Manipulation Of Surrounding Using The Brain With Cloud Support

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INTRODUCTION

The motive of this project is to develop a full fledged server with support to latest technologies developing in the market. That is - (1) Provide IoT support (2) Provide cloud support (3) Provide machine leaning and artificial intelligence support.

It combines technologies of various fields into a one unique machine. Use of various programming languages is take like - (1) Python (2) C ++ (3) C (4) Java (5) Bash scripts/ Terminal scripting (6) MySQL query language (7) HTML.

HOW IT IS ACHIEVED

IoT helps in interfacing the virtual world with the physical world, while generating enormous amount of data which can be stored inside the cloud server and proper and easy LAN and WAN access of that data is made possible only with the help of cloud server. While the generated data need to be processed to fetch some meaning and value to the business which is supported with the help of technology called machine leaning and artificial intelligence.

Python is used to create bash scripts and implement the technology of computer vision in this project while C and C++ is used to program the micro controllers.

HTML, JAVA, MySQL and others are used to develop the web interface to provide user support and make the server capable of data protection, access and user credential protection.

The motive of this project is to make a wast scope idea that have its implementation in day to day life by providing and easy mind controlled appliance that allow user to control the power of appliance just by thinking by using EEG, computer vision and IoT.

Second motive of this project is to allow speech controlled environment for have, provide security and real time surveillance to each and every home and provisioning a secure way of data access i.e a self hosted cloud in a cheap yet affective way.

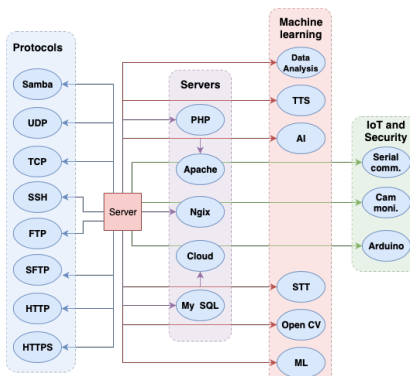## SERVER SIDE UTILITIES

Figure 1. Utilities and facilities running on server

Server side is consist of 4 different parts i.e

(1) Protocols (2) Servers technologies (3) Machine Learning and AI based technologies (4) IoT and Security Technologies.

As shown in figure 1, left side shows 8 protocols running:
(1) Samba (2) UDP (3) TCP (4) SSH (5) FTP (6) SFTP (7) HTTP (8) HTTPS

It also hows 5 servers running:
(1) PHP (2) Apache (3) Nginx (4) Cloud (5) My SQL.

It also have 6 ML and Data Science facilities running:
(1) Data Analysis (2) TTS (3) STT (4) AI (5) Open CV (6) ML.

It supports 3 IoT and Security facilities running:
(1) Serial Communication (2) Monitoring over webcam (3) Arduino *dev*/ttyACM0.
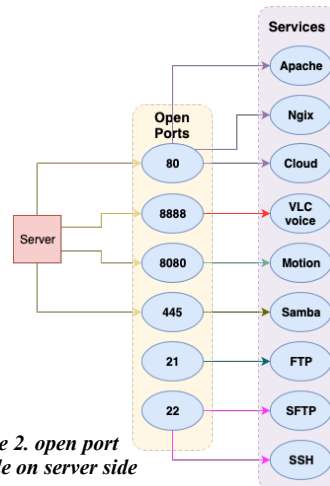
SERVER SIDE OPEN PORTS

Figure 2. open port available on server side

Figure 2. shows, server side is consist of 4 different parts i.e
(1) 80 - Apache and Nginx
(2) 8888 - Sound
(3) 8080 - Motion service
(4) 445 - NAS storage
(5) 21 - FTP
(6) 22 - SSH

VOICE CONTROL

Figure 3. Voice control mechanism

Figure 3. show the complete flow of the voice control mechanism followed between client and server.

The complete architecture for voice control is divided into 7 components, all the components have sub parts inside it. Those parts are - (1) STT (2) Interconnection (Nrgrok/LAN) (3) CloudScript (4) TTS (5) Bash Scripts (6) Application Control (7) VoiceStream script.

MIND CONTROL APPLICATION

Figure 4. methodology for Mind Controlled appliances

Figure 4. shows the methodology used to develop a device to provide people with ability to turn appliances ON and OFF just by concentrating on the specific appliance.

The technology used here is Bluetooth to transfer brainwaves over bluetooth to the Arduino micro-controller from EEG. Then the raw brainwaves are converted to numerical format and if concentration is more than the specified than it sends a trigger to the raspberry pi over GPIOs which then triggers a python script.

The script analyse if the concentration to a specific object is more than 5 seconds than the raspberry pi runs a script to take picture of the object which then is analysed by the OCR running with the help of openCV in python environment.

If the text says LED then it triggers and supply the power to the LED, hence result in turning the LED on. If the text is not LED then the scripts run again and stay in a constant loop.

CONCLUSION

This project is a complete solution for home automation, cloud storage, network security and human computer interface using EEG to control the computer and manipulate the environment.

REFERENCES

[1] Guttikunda, S.K., Goel, R. and Pant, P., 2014. Nature of air pollution, emission sources, and management in the Indian cities. *Atmospheric environment*, *95*, pp.501-510.
[2] Freeman, B., McBean, E., Gharabaghi, B. and Thé, J., 2017. Evaluation of air quality zone classification methods based on ambient air concentration exposure. *Journal of the Air & Waste Management Association*, *67*(5), pp.550-564.