper Personalization: Use LLMs to provide more personalized recommendations.
- Expanded Functionality: Integrate additional APIs for weather updates, news retrieval, and smart device control.
- Broader Applications: Explore applications in education, accessibility, and professional environments.

REFERENCES

[1]. Nasirian F., Ahmadian M., & Lee O.K.D. (2017). AI-based voice assistant systems: Evaluating from the interaction and trust perspectives.

[2]. Kumar, R.A., Mallikarjuna Reddy, A., Chandrasekhar Reddy, T., Ravi Kishore, M. A study of block chain technology and cryptocurrency Journal of Advanced Research in Dynamical and Control Systems, 2018, 10(11 SpecilIssue), pp. 994–1000

[3]. Dayaker, P., Honey Diana, P., Chandrasekhara Reddy, T., Mallikarjuna Reddyreddy, A. Advancements of security and privacy of sensitive data cloud computing, Journal of Advanced Research in Dynamical and Control Systems, 2018, 10(11 SpecilIssue), pp. 956–964

[4]. Mallikarjuna Reddy, A., Venkata Krishna, V., Sumalatha, L. Eficient face recognition by compact symmetric elliptical texture matrix (Csetm), Journal of Advanced Research in Dynamical and Control Systems, 2018, 10(4), pp. 428–439

[5]. Reddy, A.M., Venkata Krishna, V., Sumalatha, L. Face recognition based on stable uniform patterns, International Journal of Engineering and Technology(UAE), 2018, 7(2), pp. 626–634

[6]. Reddy, A.M., Krishna, V.V., Sumalatha, L., Niranjan, S.K. Facial recognition based on straight angle fuzzy texture unit matrix, Proceedings of the 2017 International Conference On Big Data Analytics and Computational Intelligence, ICBDACI

[7]. 2017, 2017, pp. 366–372, 8070865

[8]. Reddy, A.M., Subbareddy, K., Krishna, V.V. Classification of child and adulthood using GLCM based on diagonal LBP, Proceedings of the 2015 International Conference on Applied and Theoretical Computing and Communication Technology, iCATccT 2015, 2016, pp. 857–861, 7457003.

[9]. Vijay Kumar, V., Ganapathi Raju, N.V., Mallikarjuna Reddy, A. Histograms of term weight feature (HTWF) model for authorship attribution, International Journal of Applied Engineering Research, 2015, 10(16), pp. 37527–37533.

[10]. Manoranjan Dash, N.D. Londhe, S. Ghosh, et al., "Hybrid Seeker Optimization Algorithm-based Accurate Image Clustering for Automatic Psoriasis Lesion Detection", Artificial Intelligence for Healthcare (Taylor & Francis), 2022, ISBN: 9781003241409

[11]. Manoranjan Dash, Design of Finite Impulse Response Filters Using Evolutionary Techniques - An Efficient Computation, ICTACT Journal on Communication Technology, March 2020, Volume: 11, Issue: 01

[12]. Manoranjan Dash, "Modified VGG-16 model for COVID-19 chest X-ray images: optimal binary severity assessment," International Journal of Data Mining and Bioinformatics, vol. 1, no. 1, Jan. 2025, doi: 10.1504/ijdmb.2025.10065665.

[13]. Manoranjan Dash et al.," Effective Automated Medical Image Segmentation Using Hybrid Computational Intelligence Technique", Blockchain and IoT Based Smart Healthcare Systems, Bentham Science Publishers, Pp. 174-182,2024

[14]. Manoranjan Dash et al.," Detection of Psychological Stability Status Using Machine Learning Algorithms", International Conference on Intelligent Systems and Machine Learning, Springer Nature Switzerland, Pp.44-51, 2022.

[15]. Samriya, J. K., Chakraborty, C., Sharma, A., Kumar, M., & Ramakuri, S. K. (2023). Adversarial ML-based secured cloud architecture for consumer Internet of Things of smart healthcare. IEEE Transactions on Consumer Electronics, 70(1), 2058-2065.

[16]. Ramakuri, S. K., Prasad, M., Sathiyanarayanan, M., Harika, K., Rohit, K., & Jaina, G. (2025). 6 Smart Paralysis. Smart Devices for Medical 4.0 Technologies, 112.

[17]. Kumar, R.S., Nalamachu, A., Burhan, S.W., Reddy, V.S. (2024). A Considerative Analysis of the Current Classification and Application Trends of Brain–Computer Interface. In: Kumar Jain, P., Nath Singh, Y., Gollapalli, R.P., Singh, S.P. (eds) Advances in Signal Processing and Communication Engineering. ICASPACE 2023. Lecture Notes in Electrical Engineering, vol 1157. Springer, Singapore. https://doi.org/10.1007/978-981-97-0562-7_46.

[18]. R. S. Kumar, K. K. Srinivas, A. Peddi and P. A. H. Vardhini, "Artificial Intelligence based Human Attention Detection through Brain Computer Interface for Health Care Monitoring," *2021 IEEE International Conference on Biomedical Engineering, Computer and Information Technology for Health (BECITHCON)*, Dhaka, Bangladesh, 2021, pp. 42-45, doi: 10.1109/BECITHCON54710.2021.9893646.

[19]. Vytla, V., Ramakuri, S. K., Peddi, A., Srinivas, K. K., & Ragav, N. N. (2021, February). Mathematical models for predicting COVID-19 pandemic: a review. In Journal of Physics: Conference Series (Vol. 1797, No. 1, p. 012009). IOP Publishing.

[20]. S. K. Ramakuri, C. Chakraborty, S. Ghosh and B. Gupta, "Performance analysis of eye-state charecterization through single electrode EEG device for medical application," *2017 Global Wireless Summit (GWS)*, Cape Town, South Africa, 2017, pp. 1-6, doi:10.1109/GWS.2017.8300494.