

**NUTRIBOT
&
ETHICAL IMPLICATION OF AI**

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C O L L E G E

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NUTRIBOT

A Chatbot for personalized Nutritional Guidance and Meal Planning

A conversational AI based chatbot that provides nutritional advice and meal planning suggestions to promote a balanced diet and healthier lifestyle.

Introduction:

Maintaining a healthy diet can be challenging, especially in today's fast-paced world where people are always on the go. A healthy diet is crucial to maintaining good health, reducing the risk of chronic diseases like obesity, heart disease, stroke, diabetes, and improving overall well-being. However, people often struggle to make healthy choices due to a lack of knowledge about nutrition, busy schedules, and conflicting dietary advice. The use of conversational AI-based chatbots can provide a solution to these problems by offering personalized nutritional guidance and meal planning ideas.

Problem Statement:

The main problem this project aims to solve is the lack of knowledge and guidance that people have when it comes to making healthy food choices. There is an abundance of information available on the internet about healthy eating, but it can be confusing and misleading. Additionally, people often have busy schedules and find it difficult to make time for meal planning and cooking healthy meals. This can lead to a reliance on fast food and unhealthy processed foods, which can contribute to weight gain and poor health outcomes.

Proposed Solution:

A conversational AI-based chatbot can offer personalized nutritional guidance and meal planning ideas to help users make healthy food choices. The chatbot will understand user preferences, dietary restrictions, and nutritional needs. It will provide users with nutritional advice and recommendations for healthy meals and snacks. This solution can be particularly useful for individuals who are looking to lose weight or manage chronic diseases such as diabetes or heart disease.

Use Case: Meal Planning and Nutritional Guidance

❖ Scenario:

- One girl is a 30-year-old who is trying to lose weight and eat healthier. She has a busy job and finds it difficult to make time for meal planning and cooking healthy meals. She is also confused about what foods to eat and how much to eat to reach her goals. She decides to use our **NUTRIBOT** to help herself with meal planning and nutritional guidance.

- She opens the chatbot on her smartphone and tells it about her goals to lose weight and eat healthier. She also shares her dietary preferences, food allergies, and daily schedule.
- The chatbot asks her about her current eating habits, such as what she typically eats for breakfast, lunch, and dinner, and how much water she drinks per day.

❖ **Expected result based on above use case:**

- ✓ Based on the information provided by her, this chatbot recommends a personalized meal plan that includes breakfast, lunch, dinner, and snacks for the week. The chatbot also suggests healthy recipes that she can try based on her dietary preferences and age.
- ✓ The chatbot educates her about the importance of portion control and recommends serving sizes for each meal. It also provides her with nutritional information for each food item, such as calorie count, vitamin, and mineral content.
- ✓ With the help of this chatbot, she can plan and prepare healthy meals that align with her goals and preferences. She is also more aware of portion sizes and nutritional information, which helps her make better choices when dining out or grocery shopping. Over time, she can lose weight and improve her overall health and well-being.

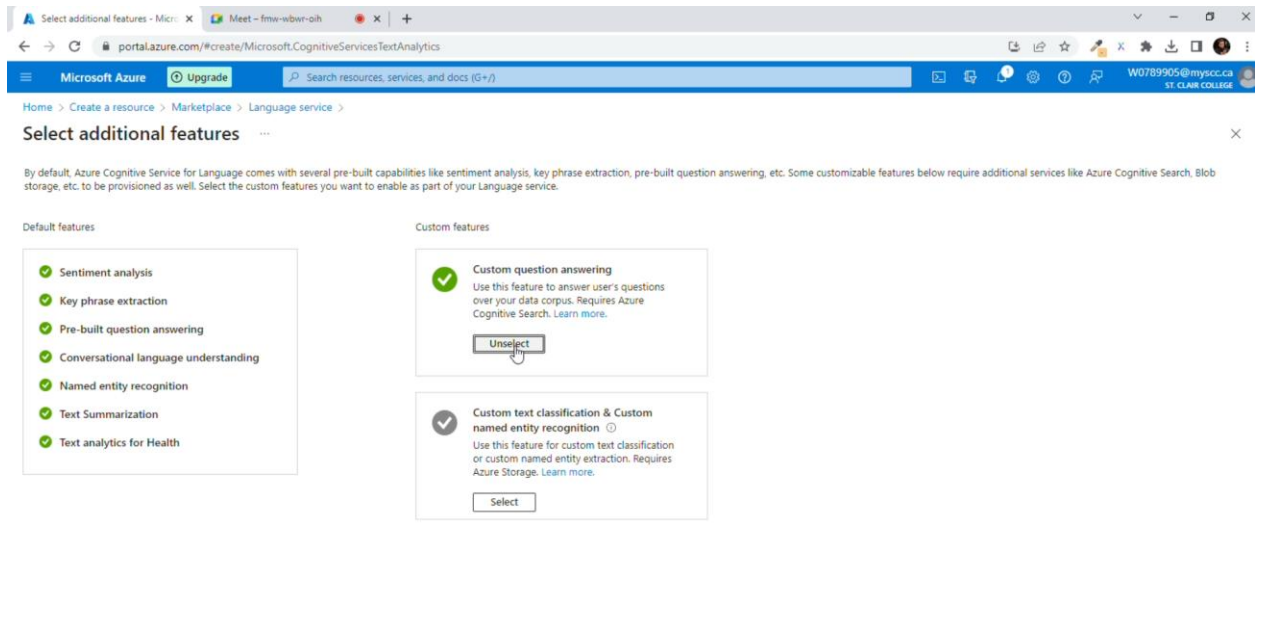
Here are a few more potential use cases:

1. **Fitness freaks:** People who are interested in fitness and exercise may want to use this chatbot to help them plan meals that support their training goals. For example, they may want to build muscle or increase endurance, and the chatbot can provide them with meal plans that align with those goals.
2. **Parents:** Parents who want to ensure that their children are eating a healthy and balanced diet may use this chatbot to get ideas for kid-friendly meals and snacks. The chatbot can consider any dietary restrictions or allergies and provide meal options that are both nutritious and appealing to children.
3. **Seniors:** Older adults who may be on fixed incomes or have limited mobility may benefit from the chatbot's meal planning. The chatbot can help them plan meals that are affordable and easy to prepare, while also considering any dietary restrictions or health concerns.

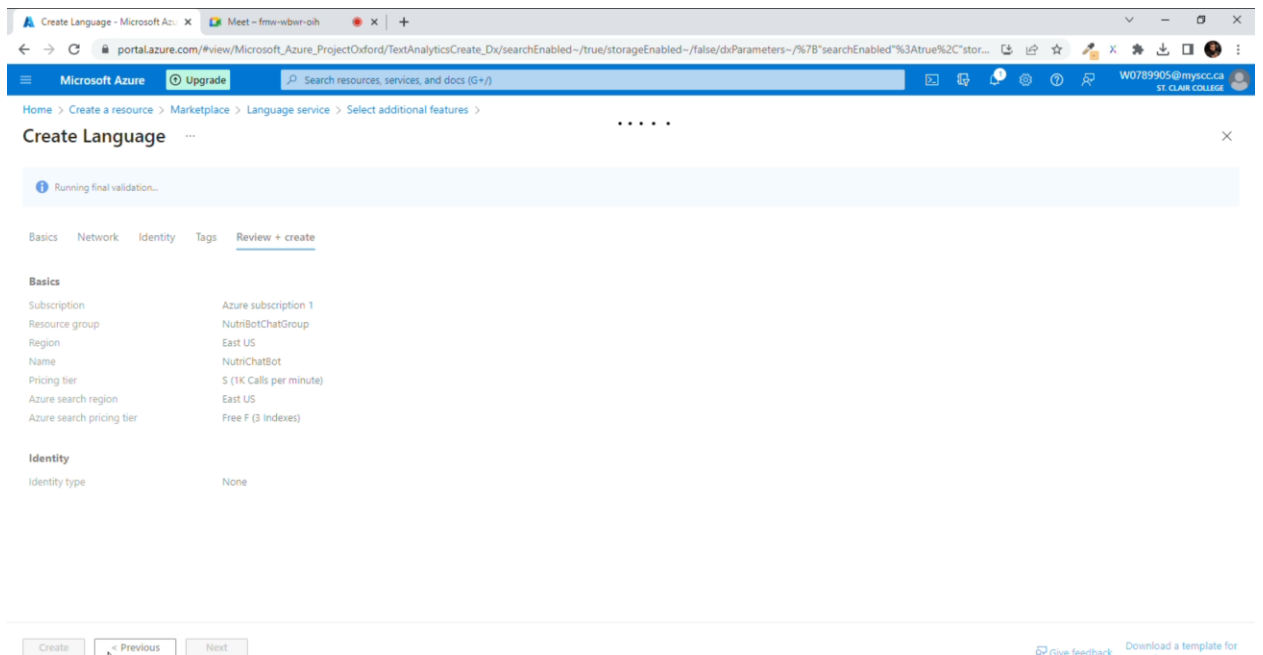
Screenshots of Project Implementation:

Using the steps below we created a new resource in Language service.

Step 1: First, we created language resources to create our chatbot.

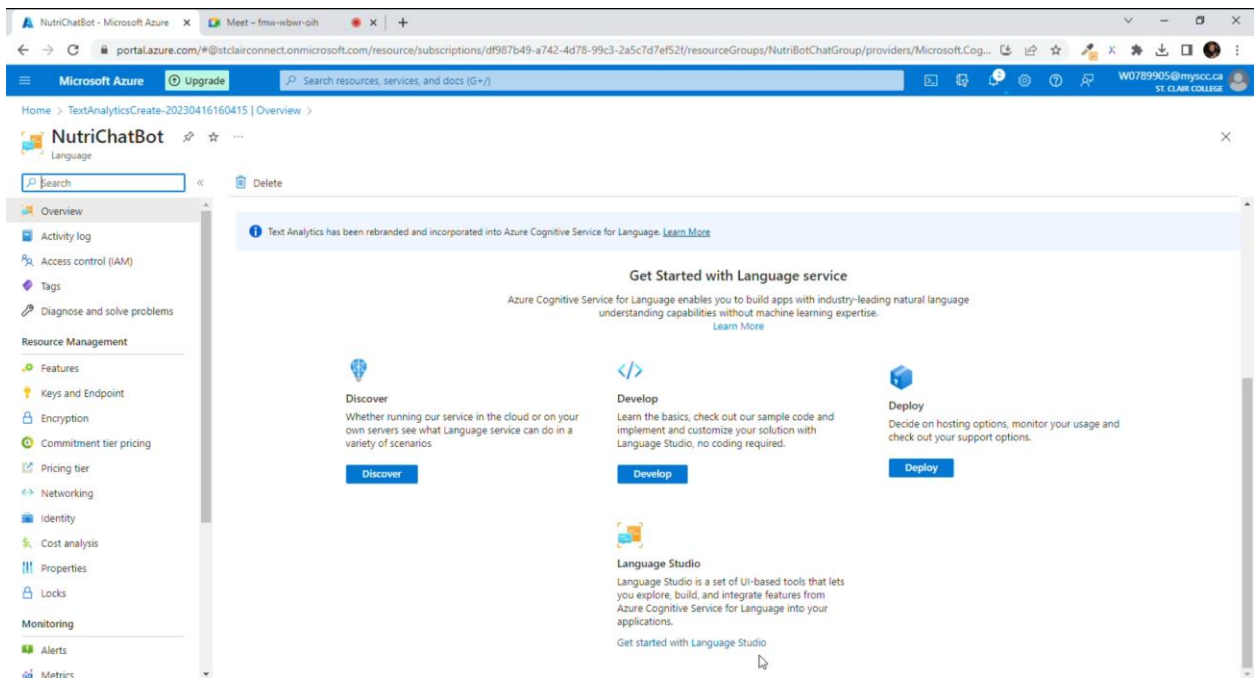


a)

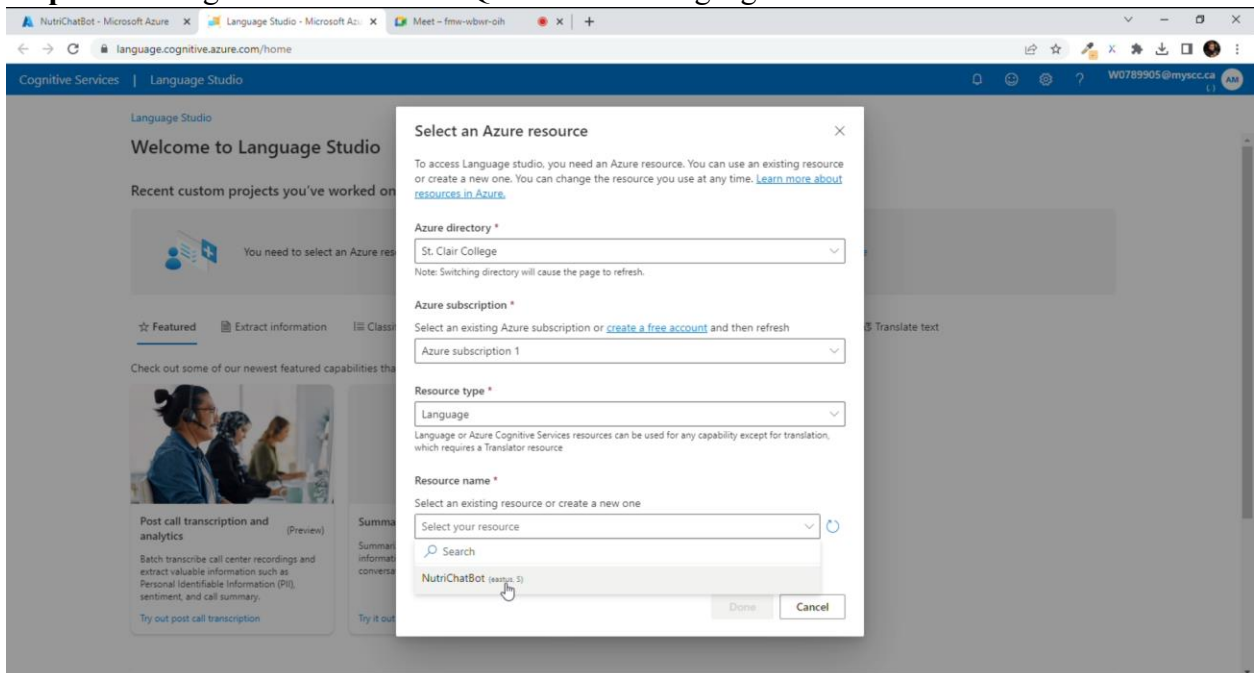


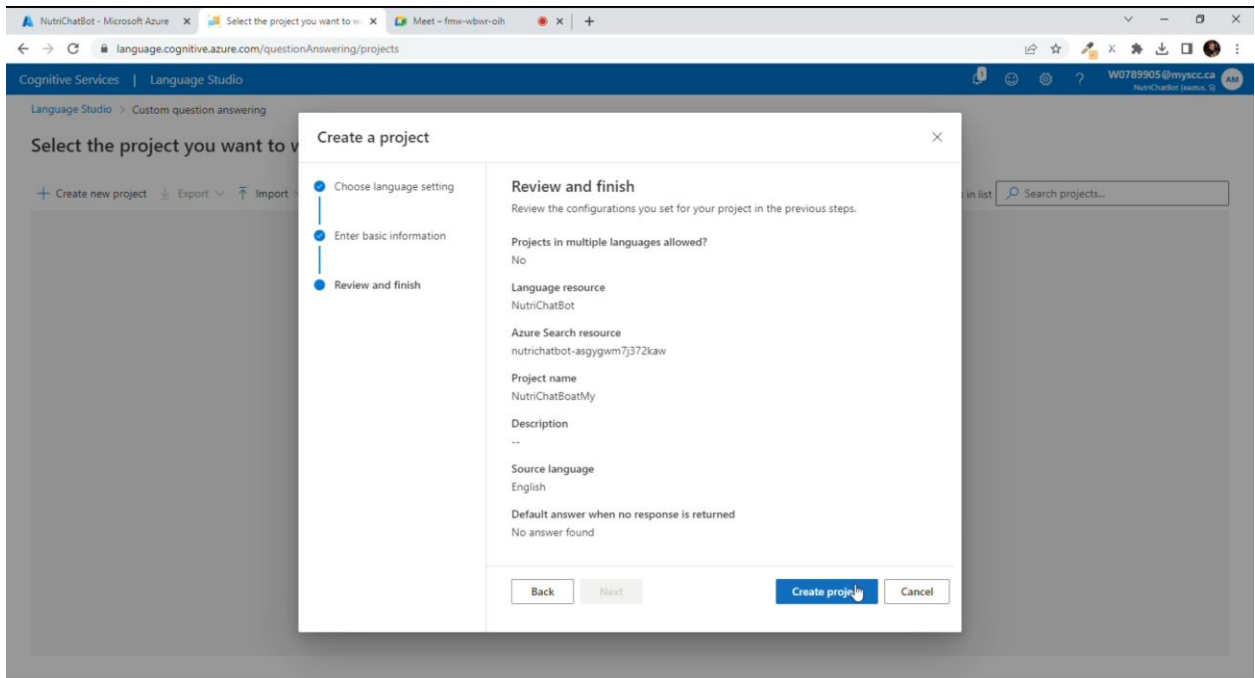
b)

Step 2: The language resource named **NutriChatBot** allows us to create a chat bot using Conversational AI.



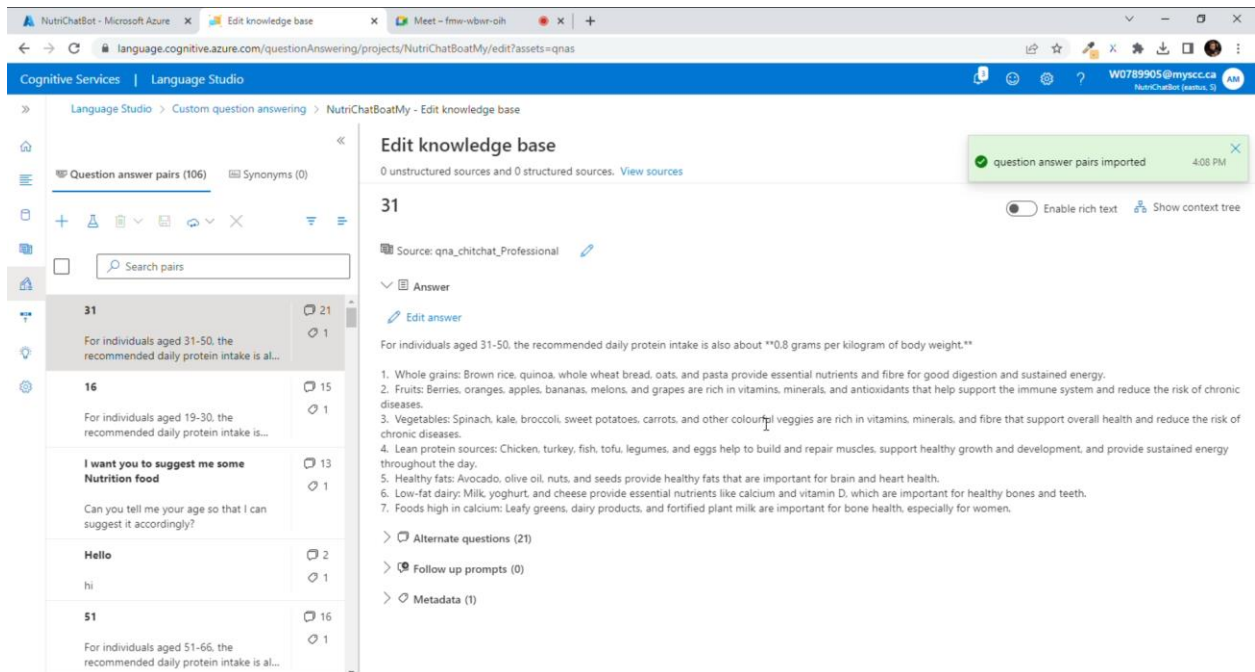
Step 3: Creating chatbot in Azure's Q&A Maker - language studio.





Step 4: Training Chat Bot

a. Predefined questions and answers for initial conversation.



b. Training model as wise so that if customer ask question, it can give proper output.

Language Studio > Custom question answering > NutriChatBotMy - Edit knowledge base

Question answer pairs (106) Synonyms (0)

31

For individuals aged 31-50, the recommended daily protein intake is al...

16

For individuals aged 19-30, the recommended daily protein intake is...

I want you to suggest me some Nutrition food

Can you tell me your age so that I can suggest it accordingly?

Hello

hi

51

For individuals aged 51-66, the recommended daily protein intake is al...

Edit knowledge base

0 unstructured sources and 0 structured sources. View sources

31

Source: qna_chitchat_Professional

Answer

Edit answer

For individuals aged 31-50, the recommended daily protein intake is also about **0.8 grams per kilogram of body weight.**

1. Whole grains: Brown rice, quinoa, whole wheat bread, oats, and pasta provide essential nutrients and fibre for good digestion and sustained energy.
2. Fruits: Berries, oranges, apples, bananas, melons, and grapes are rich in vitamins, minerals, and antioxidants that help support the immune system and reduce the risk of chronic diseases.
3. Vegetables: Spinach, kale, broccoli, sweet potatoes, carrots, and other colourful veggies are rich in vitamins, minerals, and fibre that support overall health and reduce the risk of chronic diseases.
4. Lean protein sources: Chicken, turkey, fish, tofu, legumes, and eggs help to build and repair muscles, support healthy growth and development, and provide sustained energy throughout the day.
5. Healthy fats: Avocado, olive oil, nuts, and seeds provide healthy fats that are important for brain and heart health.
6. Low-fat dairy: Milk, yoghurt, and cheese provide essential nutrients like calcium and vitamin D, which are important for healthy bones and teeth.
7. Foods high in calcium: Leafy greens, dairy products, and fortified plant milk are important for bone health, especially for women.

> Alternate questions (21)

> Follow up prompts (0)

> Metadata (1)

Step 5: Deployment

Language Studio > Custom question answering > NutriChatBotMy - Deploy knowledge base

Deploy knowledge base

Deploy knowledge base and create a bot in a few clicks.

Deploy Get prediction URL

Deploy this project?

Deploy NutriChatBotMy? Once deployed you can integrate it within a bot.

Deploy Cancel

Deploying your knowledge base will copy the knowledge base from the test index to the production index.

NutriChatBot - Microsoft Azure x Deploy knowledge base x Meet - fms-wbwr-oh x +

language.cognitive.azure.com/questionAnswering/projects/NutriChatBotMy/deploy

Cognitive Services | Language Studio

» Language Studio > Custom question answering > NutriChatBotMy - Deploy knowledge base

Deploy knowledge base

Deploy knowledge base and create a bot in a few clicks.

Deploy Get prediction URL

✔ Your knowledge base is now deployed. You can get your prediction URL or create a bot.

Knowledge base status			
State:	Deployed	✔	Resource: NutriChatBot
Deployment Date:	4/16/2023	✔	Location: eastus
Deployment Time:	4:10:44 PM	✔	Tier: Standard (S)

Next steps: Create a bot

Step 1: [Read the documentation](#) to learn more about creating bots.

Step 2: Go to Azure to create a bot.

Create a bot

✔ NutriChatBotMy - Successfully depl... 4:08 PM

NutriChatBot - Microsoft Azure x Deploy knowledge base x Custom deployment - Microsoft x Meet - fms-wbwr-oh x +

portal.azure.com/#create/Microsoft.Template

Microsoft Azure Upgrade Search resources, services, and docs (0+)

Home >

Custom deployment

Deploy from a custom template

✔ Validation Passed

Basics Web App **Review + create**

Summary

Customized template
4 resources

Terms

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By clicking "Create," I (a) agree to the applicable legal terms associated with the offering; (b) authorize Microsoft to charge or bill my current payment method for the fees associated the offering(s), including applicable taxes, with the same billing frequency as my Azure subscription, until I discontinue use of the offering(s); and (c) agree that, if the deployment involves 3rd party offerings, Microsoft may share my contact information and other details of such deployment with the publisher of that offering.

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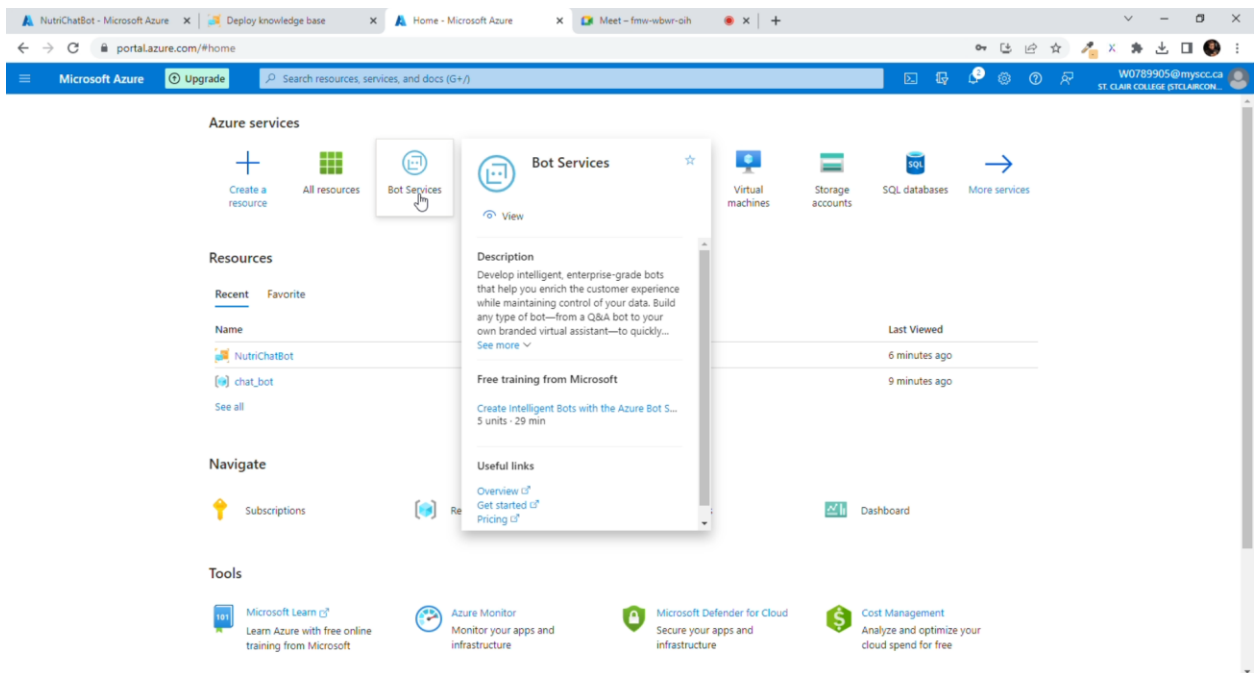
Neither subscription credits nor monetary commitment funds may be used to purchase non-Microsoft offerings. These purchases are billed separately.

Create < Previous Next

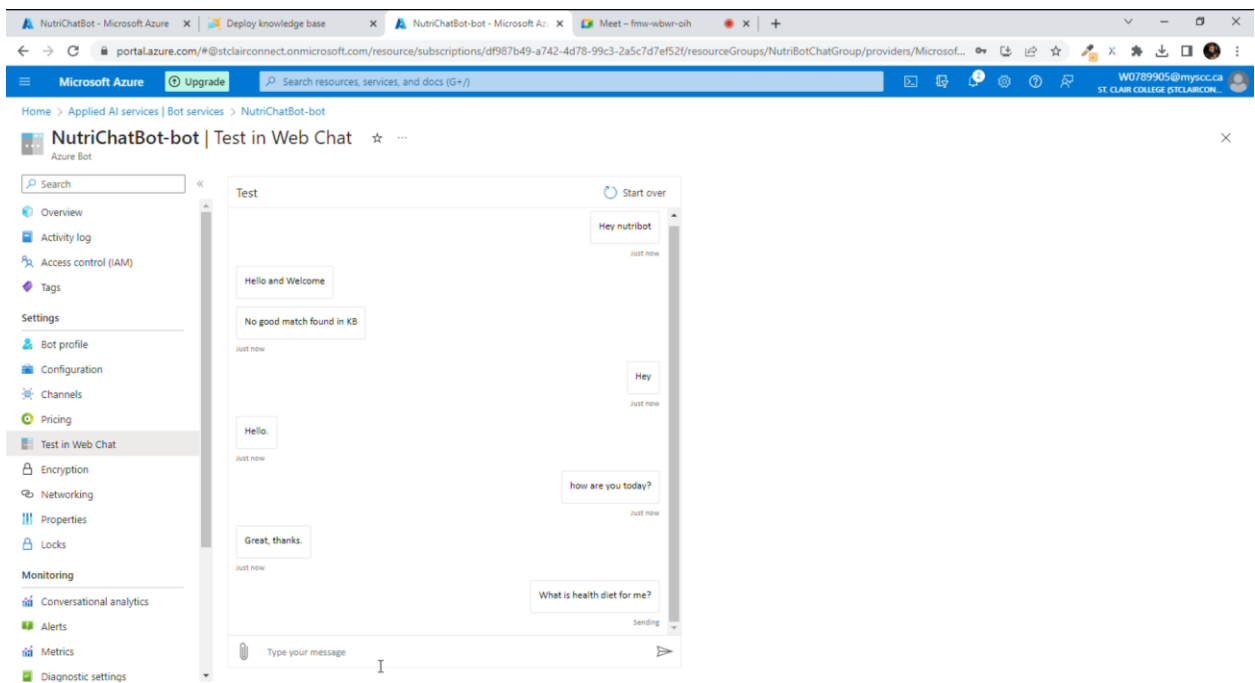
*** Submitting deployment...
Submitting the deployment template for resource group 'NutriBotChatGroup'.

Step 6: Testing on web chat

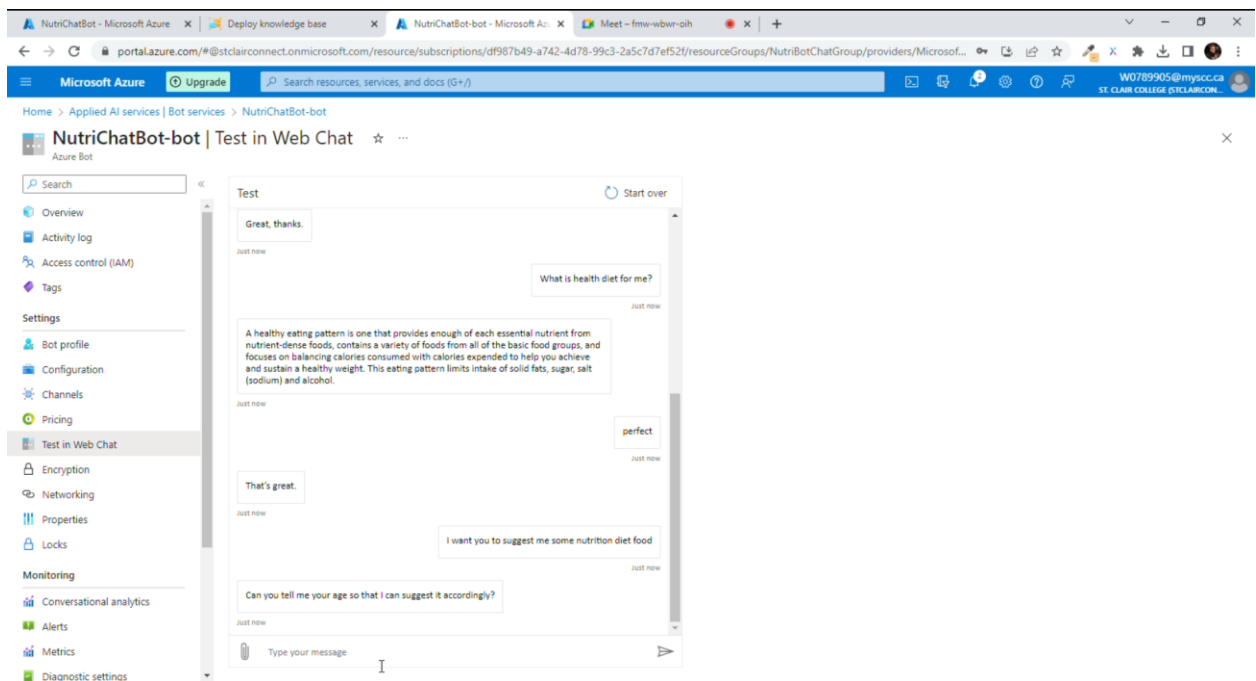
- Enabling bot services and testing the bot in web chat.



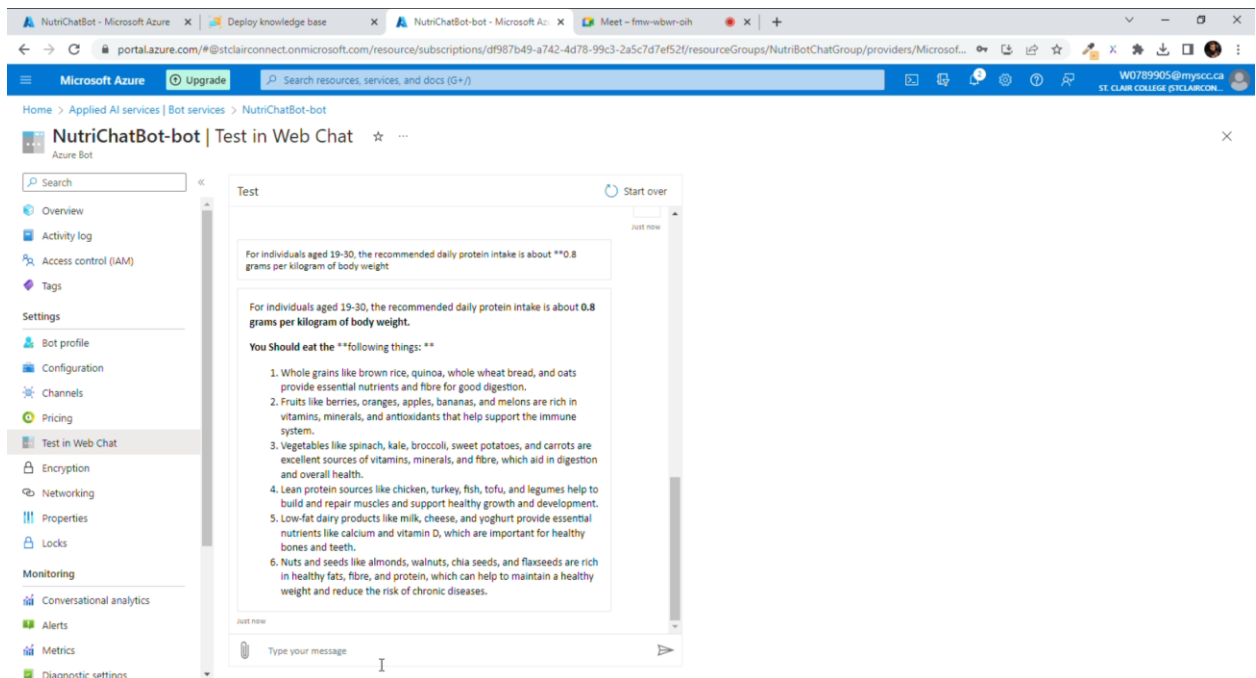
- Initial Q&A to chat bot



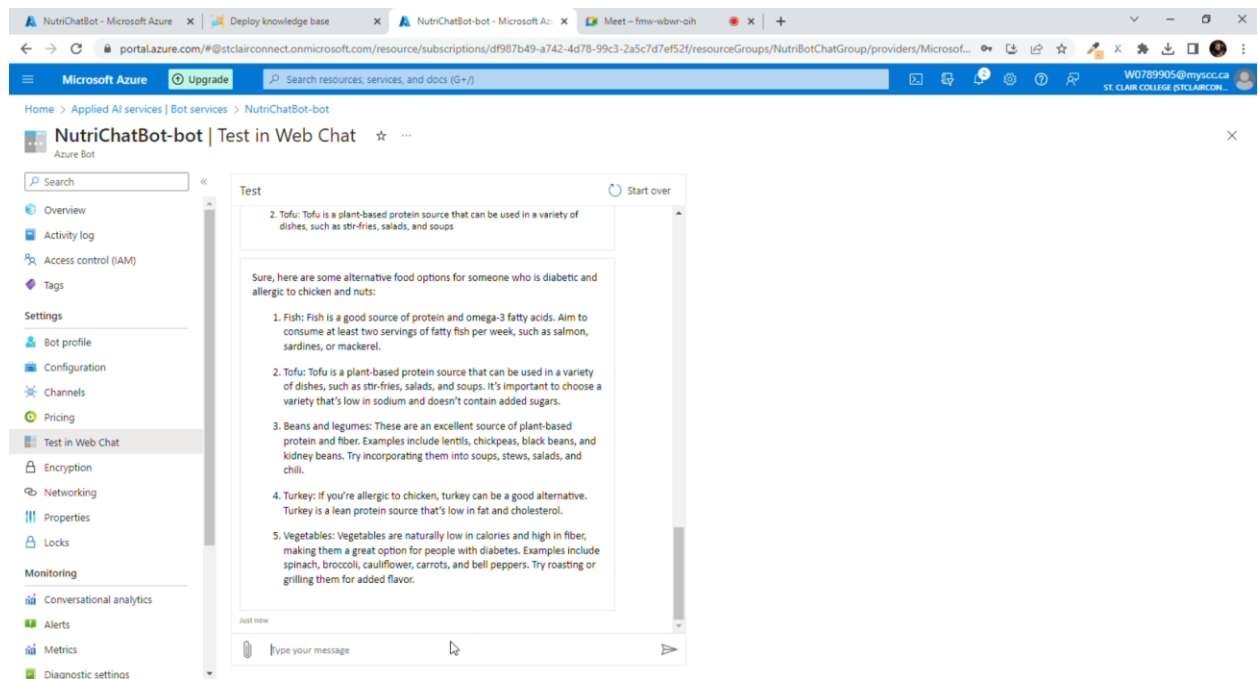
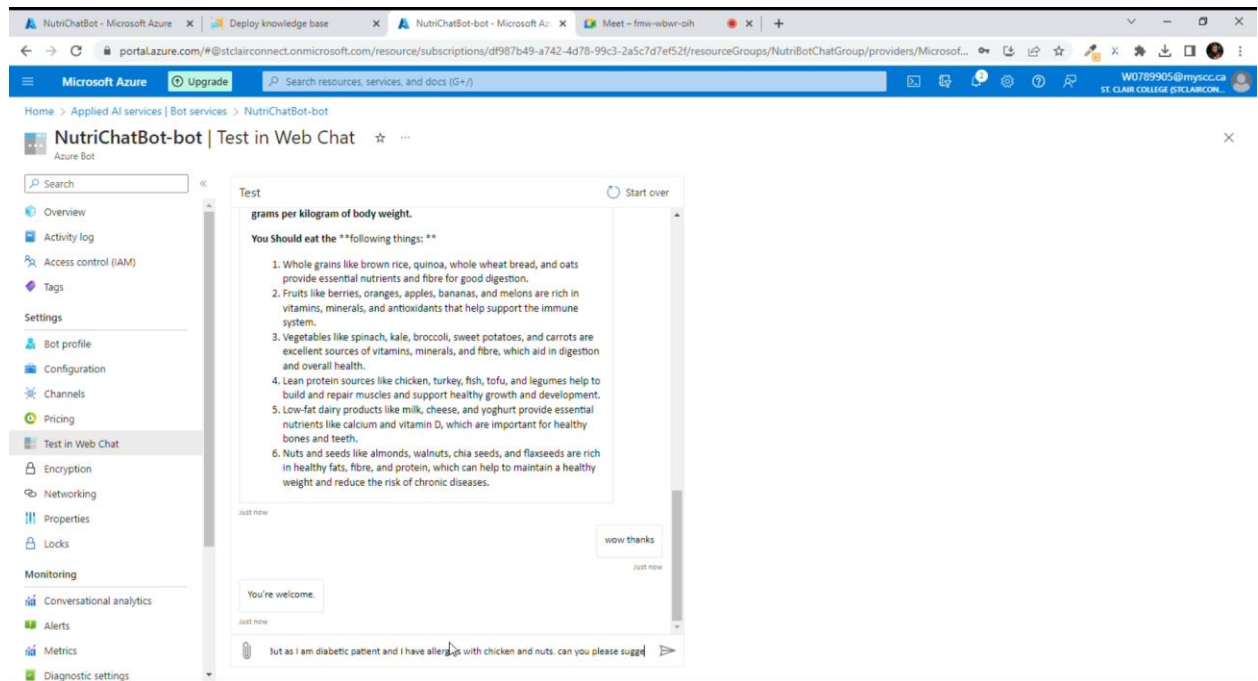
- Asking questions as per proposed scenario.



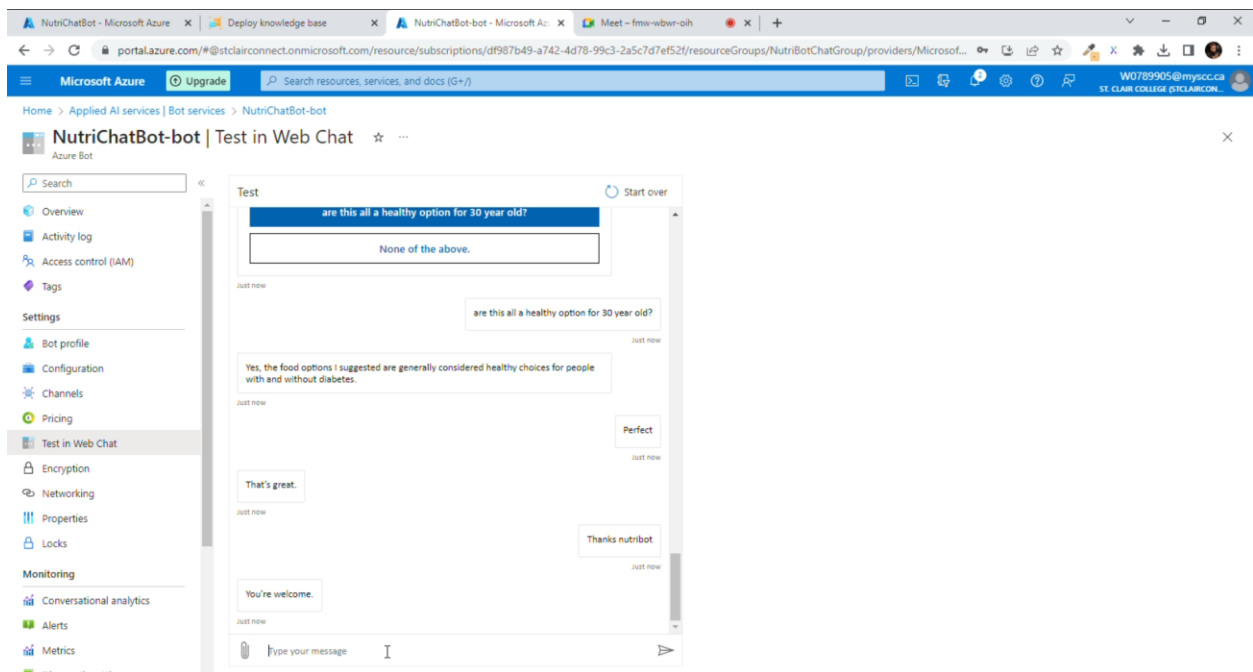
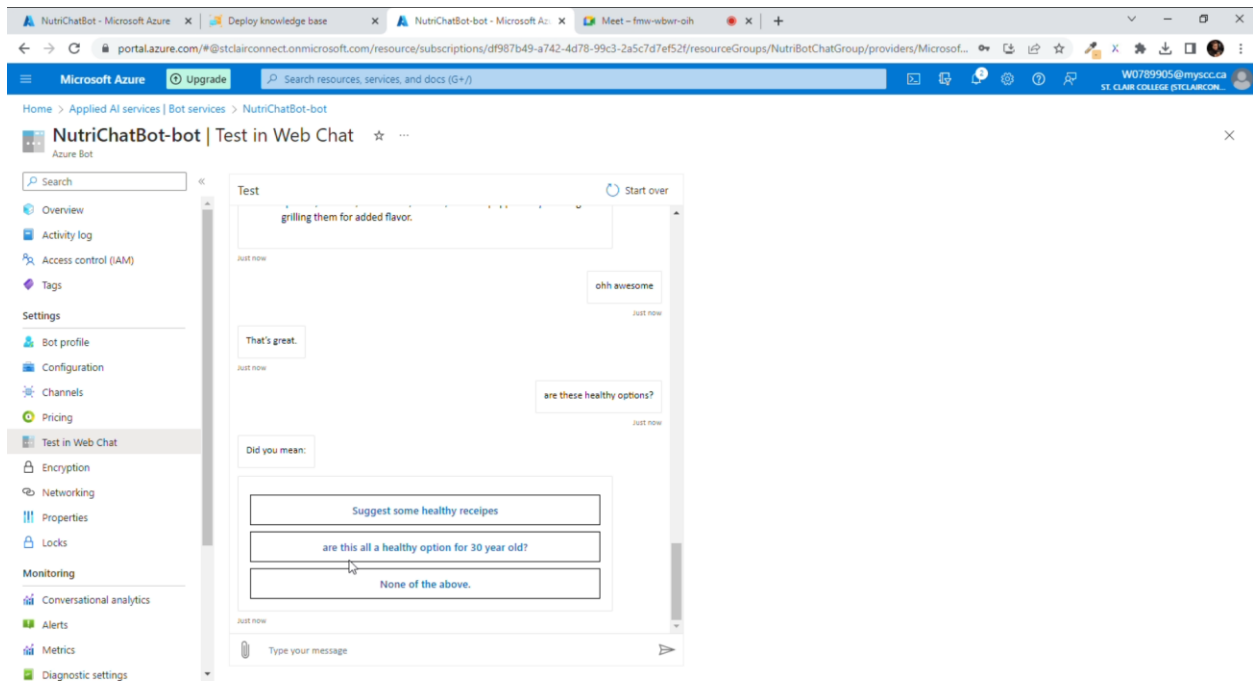
- Entering age as 30 following answer the chatbot will give.



- Telling chatbot the person is **diabetic and allergic** to chicken and nuts so asking for alternatives.



- The person asking chatbot for the options you are suggesting is a healthier diet for them and **chat bot asking is that a question you are asking by giving multiple option.**



Limitations of this Chatbot:

There are several limitations to consider when designing a chatbot for personalized nutritional guidance and meal planning, including:

- **Lack of personalization:** While a chatbot can provide personalized nutritional guidance based on user data, such as age, weight, and activity level, it may not be able to account for individual preferences, tastes, or dietary restrictions.
- **Limited scope:** A chatbot may only be able to provide nutritional guidance and meal planning within a specific domain, such as weight loss or fitness nutrition. It may not be able to provide comprehensive guidance for users with complex health conditions.
- **Reliance on user input:** A chatbot's effectiveness relies on the accuracy and completeness of user input. Users may not accurately report their dietary habits or may omit important information that could affect their nutritional needs.
- **Limited understanding of cultural differences:** Cultural differences can play a significant role in dietary habits and food choices. A chatbot may not be able to understand these nuances or provide culturally sensitive guidance to users from different backgrounds.

Overall, while a chatbot for personalized nutritional guidance and meal planning can be a useful tool, it should not replace the advice of a qualified nutritionist or dietitian.

Ethical Implications of AI

April 16, 2023

Abstract

Artificial Intelligence has revolutionized the world in which we live as well as various aspects of our life, ranging from healthcare to education, and from entertainment to transportation.

Furthermore, as a technological platform, AI may automate labor-intensive occupations or create new ones that allow humans to be usefully employed. It's now nearly hard to picture a world without AI since it has become so ubiquitous. However, there are several concerns that come with the increased use of AI. The present trend in AI development is towards further automation, yet doing so may entail passing up the opportunity to create the 'right' kind of AI, which has superior economic and societal results.

Ethical Implications of AI

We've seen some amazing AI technology emerge in recent months that captured everyone's attention and left us in awe. Who would have believed that artificial intelligence (AI) could be utilized in artistic professions, but then we saw some incredible images being created by Dall-E. However, all that was little in comparison to the enormous interest in ChatGPT, where more than a million individuals signed up in just one week. However, these tools and other generative AI technologies have also come under fire and raised certain issues. Very soon after ChatGPT was released, reports of kids using it to cheat on assignments began to circulate, fueling debate over the authenticity of artificial intelligence generated content. And this issue goes beyond minor controversies, in the media sector, it can be a contentious matter to determine who should be given credit for creating content produced by AI or who owns the copyright to it. Additionally, if a generative AI algorithm is trained on a dataset of copyrighted material, the content it generates may contain elements that are copied from the original work potentially leading to copyright infringement issues. We have only just begun to understand the potential effects of AI, but let's focus on the ethical implications of it. The subject is quite intricate and nuanced. The public is really worried about how AI might affect their jobs. There is a chance for prejudice, there may be problems with accountability and transparency in how it's developed and used. Aside from governments and regulatory agencies defining rules and standards, tech businesses and researchers also play important roles in ensuring that AI is created and used ethically. Finally, let's not forget the public's role in advocating for ethical AI practices and understanding them.

Real life ramifications of AI

One of the concerns with generative AI is the development of deep fakes and other deceptive information intended to sway public opinion or further a particular goal. For instance, when the deep fake video of Ukrainian President Volodymyr Zelenskyy ordering his soldiers to lay down their weapons and give up the war against Russia surfaced, it had significant geopolitical repercussions. Despite being swiftly exposed as a hoax, it was still harmful since it led some people to doubt the authenticity of later distributed real videos of Zelenskyy. Imagine the consequences if deep fake videos were to become undetectable by humans.

Ethical Implications

When discussing the effects of AI, people frequently bring up the topic of job loss. How much education or training a profession takes, the complexity of the work, and the amount of data available to aid AI in learning are just a few of the many factors that can influence whether AI might replace a career. Jobs that require a lot of repetitive work and a lot of data, such as data entry in manufacturing and some customer support positions, are more likely to be replaced by AI. Jobs requiring greater knowledge and expertise, such as those requiring decision-making and research analysis, usually aren't as at risk. However, it's important to note that even in these occupations, AI may be able to support people rather than completely replace them.

Another major ethical implication is bias. AI algorithms are designed by humans and as a result, they are prone to biases and prejudices. AI systems are only as unbiased as the data that's used to train them. Unfortunately, data often reflects human biases, which means AI can replicate those biases too. Due to this, some groups of people may be discriminated against, for instance,

facial recognition software being less accurate for people with darker skin tones. There have been numerous examples of AI systems that perpetuate and amplify biases present in the data they're trained on. One example is an AI algorithm called Correctional Offender Management Profiling for Alternative Sanctions (COMPAS) that's used in the U.S to predict which criminals are more likely to reoffend in the future. It's used by the judges to make decisions about things like jail sentences and bail amounts for the criminals. However, a ProPublica analysis revealed that COMPAS was unreliable. Compared to white criminals, it was more probable to anticipate that black criminals will commit crimes again in the future. Black criminals were mistakenly categorized as more dangerous than white criminals nearly twice as often, even for violent crimes. Therefore, it appears that COMPAS somehow picked up on the human bias that black people are more likely to commit crimes both now and, in the future, than other races.

Another example was an AI algorithm, Amazon had called the Recruiting Engine, that was supposed to help them decide which job applicants to interview based on their resumes. The idea was to use AI to find talented people and get rid of human bias in the recruitment process but it turned out that Recruiting Engine was biased against women. It's probable that this occurred because of the algorithm being trained on resumes that Amazon had received over the previous ten years, the majority of whom were men with preconceived notions against female candidates. When Amazon looked into the algorithm, they discovered that it automatically devalued resumes that contained the word "women" and devalued graduates of all-women universities. As a result, Amazon scrapped the algorithm and stopped using it to evaluate applicants for employment.

Moving on to another implication, transparency and accountability. While AI can make decisions faster and more accurately than humans, there's always the risk of unintended

consequences. Who decides what problems AI is designed to solve? Who has access to AI and who is excluded? What if an autonomous vehicle were to cause harm to a pedestrian, who would be held responsible? AI development and application must be open and responsible. In order for people to understand how decisions are made, it is crucial to guarantee that AI systems' decision-making processes are visible. Establishing accountability for the deeds of AI systems is equally crucial. This involves making sure that people are held accountable for the deeds of AI systems and that there is a straightforward procedure for seeking redress in situations when AI systems are at fault. In other words, we want all of us to kind of have a say in how AI will be used to benefit our society in the future.

Finally, we talk about data protection and privacy. For decision-making, AI systems rely extensively on data. AI systems may also gather and analyze enormous volumes of data, which raises questions about privacy and spying. Personal data like location, browsing history, and social media activity may be included in this data. An abuse of personal data is more likely as AI systems get more sophisticated. It is critical to make sure that individuals have control over their data and that it is collected and utilized in an ethical manner. We use video tracking of people in healthcare settings to ensure they are recovering from an injury or something similar because when we develop AI, we do so for what we believe to be good reasons. However, the same technology could be removed and used in smart bombs to track people or by governments to track their citizens as they move around. Additionally, people can be tracked using facial recognition technologies without their knowledge or agreement. This constitutes a serious breach of privacy and may have unforeseen effects.

Ethical Implications of AI in Healthcare Sector

Artificial Intelligence (AI) has the potential to transform the healthcare industry, but it also poses significant ethical concerns. Some jobs currently carried out by healthcare personnel may be replaced by AI systems, which may result in job losses or changes to the nature of work. Healthcare organizations must implement AI in a fair manner that upholds the rights of medical practitioners.

Patients have a right to be informed of and give their consent before artificial intelligence is used in their care. Patients must be informed of the possible advantages and risks of AI and given the choice to decline its use by healthcare professionals.

Large amounts of data are necessary for AI systems to learn and advance, but this data frequently contains sensitive personal data. Healthcare providers are required to abide by data protection rules and take precautions to protect patients' privacy because there is a risk of data breaches or misuse.

As a result of biases and prejudices from its developers or the data used to train them, AI algorithms may produce discriminatory results, especially for underrepresented groups. Healthcare providers must create AI systems that minimize bias and discrimination in order to assure justice.

It can be tough to assign blame when things go wrong when operating on a patient since AI systems might be sophisticated and challenging to comprehend. Healthcare organizations must create AI systems that are accountable and transparent, explaining how algorithms come to their conclusions.

In conclusion, even if AI in healthcare has enormous potential, ethical issues need to be resolved. Healthcare organizations must prioritize patient privacy, fairness, transparency, informed consent, and respect for the rights of healthcare professionals while developing and utilizing AI systems.

Recommendations for Designing Ethical AI Systems

Before we get to the recommendations, to ensure that AI can be used for the benefit of as many people as possible, we must all engage in a broad, open conversation about what it can and cannot do.

Using diverse and representative data to train the AI systems is one approach to ensure that the algorithms are not biased, which is extremely crucial. By doing this, the algorithms themselves may become less biased. Another strategy is to routinely assess bias using tools like human review and fairness measures. The use of diverse data, routine testing and auditing, collaboration with experts and stakeholders, and other practices can all be beneficial in discovering and addressing bias in AI systems. To ensure that AI is utilized ethically, governments and regulatory agencies can also establish rules and norms.

Giving reasons for a system's choices is another technique to make AI ethical. This can be achieved via methods like feature importance, which essentially illustrates the reasons that went into making a given decision, or decision trees, which show the logical flow of decisions made by the AI systems. Access to the data and algorithms that were used to train the AI systems can

also be made available. People can learn how the algorithms function and what factors influence their decisions by doing this. Also, tech companies can have a dedicated team of researchers and engineers to make sure their AI systems are ethical.

Not to forget, one thing we can do as individuals is educate ourselves on AI ethics and its potential impacts on society. This can entail engaging with subject-matter experts, attending events or workshops, and reading relevant articles, books, and research papers.

Conclusion

To sum it up, AI's ethical implications are complex and varied. It is crucial to think about how AI systems will affect society, people, and the environment as we continue to create and use them. While AI offers significant potential, it also presents significant ethical challenges that need to be addressed to ensure responsible deployment that aligns with societal values. The ethical concerns discussed in this report must be considered to ensure that AI systems operate transparently, equitably, and with respect for individual privacy, promoting social welfare. By doing so, we can ensure that AI is a force for good, rather than a source of harm.

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