

**People's Democratic Republic of Algeria**

**Université FARHAT ABBES Setif**

**Faculté des Sciences**

**Département d'Informatique**



End of study report

To obtain the Diploma in Computer Science

# **Theme:**

Realization BuddyBot: bot virtual assistant.

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# **General introduction:**

In today's digital era, where human-computer interaction plays a pivotal role, the development of chatbots has emerged as a significant avenue for enhancing user experience and streamlining processes. This project introduces a sophisticated chatbot designed to provide seamless assistance and engagement in various domains. From customer service to information retrieval, the chatbot offers a versatile platform for users to interact, inquire, and accomplish tasks efficiently. Through meticulous design and implementation, this report delves into the architecture, functionalities.

## **What is a CHATBOT:**

A chatbot is a computer program designed to simulate conversation with human users, especially over the internet. It utilizes artificial intelligence (AI) and natural language processing (NLP) to understand and respond to user inputs in a way that mimics human conversation. Chatbots can be deployed on various platforms such as websites, messaging apps, and social media platforms, providing users with assistance, information, entertainment, or support in real-time. They can handle a wide range of tasks, from answering frequently asked questions and providing recommendations to executing specific actions and facilitating transactions. Overall, chatbots aim to enhance user experience by offering quick, personalized, and efficient interactions.

## **The impact of CHATBOT for students:**

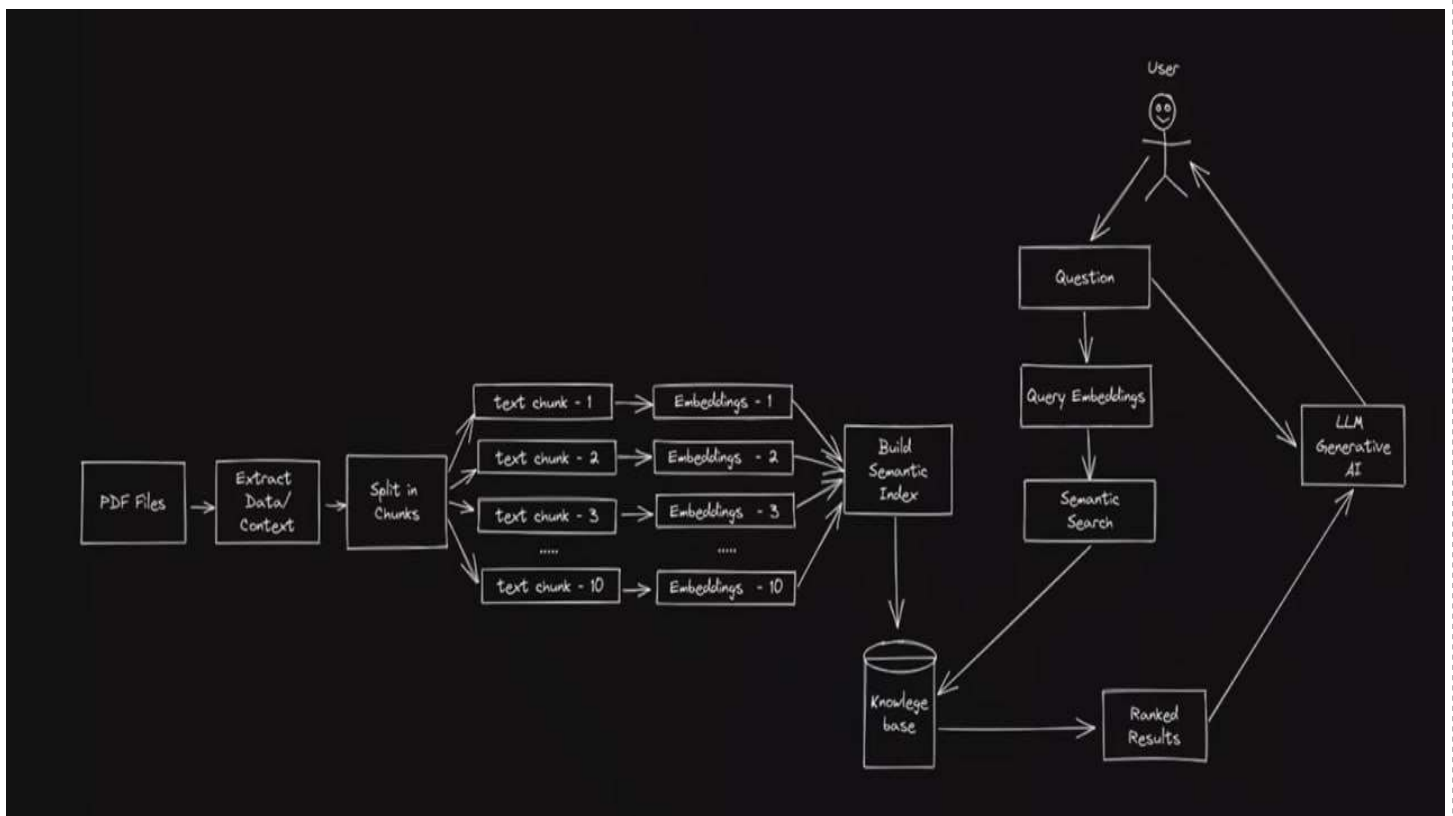
The impact of chatbots on students can be significant across various aspects of their academic journey: Chatbots offer round-the-clock support to students, providing instant responses to queries related to coursework, assignments, schedules, and more. This accessibility can help students address their concerns and stay on track with their studies, especially during non-office hours.

In conclusion, chatbots have become essential in our daily lives and have a significant impact in various fields Especially for students

# Bot architecture:

Bot architecture refers to the design and structure of a software bot, outlining how it functions, interacts with users, processes information, and executes tasks. Here's a breakdown of the typical components and considerations in Bot architecture:

First, the front-end component where users interact with the bot. It could be a chat interface, or any other form of interaction. Also, Bots often integrate with messaging platforms like custom web interface. This integration allows the bot to receive user inputs and send responses. Where it depends NLU processes user inputs to understand their intent, extract entities, and determine the appropriate response. Techniques like machine learning and natural language processing (NLP) are used here. Then the bot access knowledge bases, databases (The database was created from PDF that we extract data from it and split it into chunks than store it in text chunk after than we turn embeddings, I build semantic Index than make it in a vector data base [FAISS]), site web, or external APIs like Gemini AI model to fetch information or perform tasks. This could include retrieving data, making calculations, or executing commands. Where Dialog management handles the flow of conversation between the user and the bot. It keeps track of context, manages state, and decides which response to provide based on the current conversation context.

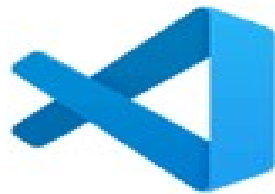


# **Software:**

## **Visual Studio Code:**

Visual Studio Code is a free and open-source code editor developed by Microsoft.

It is designed for software developers and takes support many popular programming languages such as JavaScript, TypeScript, Python, Java, C++, and many more. Visual Studio Code is available for Windows, macOS and Linux, and has a wide range of features such as syntax highlighting, automatic code completion, formatting, highlighting syntax errors, debugging, file and folder management, integration with version control tools like Git, and much more. Visual Studio Code is widely used by developers to create applications, websites and web services.



Visual Studio Code

## **Python:**

Python 3.12.2 is a high-level, interpreted programming language known for its simplicity and readability. It was created by Guido van Rossum and first released in 1991. Python emphasizes code readability and expressive syntax, making it accessible to both beginner and experienced programmers. Python is widely used in various domains, including web development, data science, artificial intelligence, scientific computing, and automation. Its versatility, simplicity, and extensive ecosystem make it one of the most popular programming languages among developers worldwide.



# **Libraries:**

## **LangChain:**

LangChain is an open source framework that lets software developers working with artificial intelligence (AI) and its machine learning subset combine large language models with other external components to develop LLM-powered applications. LangChain is a framework that simplifies the process of creating generative AI application interfaces. Developers working on these types of interfaces use various tools to create advanced NLP apps; LangChain streamlines this process.

LangChain was launched as an open source project by co-founders Harrison Chase and Ankush Gola in 2022; the initial version was released that same year.



# LangChain

## **StreamLit :**

Streamlit is an open-source Python framework for data scientists and AI/ML engineers to deliver dynamic data apps with only a few lines of code. It is designed for data scientists and AI/ML engineers that aren't willing to spend weeks learning how to construct web apps using these frameworks. They choose a tool that is simpler to learn and use, as long as it can display data and collect necessary information for modeling. With Streamlit, you can create a visually appealing application and deploy it in minutes with just a few lines of code.



# Streamlit

## **Faiss :**

FAISS is a library stands for Facebook AI similarity search which is used to create embedding for documents and to perform similarity search operations on the document which are the form of embeddings or vectors of sentences in the document. langchain provides faiss module to be used on our application.



## **GoogleGenerativeAI :**

Google Gemini is an artificial intelligence (AI) chatbot tool designed by Google to simulate human conversations using natural language processing (NLP) and machine learning. In addition to supplementing Google Search, Gemini can be integrated into websites, messaging platforms or applications to provide realistic, natural language responses to user questions.



## **PyPDF2 :**

PyPDF2 is a free and open source pure-python PDF library capable of splitting, merging, cropping, and transforming the pages of PDF files. It can also add custom data, viewing options, and passwords to PDF files. PyPDF2 can retrieve text and metadata from PDFs as well.

# PyPDF2

