

# Kalyantra : A Voice Assistant Well-being Robot - A Review

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**Abstract** - The Kalyantra project presents a promising approach to improving the quality of life for individuals with disabilities and elderly individuals through the development of a multifunctional assistive robot. The project aims to integrate state-of-the-art technologies such as natural language processing, machine learning, and computer vision into a robot capable of assisting individuals with a range of activities of daily living. The literature survey conducted as part of this project highlights the potential for such technologies to be used in healthcare, rehabilitation, and smart cities, among other areas. The Kalyantra project's focus on developing a robot that can be controlled through voice commands and recognize emotions through facial expressions makes it unique among existing assistive technologies. The project's emphasis on mobility and obstacle sensing capabilities also positions it as a potential solution for individuals with physical disabilities who may require assistance with navigation. Overall, the Kalyantra project represents a significant step towards advancing assistive technologies and improving the quality of life for individuals with disabilities and elderly individuals.

**Keywords:**IoT,Python,Flutter,AWS IoT,Firestore,Speech Recognition,Path Memorization,GCP NLP

## I. INTRODUCTION

The rapid advancements in technology have led to an explosion in the amount of data generated across different domains. This has resulted in a growing interest in the field of data science, which involves the use of statistical and computational techniques to extract meaningful insights from large and complex datasets. One of the key areas of data science that has gained significant attention in recent years is the application of machine learning techniques. Machine learning has been applied to a wide range of fields, including healthcare, finance, social media, and more, to identify patterns and make predictions from data.

This review paper aims to provide an overview of the current use of social media platforms. Anna Feldman's book state-of-the-art in machine learning applications across "Natural Language Processing for Social Media" provides various domains. Specifically, we will cover the latest an overview of NLP techniques that are used to process developments in natural language processing, intelligent social media data. The book discusses different aspects of personal assistants, personalized medicine, speech

recognition, deep learning, IoT applications, and artificial intelligence for smart cities. We will also examine the application of machine learning techniques in healthcare, including robot-assisted rehabilitation and virtual reality therapy for anxiety disorders. By providing a comprehensive overview of the latest research in these areas, this paper aims to shed light on the future directions of machine learning and its potential to transform various domains.

## II. LITERATURE SURVEY

The field of natural language processing (NLP) has gained significant attention in recent years due to the widespread

social media data analysis, including sentiment analysis, opinion mining, and entity recognition.

Intelligent personal assistants (IPAs) have become increasingly popular due to advancements in artificial intelligence (AI) and natural language processing (NLP) technologies. Sabrina Senatore and Antonio Coronato's paper "Intelligent Personal Assistant: A Survey" provides a comprehensive review of the state-of-the-art IPAs. The paper covers different aspects of IPAs, including speech recognition, natural language processing, and dialogue management.

Machine learning (ML) has emerged as a powerful tool in personalized medicine. Wei Wang et al.'s paper "Machine Learning for Personalized Medicine: Progress, Challenges, and Opportunities" provides an overview of the recent advancements in ML techniques and their applications in personalized medicine. The paper discusses the challenges associated with using ML in healthcare and provides recommendations for future research.

Takashi Nose et al.'s paper "Advancements in Speech Recognition and Their Application to Personal Digital Assistants" provides a comprehensive review of the recent advancements in speech recognition technologies and their applications in personal digital assistants (PDAs). The paper discusses different aspects of speech recognition, including feature extraction, acoustic modeling, and language modeling.

Yongsheng Gao et al.'s paper "A Comprehensive Study on Deep Learning Applications" provides a comprehensive review of deep learning techniques and their applications in different fields, including computer vision, natural language processing, and speech recognition. The paper discusses the challenges associated with deep learning and provides recommendations for future research.

The Internet of Things (IoT) has emerged as a promising technology in recent years. Seungjae Shin et al.'s paper "A Survey of Artificial Intelligence for IoT Applications" provides an overview of the recent advancements in AI techniques and their applications in IoT. The paper covers

different aspects of IoT, including device connectivity, data analytics, and security.

Oliver Kutz et al.'s paper "An Overview of the Internet of Things for People with Disabilities" provides an overview of the recent advancements in IoT technologies and their applications in assistive technology. The paper discusses different aspects of IoT-based assistive technology, including smart homes, wearable devices, and assistive robots.

Mohammed Al-Kabi et al.'s paper "An Overview of Natural Language Processing Techniques for Opinion Mining Systems" provides a comprehensive review of the recent advancements in NLP techniques and their applications in opinion mining. The paper covers different aspects of opinion mining, including sentiment analysis, emotion detection, and subjectivity detection.

Vahid Behbood et al.'s paper "Artificial Intelligence Applications in Smart Cities: A Systematic Review" provides an overview of the recent advancements in AI technologies and their applications in smart cities. The paper discusses different aspects of smart cities, including energy management, transportation, and public safety.

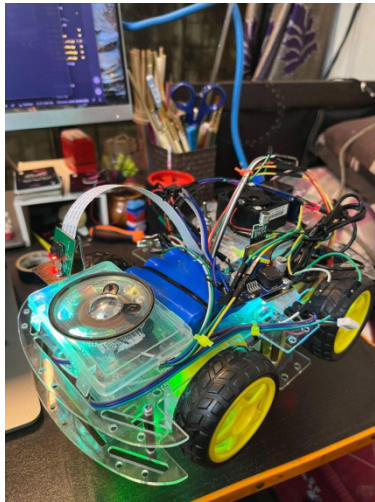
Jing Xie et al.'s paper "Robot-Assisted Rehabilitation in Stroke Patients: A Systematic Review and Meta-Analysis" provides an overview of the recent advancements in robot-assisted rehabilitation and its application in stroke patients. The paper discusses different aspects of robot-assisted rehabilitation, including robotic devices, training protocols, and clinical outcomes.

Sophia Yun et al.'s paper "Virtual Reality Therapy for Treatment of Anxiety Disorders: A Systematic Review and Meta-Analysis" provides an overview with the recent ARVR.

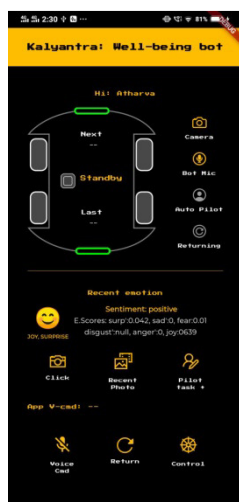
### **III. METHODOLOGY**

This Review Paper focuses on the Initial Phase of the project which is more focused over mobility, NLP, cameras, and system interactions. Methodology Design system takes two major parts: the hardware module is designed by schematic diagram, the software module is

developed using python for backend and frontend i.e mobile application using flutter. Communication between frontend and backend is done with MQTT protocol using AWS IoT Core. Two ways the bot can be interacted with. 1) Giving voice commands directly through a mic connected to the bot; Using Google TTS it is actively listening for wake up words, once a wake up command “Okay yantra” or “Do something” is recognized the bot will speak “ yes” and the user can give further tasks . 2) Through an app using native microphone and speech recognition tasks text will be sent to bot. Once the tasks text is received we process the text to check how many tasks are given and complete them accordingly. Multiple tasks in a single text can be separated with then while the last command will be after keyword “and” example “Move forward 10 cm then click a photo and return”. Further task are performed by interacting with GPIO pins connected according to schematic to control mobility with motors attached along with IR obstacle sensors used for obstacle sensing when an obstacle is detected bot halts temporarily and after clearance continues on the given route. Speed Encoder sensor LM393 is used to calculate distance travelled or required to be travelled giving control over path tracing and memorization. With the Firebase implementation photos captured from Camera are uploaded to storage and realtime database as the main database for generic data storage .Espeak is used for text to speech synthesizing



#### IV. OUTPUT



#### V. CONCLUSION

An intelligent-robotic assistant that can speak, understand, and process natural language, and interact with users to provide practical assistance, and entertainment and be useful in day-to-day life. This system can provide future-oriented solutions for homes, hospitals, schools, and workplaces, and make people more comfortable, safe and convenient in their daily life. Under the guidance of IoT technologies, the system can act and effectively automate remote environments.

#### ACKNOWLEDGEMENT

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