Fotios Bampouridis

9/12/25

# Research and Problem Identification for AI Agents

An AI agent is a computer program that can look at a situation, decide what to do, it takes and looks up information, and then takes action to reach a goal. There are 6 types of characteristics. Such characteristics are: Works on its own without human help (autonomous), takes in information from its surroundings (perception), makes decisions, does actions. aims to reach a certain goal, Ai can also learn and adapt if needed. These characteristics make the AI agent highly effective and capable. There are 4 main AI agents for specific purposes. Reactive Agents just react to what's happening but don't store information. Deliberative agents actually think and plan before answering, learning agents they learn from experience and improve over time, and finally Conversational agents they primarily talk and chat with people. A good example is Chat gpt its a Conversational Agent. It uses information that you used and communicated with the agent to help. Reactive agents can be email and phone spam since they only send information and store nothing. Apple maps is a deliberative agent since it plans the routes before taking action. Youtube recommendations is a learning agent because it learns from what you like to recommend your videos. I believe that the best tool for our group project would be LangChain because it has great integration, it's easy to work with, and there's a big community so help is always where you need it. Of course you do need to know a good amount of python and API but the flexibility I say it's definitely worth it compared to the Raza which I'll say is better for more basic AI such as chat boxes and spam mails. As for APIs I'll say OpenAI API since it was designed to work perfectly with LangChain. Got great support, simple integration. So to make general purpose AI or AI super flexible I'll say this combo is good. Finally for Cloud I'll definitely think Azure AI / Azure OpenAI because it is perfectly integrated with LangChain and Open AI API is very flexible. My preference would be Google Dialingflow for its simplicity and beginner friendliness, but recommend Azure.Now why I chose Azure, LangChain, and OpenAI for my ecommerce is primarily because of its flexibility and huge growing community. Also because they are beneficial to get a job since enterprises tend to use them. Azure can handle multiple customers/users.Open Ai and langchain will allow the AI to summarize users orders and recommend products they might be interested in. As my teammate Open AI handles NLP so all we need is to integrate it . Now let's see what problem an AI agent could solve. Let's say you want to find a console, or laptop, maybe a game and you don't want to look around the web to find specific one for the right price and quality. We can create an AI agent that all you have to do is write what you are looking for. Success will be measured by how quickly and accurately the AI finds products that match the user's request.For example, let's say you want a new laptop, you can write specs you want like 4k resolution, Oled screen, GPU rtx 4050, 32gb ram for the price of 900$, refurbished like new. The AI agent will check each store and read the description to find your closest requested laptop possible. This agent would be super valuable for people who don't have time to search hours and hours on different sites and stores. For our Game store our AI agent would primarily be a chatbox that will search the store to find what you are looking for. Example name of game, type of laptop, games on sale, even discounts buy 4 get 1 free. This way customers would have easy time locating the products. Also probably send emails for available products the customer was looking for. To conclude, my research on AI agents helped me and my lovely team choose the right tools and design for my Capstone project. By understanding different agent types and their main characteristics, an Ai agent has shown that a conversational agent is best for a shopping assistant. Studying real-world applications like ChatGPT and YouTube recommendations did show me how the agent can interact and learn from users. Using LangChain, OpenAI API, and Azure ensures flexibility, NLP capabilities, and scalability for handling multiple customers efficiently. I believe this is a great way not only to learn more about AI and improve my resume for future job applications, but also start learning python and how to use APIs. Overall I'm way too excited to try so many tools, improve my skills, and design an AI. A dream that I had for 8 whole years will finally come true.

—---------------------------------------------------------------------------------------------------------------------------