Aurora Preliminary Project

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Windows , design and implementation of a virtual assistant in IT environments desktop analysis.

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1. Description:

Introduction:

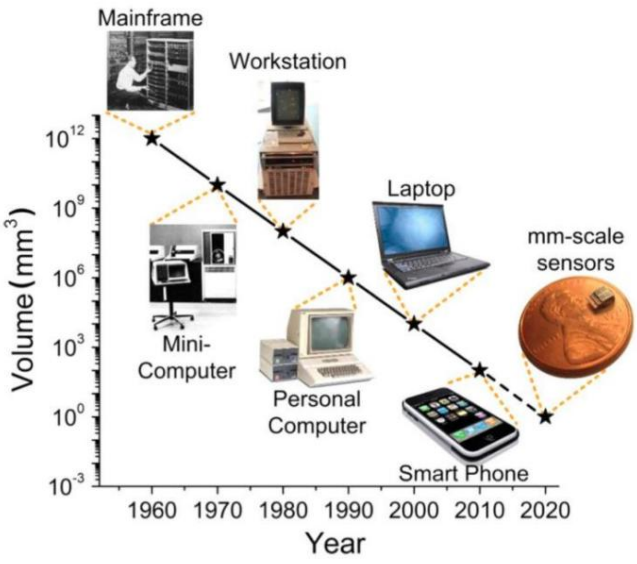
In these times and thanks to technological advances, the use of Digital devices have spread throughout the population, first due to the arrival of home computers, with models such as the IBM PC, to later increase with the arrival of the phones and currently, smartphones .

It is true that due to technological advances, many tasks before made by humans have been modified or directly changed by such devices, a clear example of this phenomenon is You can see the ***contact list:***

Previously when a user wanted to call another user on phone had to use its memory to find the phone number correct, or with the telephone directories which they tried to store permanently said numbers to avoid using memory, all this changed with the arrival of digital notes and later the telephone book or better said popularly as the ***"phone book" contacts."***

Project Type, context:

Taking into account the previous context and the length of time with which these changes have been happening in our lives, we can appreciate that in a matter of a couple of years the , changes that have been experienced are extremely big.

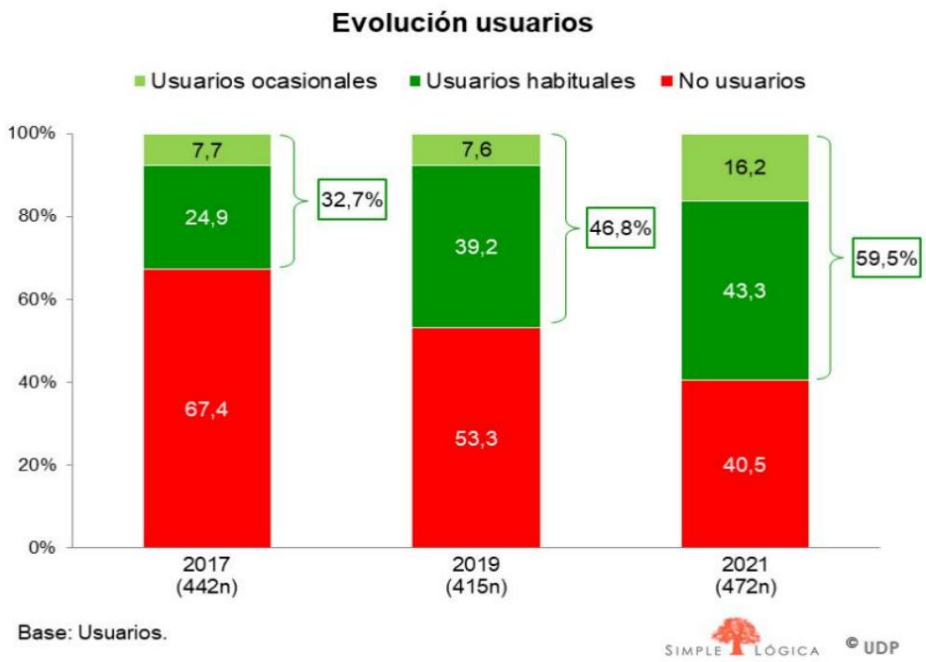


As can be seen in the graph, leap between technologies throughout the history of digital devices has been in an approximate period of **10 years**

These changes in many cases have been correctly assimilated by the population. eliminating certain habits or modifying them, since technology already could supply in a more comfortable and effective way a more correct solution for the problem or inconvenience caused by that habit.

Although unfortunately for certain sectors of the population, such assimilation consisted of a slower process or in many cases unfeasible for certain sectors of the population, who despite their efforts were left behind with respect to the common majority.

As can be seen in the graph, a certain sector of the advanced population age is not having any type of electronic device in their homes thus showing the so-called ***digital divide*** between generations. This is where it resides the problem and the issue to be addressed in this project, being an example of the groups mentioned.



SOURCE: UDP Digital Divide Report

The purpose of this project is to significantly improve the interaction human with home computers, through the gradual elimination of intermediaries between the device and the human.
(Understanding the intermediary as any peripheral that is capable of in some cases represent a problem and not a tool between the device and the human)

To achieve this goal, a program will be created in charge of interpreting and translating human voice sentences to internal actions within the device, the idea consists that the user uses the peripherals as little as possible or uses them together with this tool to speed up your work within the device.

In this way, since for the user in most cases it is more comfortable the use of your voice as commands than the use of peripherals, especially for the elderly, seeks to provide such comfort for the user without losing the advantages that the technology, helping the ***digitalization of people*** and thus, contributing to closing the digital gap between generations.

2. Objectives:

The main objectives of the program will be to make use of the programming language of ***python*** to create a voice interface which will be responsible for playing a role intermediary between the user and the ecosystem of the electronic device, responding to the user's voice commands, which will be activated by a keyword “Aurora” , the name of said program.

Specific objectives:

In order to meet the objective established in this project, the project must satisfy a series of key points specifically designed to make the user experience as comfortable and practical as possible, following the following points:

-> Voice listening interface: The program must be able to listen and interpret short practical sentences, in various modes of language, responding to requests of the user in both formal and informal language.

->Voice response interface: The program must be able to respond to the user in a clear and concise manner unless the user tells you otherwise, to This task must make use of the speakers or headphones of the specific device to play a voice that responds to the user's commands.

->Task manager: The program must be able to manage light tasks for the users within the operating system such as alarms, web searches, etc.

Concretion of objectives: Activities

In order to satisfy these requirements, the workload has been divided into one series of steps to follow to obtain the aforementioned objectives, being the following points to follow:

-> Development Voice Listening Interface:

A series of methods will be developed in the Python language which will be the responsible for managing the listening of the user's voice in order to transpose their guidelines to String text, which will be interpreted by the program to understand what kind of command it is, subsequently calling the correct method that will execute the task in question along with the voice response from the program.

-Audio capture: Use a library like ***SpeechRecognition*** to capture audio of the user's microphone.

-Voice recognition: Uses voice recognition algorithms to convert the audio in text.

-Text processing: Performs text preprocessing to eliminate noise or recognition errors.

-Command interpretation: Analyzes the text to identify the action requested by the user.

-Call to the command manager (main file): Once the command has been identified, call the question or command manager to execute the corresponding action.

-> Development of Question or Command Manager (main file):

Being the next step to the voice listening interface, it will be the component to develop responsible for interpreting and actively managing the user's command, processing and manipulating information to perform the appropriate task, as has been requested by the user, therefore the following will be developed:

-Command storage: A data structure to store the different commands and their corresponding actions.

-Command analysis: Development of techniques to analyze and understand the intention of the user.

-Identification of the action: Based on the analysis of the command, identification of the action that must be performed.

-Execution of the action: Call to the corresponding method to carry out the action requested by the user.

-> Development Voice Response Interface:

Being the next step to the question manager, it will be the component to develop responsible for managing the response that must be provided to the user, being the responsible for managing the sound response that the user will receive for the command requested, therefore it will be developed:

-Response generation: Use the command manager to obtain the response you must be provided to the user.

-Voice synthesis: Use the gTTS library to synthesize the voice response.

-Response playback: Plays the response generated through the system speakers.

3. Calendar:

In order to carry out the development of the project, it will be necessary to distribute the time spent and assigned before the presentation of the project, which taking into account Taking into account the magnitude of the project, the calendar will be divided into 2 phases necessary for the project development:

->Phase 1 investigation:

Due to the lack of in-depth knowledge in the assigned language, as well as the use of tools unknown to the members of the project, it will be necessary to previous research period, in which various data will be collected about the way of acting with the proposed technologies, this period lasting a total ***of 2 approximately weeks (Depending on the volume of information obtained and the quality of it)***

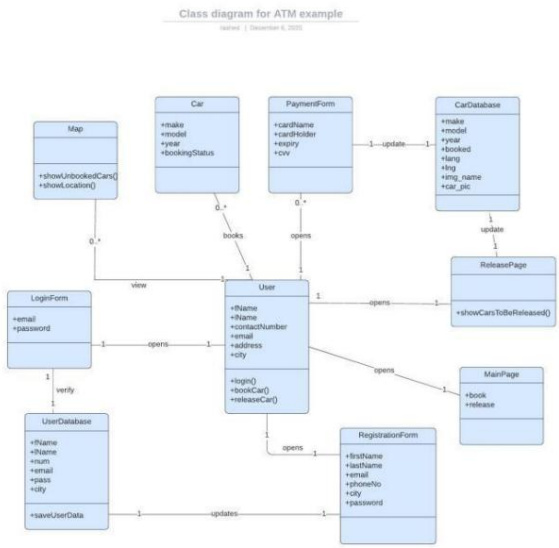
->Phase 2 development and documentation:

Once sufficient data has been obtained about the technologies with which to operate, will move into a phase of intercalated development, this means that as the project progresses , intermittently it will develop progressively at the same time with the project, the relevant documentation on the progress of the project itself.

Regarding the established schedule, the week will be subdivided into a series of shifts mandatory development requirements as shown in the table below, ***the project developed day by day:***

Monday (p.m)	Tuesday (p.m)	Wednesday (p.m)	Thursday (p.m)	Friday (p.m)	Saturday (p.m)	Sunday (am-pm)
6:00-8:00	6:00-8:00	6:00-8:00	6:00-8:00	6:00-8:00	12:00-2:00 6:00-8:00	12:00-2:00 6:00-8:00

Regarding the testing and management of possible errors during development, as well as With the documentation, these will be carried out tests following the unitary model as the code is being made and designing, in this way you can analyze possible impediments or failures in development life in a more effective leaving a product or result more finished at the end of the process.



4.HR:

Within the members of the project, a list of all the activities will be displayed to be carried out within the project and the person in charge of carrying out each and every one of these tasks to perform:

-Theme selection: Alejandro Morón Turiel

-Definition of objectives: Alejandro Morón Turiel

-Project design: Alejandro Morón Turiel

-Application development: Alejandro Morón Turiel

-Documentation: Alejandro Morón Turiel

-Testing and debugging: Alejandro Morón Turiel

-Evaluation and validation: Alejandro Morón Turiel

5. Material resources:

Among the resources necessary for the correct development of this tool will be The following elements are necessary, which belong to the language ecosystem python programming :

Python libraries:

-SpeechRecognition Library: For speech recognition in Python.

-gTTS Library: To convert text to speech and play it through the system speakers.

-Secondary functional libraries: necessary secondary libraries for specific events or actions (wikipedia, datetime...)

Physical devices:

-Microphone: To capture user voice commands.

-Speakers: To play voice responses generated by the assistant.

-Digital device: Device responsible for running and managing the program developed (7gb storage and 8gb Ram minimum)

Testing and debugging:

-pytest testing frameworks

-IDE debugging tools

-Visual studio Code

Documentation and collaboration:

-Version control tools (GitHub)

-WSP Office (office environment)

6. Results:

Among the expected results, a program is conceived with the ability to maintain a fluid conversation with users, acting as an intelligent virtual assistant that provides support and facilitates various tasks both within the ***operating system environment and in the online environment.*** This virtual assistant is expected to be a versatile and responsive tool, capable of understanding and responding to a variety of commands and queries naturally and effectively.

In the online environment, the program must be able to ***search the web and obtain relevant information for the user.*** This could include searching for news, or obtaining data about the weather, consulting information about places of interest...

7.References:

Evolution graph of electronic devices:

https://computerhistory.org/blog/the-worlds-smallest-computer/

Population graph of Internet use/ digital devices

https://mayoresudp.org/wp-content/uploads/2021/07/54461ISAS01-Barómetro-Mayores-2021_I.pdf

Python Libraries

https://docs.python.org/es/3/library/index.html

Pytest:

https://docs.pytest.org/en/8.0.x/