Aurora Preliminary Project
Alejandro Morón Turiel

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

Table of Contents:

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   ,
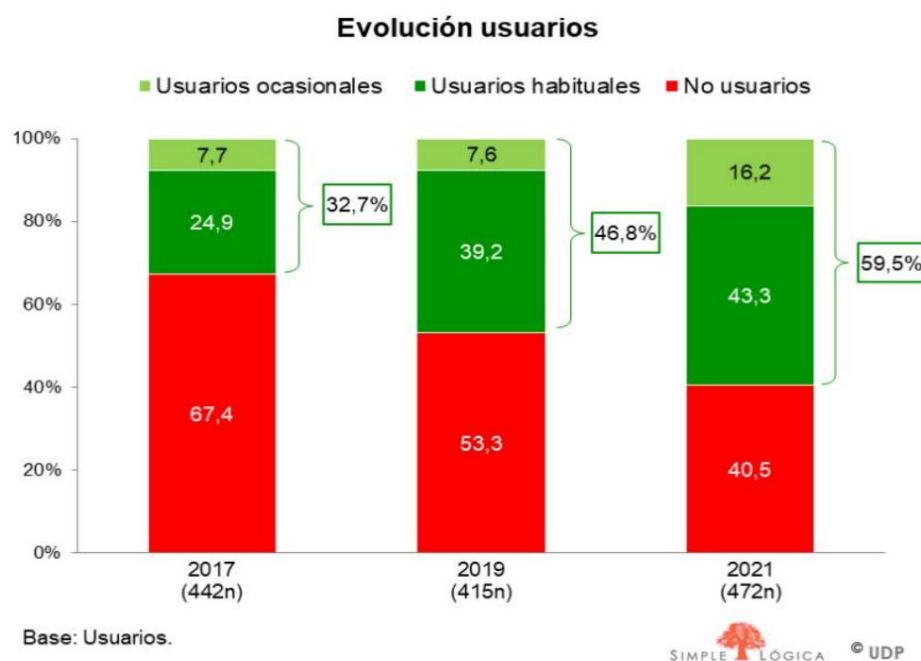changes that have been experienced are extremely
big.

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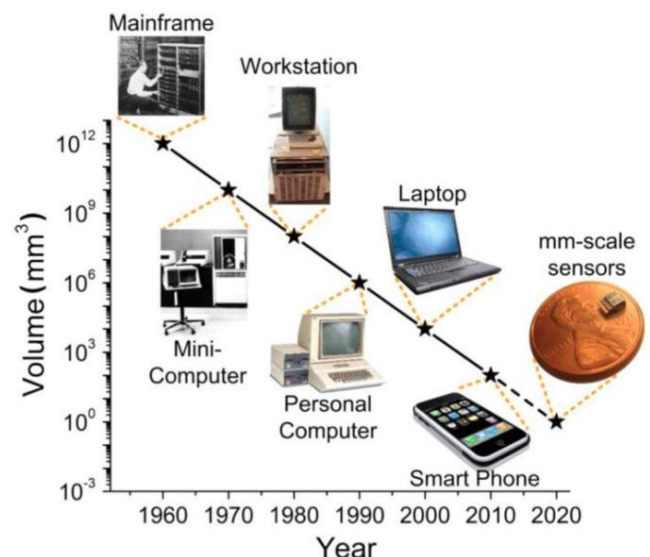
These changes in many cases have been correctly assimilated by the population.
eliminating certain habits or modifying them, since technology already
could supply in a more comfortable and effective way a more correct solution for the
problem or inconvenience caused by that habit.

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.

Evolución usuarios

■ Usuarios ocasionales   ■ Usuarios habituales   ■ No usuarios

	2017 (442n)	2019 (415n)	2021 (472n)
Usuarios ocasionales	7,7	7,6	16,2
Usuarios habituales	24,9	39,2	43,3
No usuarios	67,4	53,3	40,5
Total usuarios	32,7%	46,8%	59,5%

Base: Usuarios.

SIMPLE LÓGICA   © UDP

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.
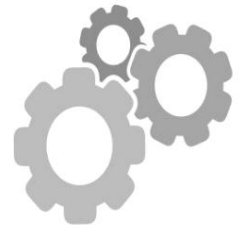
2. Objectives:

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, calendars, management of files, 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: Once the command is identified, it calls the command manager
questions or commands to execute the corresponding action.

-> Question or command manager development:

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 natural language processing techniques
(NLP) to analyze and understand user intent.

-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 a library like *pyttsx3* to synthesize the response into voice.

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

-Response customization: If necessary, customize the response according to the
context or situation.

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 (pm)	Tuesday (pm)	Wednesday (pm)	Thursday (pm)	Friday (pm)	Saturday (pm)	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 with the documentation, these tests will be carried out following the unitary model as the code is created and designed, in this way possible impediments or failures in life can be analyzed. of development in a more efficient way, leaving a more finished product or result at the end of the process.

Class diagram for ATM example

4.HR:
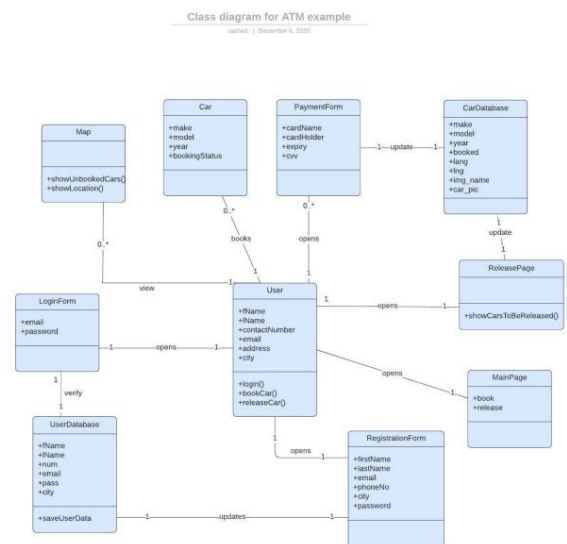
Within the members of the project, a list of all the activities to be carried out within the project and the person in charge of carrying out each and every one of said tasks to be carried out will be presented:

ÿ Topic selection: Alejandro Morón Turiel

ÿ Definition of objectives: Alejandro Morón Turiel

ÿ Project design: Alejandro Morón Turiel

ÿ Application development: Alejandro Morón Turiel

ÿ Documentation: Alejandro Morón Turiel

ÿ Testing and debugging: Alejandro Morón Turiel

ÿ 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:

ÿ **SpeechRecognition Library: For speech recognition in Python.**

ÿ **Pyttsx3 library: To convert text into speech and play it through the
system speakers.**

ÿ **Tkinter GUI Libraries – to create a user interface for
Interact with the virtual assistant.**

ÿ **Functional secondary libraries: secondary libraries
necessary for specific events or actions (wikipedia, datetime...)**

Physical devices:

ÿ **Microphone: To capture user voice commands.**

ÿ **Speakers: To play voice responses generated by the assistant.**

ÿ **Digital device: Device responsible for running and managing the program
developed**

Testing and debugging:

ÿ **Pytest testing frameworks**

ÿ **IDE debugging tools**

ÿ **Visual studio Code**

Documentation and collaboration:

ÿ **Version control tools (GitHub)**

ÿ **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 operating system environment, the program is expected to be able to perform actions such as managing files and folders, performing system maintenance tasks, configuring user preferences, among other activities related to the daily use of the computer. *For example, the virtual assistant could help the user find and open specific files, back up important data, or set reminders and alarms.*

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/