AVA Artificial Virtual Assistant

Dr. A.V. Dehkara, Ankur Mishraa, Mansi Tambeb, Harshada Khadsc, Aparna Whagaded, Simran Shahareef
Assistant Professora, UG Studentb, c, d, e, f

Department of Computer Technology
Priyadarshini College of Engineering, Nagpur, Maharashtra, India

Abstract:
A virtual assistant is introducing widely to the modern world by adding some more flexible features in assistant we have come with the idea of Ava virtual personal assistant. All Virtual partner is controlled or handled by the particular software and hardware according to their different function. Our motto is to combine all those functions in one assistant called AVA who can live on user computer and mobile and accessed by any device using dedicated IP on online and offline mode, which allowed to get completely interact with human behavior. The existing computational model is based on Artificial Intelligent(AI) external Application Programming Language(APL) and Automatic Speech Recognition(ASR) augmented with devices and described Human characters. This report discusses in new technology could be harnessed to create an Artificial Virtual Personal Assistant with a focus on user-based information, building the dedicated project for a user to make it more efficient to interact with AVA skills. The advantage of AVA is that users just have to access the assistant without using specific app virtual assistance can be made available through an existing solution. We are trying to give assistant connect with more hardware and control it by using Artificial Intelligence (AI). The main part such as access AVA offline we are using Deep Speech, Hot word, (TTS), and (STT). We are using NODE MCU ESP8266, Mini ESP8266 Web Camera, Relay switch, Raspberry pi 3B along with the different sensors as hardware, and for the programming part we are using PIPENV, NPM, NODE.JS, and Python scripting.

Keywords: Cultural heritage, Virtual reality, Artificial intelligence, Conversational agent.

I. INTRODUCTION

In this modern world, the computer is using widely in education, entertainment, in offices, hospitals, private firms, NGOs, Software house, Government Sector very vast field in every sector, as a result, Artificial Intelligence is also using in every dedicated platform AI is in software and app it is very useful and easy to handle. Artificial Intelligence like problem-solving for example spelling correction in the keyboard how the result according to interest by using users' history. Artificial Intelligence is the science of making an intelligent machine or software intelligently, in a similar manner the intelligent human think. People are using more virtual tools to make their life easy in this busy world. AI-powered digital assistants are software programs. They might use specific hardware like a smart speaker, microphone, camera, oximeter, relay switch, sensors. Alternatively, you might find them as a feature on your smartphone, laptop, or wearable device. Assistants come in somewhat small packages and can perform a variety of actions after hearing your command. They can turn on lights, answer questions, play music, place online orders, and do all kinds of AI-based stuff. People who work remotely can, therefore, handle all kinds of tasks using the mobile. Their utility in both the personal and business realms will grow as well. AVA is the name of our Artificial virtual personal assistant, it is the assistance that can do whatever the user wants AVA can communicate through text and voice in both online and offline mode in every situation to make users easy to command. All the instructions will have followed by AVA as personal assistance. Not only for control but AVA is also designed for security purposes for home door lock, control switches, and for the security of the device.

II. RESEARCH OBJECTIVES

This research aims to develop an AVA (Artificial virtual personal assistance). The objectives of this project to:
1) Investigate the current approaches for AVA.
2) Design a working system for automated AVA.
3) Implement the system using the Electronics solution.
4) Evaluate the system for effectiveness.

III. LITERATURE REVIEW

Several works were reported in the literature based on the AVA module. In this section, a summary of the works is presented. Another problem encountered in the literature is an absence of a common terminology: AI agents (Castelfranchi, 1998), virtual assistants (Martin and Allende, 2015), intelligent assistants (Kiseleva et al, 2016), and so on. What is important is that while the different terms are used, they are all referring to the same thing. For this study, we will refer to them as Voice-Activated Virtual Assistants (AVAs).

For this study, we have gathered information on four key VAVAs: Siri (Apple), Google Assistant (Google), Cortana (Microsoft), and Alexa (Amazon). The reason behind this choice is that they have all been at least four years in the market, so they are more mature than other competitors, and, according to the statistic corporation Statista (201), Alexa and Google alone gather 87% of the global market share. Additionally, they use the same type of interaction with users, voice, and they are all talking AI databases. Also, they are accessible in affordable and widespread devices such as laptops, tablets, smartphones or...
own-brand devices, such as Amazon’s Echo (which is different from the others, but we found it interesting that Google and Apple are also moving towards this type of device, which could help give us a hint on future trends). These VAVAs are the AI play of four of the most powerful companies in the world, so it is vital to understand how its usage is being articulated. Efficiency may contribute to improving customers’ satisfaction.

IV. BLOCK DIAGRAM

![Block Diagram of Proposed System](image)

- **Hardware Used**
  - NodeMCU
  - Raspberry Pi
  - Esp-32 Camera Module
  - Gear Motor
  - DHT 11
  - Water Level Sensor
  - Raspberry Pi Camera
  - Microphone
  - Usb Sound Card
  - IR Sensor
  - PIR Sensor
  - 4-Channel Relay Module
  - MAX30100 Oximeter
  - GPS Module
- **Software Used**
  - Arduino IDE
  - Anaconda IDE
  - Pycharm IDE
- **Programming Used**
  - Python-Modules of AVA are written in python.
  - PIPENV-for execution of the module PIPENV is used.
  - NPM-core dependencies AVA needs NPM extensions this support the Node.js.
  - Node.JS-Coreav a is written in NODE.JS.

V. METHODOLOGY

NodeMCU

![ESP8266 NodeMCU](image)

The ESP8266 is the name of a microcontroller designed by Espress if Systems. The ESP8266 itself is a self-contained WiFi networking solution offering as a bridge from the existing microcontroller to WiFi and is also capable of running self-contained applications. This module comes with a built-in USB connector and a rich assortment of pin-outs. With a micro USB cable, you can connect NodeMCU devkit to your laptop and flash it without any trouble, just like Arduino. It is also immediately breadboarded friendly.

**Raspberry Pi**

![Raspberry Pi](image)

Raspberry pi 3b is used to host AVA and control all ESP8266 node mcu cam module, it use a 1.2GHz 64- bit quad-core Arm cortex-A53 CPU, has 1GB RAM, integrated 802.11n wireless LAN, and Bluetooth 4.1. Mic is attach to one of USB the raspberry pi to access voice of user it also saves the recorded data. Speaker is connected to give the output of the AVA this all can use text-to-speech and speech-to-text.

**Temperature Humidity sensors and Liquid water level sensor:**

![DHT11 & Water Level](image)

Measure temperature and humidity and for detecting water level we are using hardware it uses of this is to give information about the work in home through text and with text-to-speech method.

**Dual Shaft Straight BO Motor and 12V 200 RPM Geared DC Motor**

![Geared DC Motor](image)
Another module of AVA is to lock door according to the users’ instruction if you want to schedule particular time to lock door it is possible with AVA it has password detection for this special purpose. It also goes with your image or voice recognition along with pin. All the details send by text to register mobile. For door we are using RPMGeared DC motor and Dual shaft wheel Straight BO motor.

Raspberry Pi 5MP camera board module, microphone, and USB Sound Card

AVA has image recognition and sound detection where user authentication and for instruction assistant have to detect person for that raspberry pi cam, microphone, and USB sound card is used. All this are input hardware camera is to take image and video input for image and video processing, mic is to take input voice from user, and USB sound card also have connected mic to raspberry pi using USB.

Infrared (IR) sensor module:

Infrared Obstacle Sensor Module has use for control TV channels and AC temperature by using built- in IR transmitter and IR receiver that sends out IR energy and looks for reflected IR energy to detect presence of any obstacle in front of the sensor module.

ESP32 CAM Module and Infrared PIR Motion Sensor:

Using ESP8266 cam along with the motion it will turn on the flash light according the motion detected and the camera can take video. Not only it uses flash and click particular image according to motion but also useful as a security purpose.

4-channel Relay module and 2-channel relay module

4 channel relay module is used to turn ON/OFF light, Fan, TV, Car, Bike, and change the polarity of motor User can command to AVA to turn switch from your phone by voice and text, user don’t need to go manually to switch on/off. We are using 4 channel and 2 channel relay switch.

Working
Esp8266 is microcontroller is used to controlling sensor and relays, Raspberry Pi is give the instruction to Esp8266 is connected with raspberry Pi with local server created in raspberry pi. Raspberry Pi is collecting input and gives to AVR Model then AVR gives instruction and collecting the data from ESP-8266. Gear motor work as door locking and unlocking at the time delay of 100ms.DHT 11 is monitoring real time temperature and humidity. Infrared sensor and PIR sensor is work as object detection.

MODELING AND ANALYSIS
Client make request (web, app) as an HTTP request to GET some information from AVA. The following chart will shows the same

TESTING AND IMPROVEMENT OF AVA APPLICATION
The experimental setup that allows us implementing the Google assistant is presented in Fig. 2. It is based on a Raspberry Pi 3 system that contains a WiFi adapter. This is absolutely necessary because Google assistant needs an Internet connection which must be available all the time. The software part of the AIY project has two categories of applications. The first one is based on Google Assistant SDK and the other one is based on Cloud Speech API. The first one is completely free while the second one requires minimal fee. Both of them require a Google account and several steps that include some information such as name of the project. The experimental setup that allows us implementing the Google assistant is presented in Fig. 2. It is
based on a Raspberry Pi 3 system that contains a WiFi adapter. This is absolutely necessary because Google assistant needs an Internet connection which must be available all the time. The software part of the AIY project has two categories of applications. The first one is based on Google Assistant SDK and the other one is based on Cloud Speech API. The first one is completely free while the second one requires minimal fee. Both of them require a Google account and several steps that include some information such as name of the project. The experimental setup that allows us implementing the Google assistant is presented in Fig. 2. It is based on a Raspberry Pi 3 system that contains a WiFi adapter. This is absolutely necessary because Google assistant needs an Internet connection which must be available all the time. The software part of the AIY project has two categories of applications. The first one is based on Google Assistant SDK and the other one is based on Cloud Speech API. The first one is completely free while the second one requires minimal fee. Both of them require a Google account and several steps that include some information such as name of the project. The experimental setup that allows us implementing the Google assistant is presented in Fig. 2. It is based on a Raspberry Pi 3 system that contains a WiFi adapter. This is absolutely necessary because Google assistant needs an Internet connection which must be available all the time. The software part of the AIY project has two categories of applications. The first one is based on Google Assistant SDK and the other one is based on Cloud Speech API. The first one is completely free while the second one requires minimal fee. Both of them require a Google account and several steps that include some information such as name of the project. The experimental setup that allows us implementing the Google assistant is presented in Fig. 2. It is based on a Raspberry Pi 3 system that contains a WiFi adapter. This is absolutely necessary because Google assistant needs an Internet connection which must be available all the time. The software part of the AIY project has two categories of applications. The first one is based on Google Assistant SDK and the other one is based on Cloud Speech API. The first one is completely free while the second one requires minimal fee. Both of them require a Google account and several steps that include some information such as name of the project. The experimental setup that allows us implementing the Google assistant is presented in Fig. 2. It is based on a Raspberry Pi 3 system that contains a WiFi adapter. This is absolutely necessary because Google assistant needs an Internet connection which must be available all the time. The software part of the AIY project has two categories of applications. The first one is based on Google Assistant SDK and the other one is based on Cloud Speech API. The first one is completely free while the second one requires minimal fee. Both of them require a Google account and several steps that include some information such as name of the project. The experimental setup that allows us implementing the voice assistant is presented. It is based on a Raspberry Pi 3 system that contains a WiFi adapter. This is absolutely necessary because AVA assistant needs an Internet connection which must be available all the time. Such as door lock and unlocking system are show in fig 9 with the using of android application. The android application is required password based locking and unlocking. This system works on pre- decided password concept. It increases the security level to prevent an unauthorized unlocking done by attacker. In case the user forgets the passwords, system gives the flexibility to the user to change or reset the password. This automatic password based lock system gives user more secure way of locking-unlocking the system.

The proposed architecture is designed as the communication between the Master-RasPi and the Slave-NodeMcu. This communication is possible due to the published data made by the Slave-NodeMcu at the AVS API and the Particle API. Every Particle solution, such as the Photon, has a RESTful API which we can scrape for the information we want to access and post process this data for more complex actions and/or save it for further analysis. Also, since AVS saves all queries that have been used, this could be useful information which can help us providing better messages to visitors based on what is being asked or just save this queries as data acquisition.
All the mentioned data can be acquired by the Master-RasPi in a scraping process through a python script (Figure 11). In other sense, by scraping, the platform can access to the readings, variables and settings of the reactive modules and to the information of the previous voice HRI’s. Also, this python script can be programmed with a series of post-processing actions concerning to the platform itself. It is important to observe that for the scraping process, an internet connection is needed in order to access to the Particle and AVS APIs.

IV. CONCLUSION

Ava is fully working virtual personal assistance, which can perform task in online as well as offline condition as we give her local modules to her. In online condition Ava gets more resources to work with Also, any peripheral which is connected with the raspberry pi is can be control with the Virtual Personal Assistance, just by giving command. The local modules can be added or remove by user as he sees fit. Also, there is simple option for conversation with AVA, where it learns Father. Although many people use ASR systems such as Siri or Google for recreational use and every once in a while to send a text, they are not comfortable using these systems for sus-trained conversational use, as the systems have higher than tolerable error rates, especially in less than perfect settings. Whenever there

V. REFERENCES

[1]. Alberto Artasanchez Artificial Intelligence with Python for an extensive background in artificial intelligence and advance algorithm 2020

[2]. Nisheeth Josh Hands- On Artificial Intelligence with java for beginners ,He is an expert with the TDIL prog ram, department of IT, Government of India ,2018

[3]. Mario Casciaro, Node.js Design Patterns 0 Second edition, Mario is the co-founder and CEO of Sponsorama.com

[4]. Ray Kurzweil, How to create a mind: the secrets of human thought Revealed, Reverse- Engineering the brain to understand precisely how it works