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# Misty - Virtual Assistant On Linux Based Operating System

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**ABSTRACT:** This paper aims to develop a personal-assistant for Linux-based systems. Jarvis draws its inspiration from virtual assistants like Cortana for Windows, and Siri for iOS. It has been designed to provide a user-friendly interface for carrying out a variety of tasks by employing certain well-defined commands. Users can interact with the assistant either through voice commands or using keyboard input.

As a personal assistant, Misty assists the end-user with day-to-day activities like general human conversation, searching queries in google, bing or yahoo, searching for videos, retrieving images, live weather conditions, word meanings, searching for medicine details, health recommendations based on symptoms and reminding the user about the scheduled events and tasks. The user statements/commands are analysed with the help of machine learning to give an optimal solution.

**KEYWORDS:-** Personal Assistant, Linux Systems, Automation, Machine Learning

## I. INTRODUCTION

We are all well aware about Cortana, Siri, Google Assistant and many other virtual assistants which are designed to aid the tasks of users in Windows, Android and iOS platforms. But to our surprise, there's no such virtual assistant available for the paradise of Developers i.e. Linux platform.

This Software aims at developing a personal assistant for Linux-based systems. The main purpose of the software is to perform the tasks of the user at certain commands, provided in either of the ways, speech or text. It will ease most of the work of the user as a complete task can be done on a single command. Jarvis draws its inspiration from Virtual assistants like Cortana for Windows and Siri for iOS. Users can interact with the assistant either through voice commands or keyboard input.

Currently, the project aims to provide the Linux Users with a Virtual Assistant that would not only aid in their daily routine tasks like searching the web, extracting weather data, vocabulary help and many others but also help in automation of various activities.

In the long run, we aim to develop a complete server assistant, by automating the entire server management process - deployment, backups, auto-scaling, logging, monitoring and make it smart enough to act as a replacement for a 6 general server administrator.

As a personal assistant, Jarvis assists the end-user with day-to-day activities like general human conversation, searching queries in various search engines like Google, Bing or Yahoo, searching for videos, retrieving images, live weather conditions, word meanings, searching for medicine details, health recommendations based on symptoms and reminding the user about the scheduled events and tasks. The user statements/commands are analysed with the help of machine learning to give an optimal solution.

## II. RELATED WORK

**Building Jarvis - A Learner-Aware Conversational Trainer :** In order to construct adaptive conversational training systems that can assist human task performance and learning in physical worlds, a number of hurdles must be overcome. There is a great deal of intricacy in perceptual reasoning. Jarvis must first do a real-time inspection of its

video stream to identify relevant things, their parts, their relationships with other objects, and their functional condition. Then it must adjust to the domain's partial observability due to the ego-centric camera. Only a fraction of the workspace is visible when the human trainee looks through HoloLens at it. As the training human travels around their workspace, the perceptual information changes rapidly. Jarvis must combine incomplete perceptual data into a stable state representation of the world in order to make meaningful decisions about task execution.

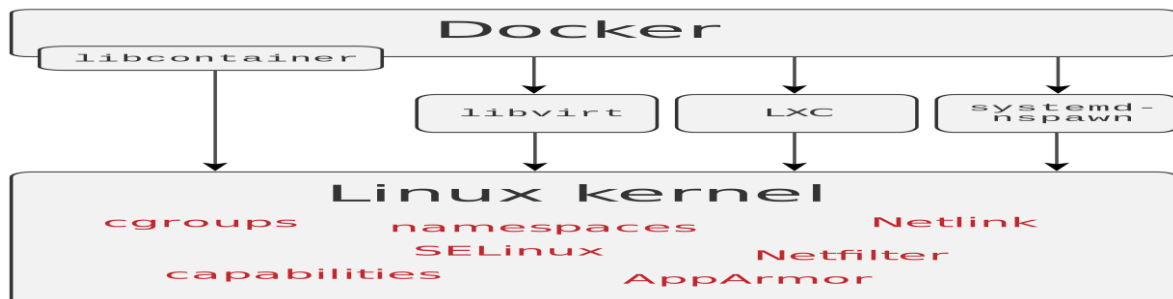
Jarvis must simulate the task the learner is attempting to do in order to adapt instructions that are most appropriate. Jarvis can dynamically build plans to help the learner achieve task goals depending on the current problem state by include relevant items, relationships, actions, and goals in the task model. Human trainees cannot be expected to follow the instruction script to the letter, i.e., they may deviate from the script and investigate their surroundings. As a result, Jarvis' logic must adjust to such non-determinism. Jarvis must also mimic the unique learner, their requirements, and their knowledge in order to provide them lessons that are appropriate to them.

Finally, these directions should be given organically, with as little disruption to the trainee's work performance as possible. The mixed-initiative conversational training system should allow the learner to ask for information that is relevant to their knowledge and performance and deliberation, conversational. These are enormous difficulties that will necessitate the integration of algorithms from a variety of AI

### Proposed algorithm

#### A. Docker Container:

DOCKER CONTAINER Docker is a computer program that performs operating-system-level virtualization. It is used to run software packages called containers. Containers are isolated from each other and bundle their own application, tools, libraries and configuration files; they can communicate with each other through well-defined channels. All containers are run by a single operating-system kernel and are thus more lightweight than virtual machines. Containers are created from images that specify their precise contents. Images are often created by combining and modifying standard images downloaded from public repositories.



### Tools

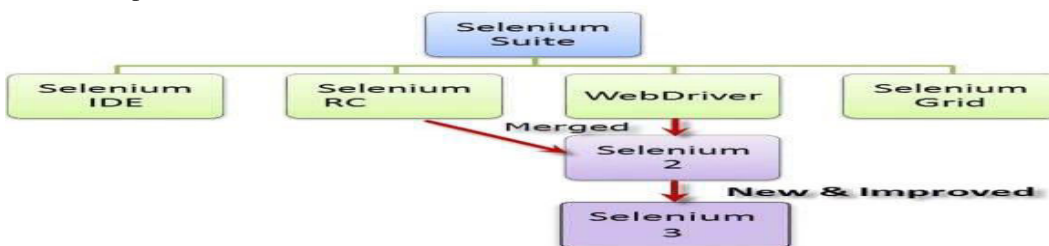
- Docker Compose is a tool for defining and running multi-container Docker applications. It uses YAML files to configure the application's services and performs the creation and start-up process of all the containers with a single command. The docker-compose CLI utility allows users to run commands on multiple containers at once, for example, building images, scaling containers, running containers that were stopped, and more. Commands related to image manipulation, or user-interactive options, are not relevant in Docker Compose because they address one container. The docker-compose.yml file is used to define an application's services and includes various configuration options. For example, the build option defines configuration options such as the Dockerfile path, the command option allows one to override default Docker command, and more. ]The first public version of Docker Compose (version 0.0.1) was released on December 21, 2013. The first production-ready version (1.0) was made available on October 16, 2014.
- Docker Swarm provides native clustering functionality for Docker containers, which turns a group of Docker engines into a single virtual Docker engine. ] In Docker 1.12 and higher, Swarm mode is integrated with Docker Engine. The swarm CLI utility allows users to run Swarm containers, create discovery tokens, list nodes in the cluster, and more. The docker node CLI utility allows users to run various commands to manage

nodes in a swarm, for example, listing the nodes in a swarm, updating nodes, and removing nodes from the swarm. Docker manages swarms using the Raft Consensus Algorithm.

#### B. SELENIUM AUTOMATION TOOL:

Selenium is a free (open source) automated testing suite for web applications across different browsers and platforms. It is quite similar to HP Quick Test Pro (QTP now UFT) only that Selenium focuses on automating web-based applications. Testing done using Selenium tool is usually referred to as Selenium testing. Selenium is not just a single tool but a suite of software, each catering to different testing needs of an organization. The entire Selenium Tool Suite is comprised of four components:

- Selenium IDE, a Firefox add-on that you can only use in creating relatively simple test cases and test suites.
- Selenium Remote Control, also known as Selenium 1, which is the first Selenium tool that allowed users to use programming languages in creating complex tests.
- WebDriver, the newer breakthrough that allows your test scripts to communicate directly to the browser, thereby controlling it from the OS level.
- Selenium Grid is also a tool that is used with Selenium RC to execute parallel tests across different browsers and operating systems. Aim of the proposed algorithm is to maximize the network life by minimizing the total transmission energy using energy efficient routes to transmit the packet. The proposed algorithm consists of three main steps.



#### C. Go-Lang

Go is an open source programming language that makes it easy to build simple, reliable, and efficient software. Go is syntactically similar to C, but with memory safety, garbage collection, structural typing, and CSP-style concurrency. The main reasons why we chose Go for this project are:

**#1 It Compiles Into Single Binary:** Golang is built as a compiled language and Google developers did a great job with it. Using static linking it is actually combining all dependency libraries and modules into one single binary file based on OS type and architecture. This means if you are compiling your backend application on your laptop with Linux X86 CPU you can just upload compiled binary into the server and it will work, without installing any dependencies there.

**#2 Static Type System:** Type system is really important for large scale applications. Python is great and fun language but sometimes we get unusual exceptions because of using the variable as an integer only to find out that it's a string. Go will let you know about this issue during compile time as a compiler error, thus saving your time and the hassle.

**#3 Performance:** This could be surprising but in most of the application cases Go is faster than Python (2 and 3). The result of the Benchmarking Game, used to determine the faster programming language, clearly favours Go, because of its concurrency model and CPU scalability. Whenever we need to process some internal request we are doing it with a separate Goroutine, which is 10 times cheaper in resources than Python threads, thus saving us a lot of resources (Memory, CPU, etc.) because of the built-in language features.

#### D. DevOps:

DevOps is a set of software development practices that combines software development (Dev) and information technology operations (Ops) to shorten the systems development life cycle while delivering features, fixes, and updates frequently in close alignment with business objectives. It is a set of practices intended to reduce the time

between committing a change to a system and the change being placed into normal production while ensuring high quality. As DevOps is intended to be a cross-functional mode of working, those that practice the methodology use different sets of tools—referred to as "toolchains"—rather than a single one. These toolchains are expected to fit into one or more of the following categories, reflective of key aspects of the development and delivery process:

1. Coding – code development and review, source code management tools, code merging
2. Building – continuous integration tools, build status
3. Testing – continuous testing tools that provide feedback on business risks
4. Packaging – artifact repository, application pre-deployment staging
5. Releasing – change management, release approvals, release automation
6. Configuring – infrastructure configuration and management, infrastructure as code tools

### III. RESULTS

Features of Misty Virtual Assistant:

1. Queries from the web:  
Making queries is an essential part of one's life, and nothing changes even for a developer working on Linux. We have addressed the essential part of a netizen's life by enabling our voice assistant to search the web. Here we have used Node JS and Selenium framework for extracting the result from the web as well as displaying it to the user. Jarvis supports a plethora of search engines like Google, Bing and Yahoo and displays the result by scraping the searched queries. In order to make queries from different search engines, the given format should be adopted:

<search engine name><query>

Jarvis supports Google, Bing and Yahoo, which should precede the desired query.

2. Accessing youtube videos Videos have remained as a main source of entertainment, one of the most prioritized tasks of virtual assistants. They are equally important for entertainment as well as educational purposes as most teaching and research activities in present times are done through Youtube. This helps in making the learning process more practical and out of the four walls of the classroom.

In order to access videos from youtube format is: youtube<video you want to search>

3. Retrieve images Users could get images directly through the Misty interface. This implementation is done using the Selenium WebDriver. The images are derived as iframes from the entire web code received from Google images. These are formatted according to use and displayed in a compact manner in the Jarvis interface. In order to retrieve image format is: Image<image you want to search>
4. Medicine Detail: One of the important issue Misty addresses is of healthcare, and medicine in general. The user can query either the medicine or the symptoms. The former lets you know the complete details of the medicine, like indications, contradictions, trade or brand names, dosage, the process of consumption, warning and precautions, storage conditions, etc. On the other hand, the symptom feature lets you query about the symptoms while Jarvis lists various diseases one is likely to be affected along with their medicine. This is helpful for people who are quite busy with their life and find trouble visiting the doctor immediately, thus relying on the web to find the best result for short term cause. Here we use Node JS framework along with Selenium to scrap the required data from the web and display it to the user. We have a huge database of various medicines and symptoms which helps Jarvis respond to the queries of the user at ease. The syntax to be used for querying the necessary are: Medicine<medicine name>

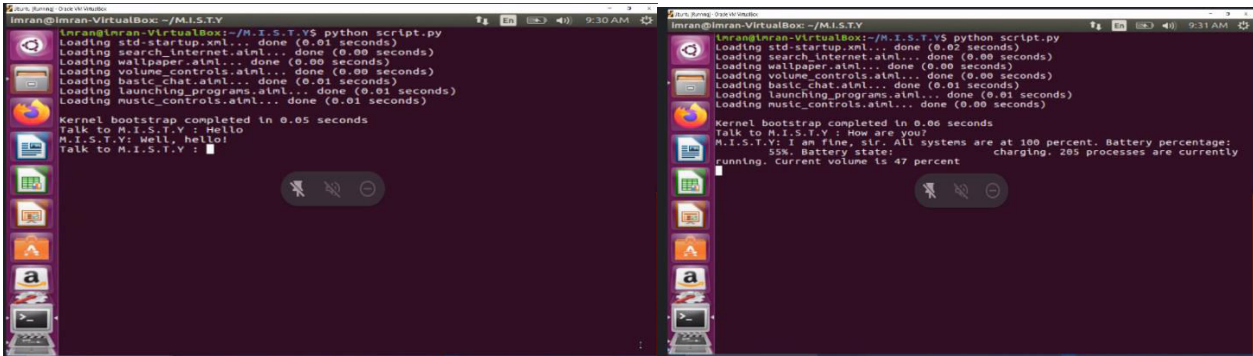


Fig 1: Basic hello command

Fig 2: command to display system details

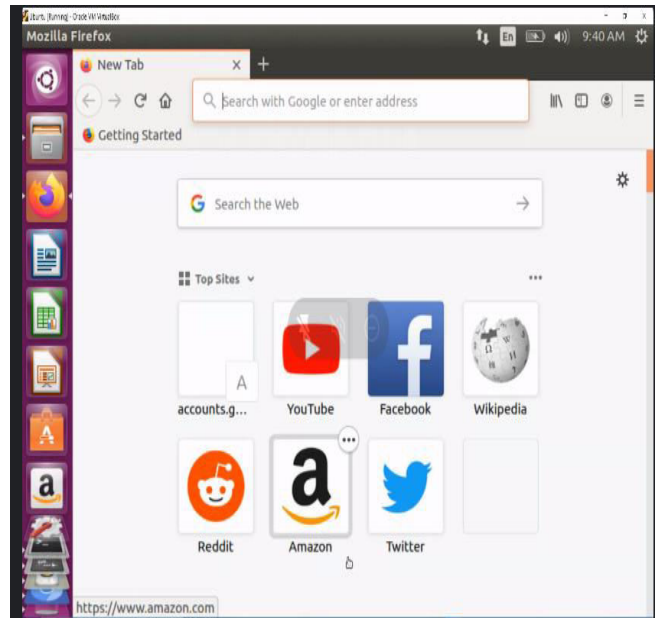


Fig 3: Command to open internal applications

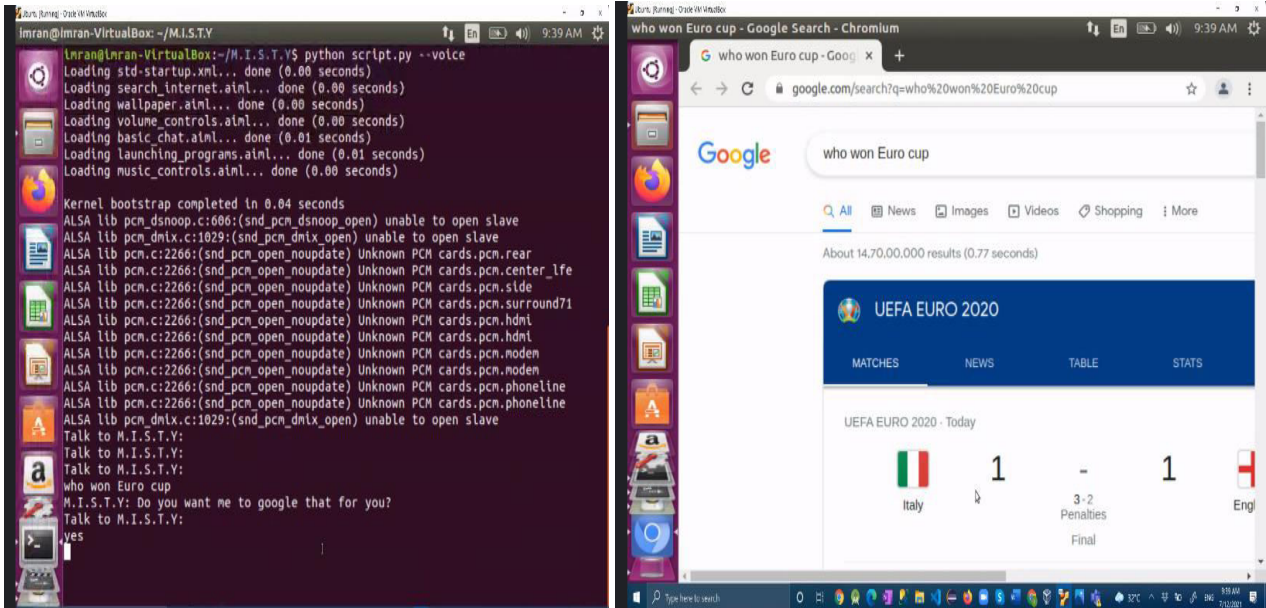


Fig 4: Voice command to browse on internet

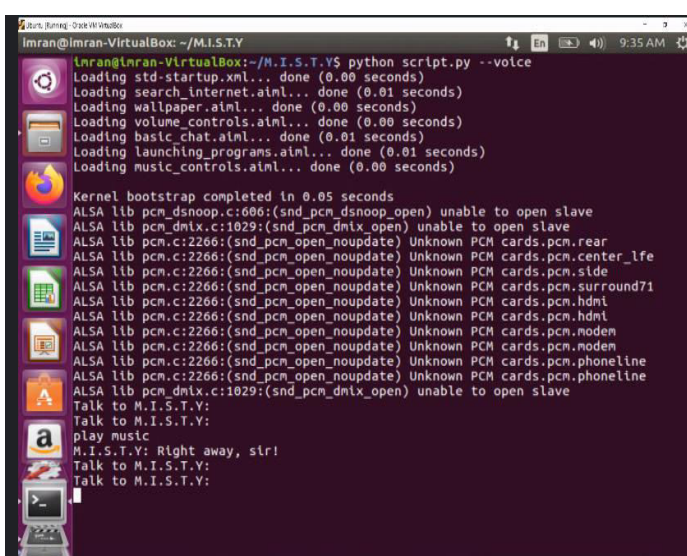


Fig 5: Command to Play music

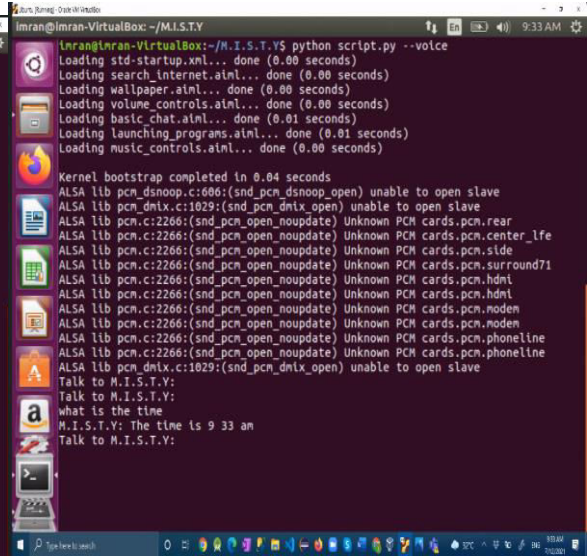


Fig 6: Command to display system time

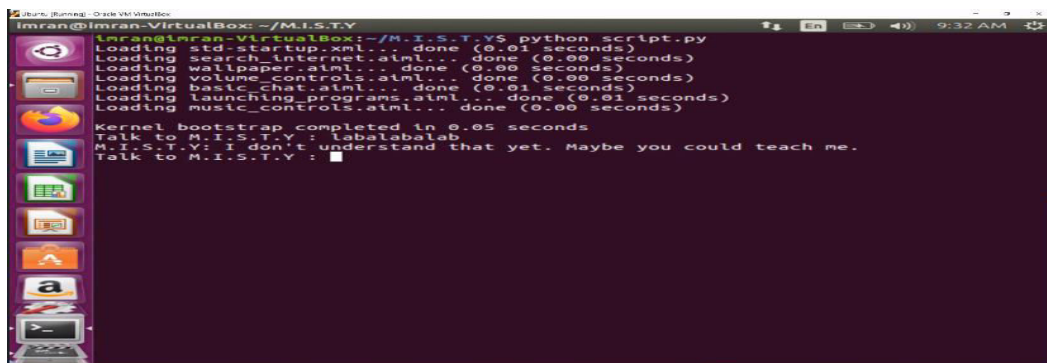


Fig 7: Invalid input

#### IV. CONCLUSION AND FUTURE WORK

Through this voice assistant, we have automated various services using a single line command. It eases most of the tasks of the user like searching the web, retrieving weather forecast details, vocabulary help and medical related queries. We aim to make this project a complete server assistant and make it smart enough to act as a replacement for a general server administration. The future plans include integrating Misty with mobile using React Native to provide a synchronised experience between the two connected devices. Further, in the long run, Jarvis is planned to feature auto deployment supporting elastic beanstalk, backup files, and all operations which a general Server Administrator does. The functionality would be seamless enough to replace the Server Administrator with Misty.

Further, in the long run, Misty Virtual Assistant is planned to feature auto deployment supporting elastic beanstalk, backup files, and all operations which a general Server Administrator does. The functionality would be seamless enough to replace the Server Administrator with Misty Virtual Assistant.

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