IEC ONLINE COURSE "APPLIED AI"

1. EDUCATIONAL PART OF THE COURSE

1.1. ChatGPT BASICS

LESSON №1: "Introduction to ChatGPT"

Module 1: Introduction

- *What is ChatGPT and how does it work?*

ChatGPT is a universal chatbot that gives users the ability to communicate with Artificial Intelligence (AI). In other words, it's a computer program that allows anyone to interact with a digital neural network, give it various tasks, and receive corresponding results. It's almost like the Genie from Aladdin's lamp, except it fulfills your wishes using texts and images, and more recently, also with voice. ChatGPT can answer almost any of your questions, help with studies, write essays, analyze documents, compose music, generate code, even joke with you, and much more. Imagine a friend who is always ready to help and knows everything in the world—that's ChatGPT.

Module 2: The History of ChatGPT Creation

- *Why, when, and by whom it was created*
- *Neural network models*

The history of Artificial Intelligence dates back to the 1950s when scientists began exploring the possibility of creating computers capable of interacting with people in natural (human) language. From the advent of the first versions of AI up until the mid-2000s, most developments in this area were confined to research centers and giant commercial companies, without public access.

In 2015, the world-renowned visionary, inventor, and entrepreneur Elon Musk, along with Sam Altman (former president of the startup incubator Y Combinator), founded the research lab OpenAI. Its goal was to create a powerful and humane AI that would benefit all humanity, rather than serving individual interests or corporations. Therefore, the company was initially registered as a nonprofit, with the idea that it would develop safe AI funded by private sponsors, keep its activities transparent, and maintain open-source code accessible to everyone. The name of the company speaks for itself – Open Artificial Intelligence (OpenAI).

Elon Musk was the most vocal advocate for creating transparent AI in the public domain, frequently warning that AI could be extremely dangerous for humanity in the future and must be controlled by society, not corporate interests.

However, the dream of a fully "incorruptible" AI was not to be. Building a super-powerful AI requires significant funding. As a result, OpenAI's top management started looking for ways to attract more investment. The solution was found by creating a subsidiary commercial company, OpenAI Limited Partnership, which collects funds from investors and operates on their behalf.

In 2018, Elon Musk left the OpenAI board of directors, stating that the originally nonprofit organization with open-source code had become its complete opposite due to the greed of its management, the company's secrecy, and its close ties with Bill Gates' Microsoft.

Despite Musk's departure, thanks to multi-billion-dollar investments, primarily from Microsoft, OpenAI released the following models of GPT (Generative Pre-trained Transformer) one after another:

2018: GPT-1 – The first version of the model was not publicly available; it was an internal OpenAI development trained on 7,000 books.

2019: GPT-2 – The first public version of the language model. The neural network learned to answer questions, generate complex essays, and translate texts with varying success. Training data: 8 million web pages or 40 GB of data.

2020: GPT-3, GPT-3.5, and the release of the first version of ChatGPT – The neural network improved in text processing, producing more complex responses in various styles, writing code, and performing simple mathematical calculations. Training data: 570 GB of data.

2023: GPT-4 and the updated version of ChatGPT – This version became multimodal, meaning it could work not only with text but also with images, generating even higher-quality responses.

2024: GPT-4o – The latest version of the neural network as of summer 2024. The "o" in GPT-4o stands for "omni," highlighting the network's versatility. Now, the chatbot can process various types of information simultaneously and respond by generating text, voicing it, creating images, and more.

Module 3: ChatGPT Capabilities at Present

•   *Service capabilities*
•   *Areas of application*
•   *SearchGPT*

The free version of ChatGPT provides users with unlimited access to the previous GPT-3.5 model and limited access to the latest GPT-4o model. Here are some of the capabilities of the free version:

1. Answering Questions: ChatGPT can answer various questions, providing information and explanations.

Example: "What is quantum mechanics?" - ChatGPT will explain the basic concepts of quantum mechanics, such as superposition and entanglement.

2. Text Creation: Users can generate texts of various kinds, from essays to stories and scripts.

Example: "Write a short story about adventures on a deserted island" - ChatGPT will create an exciting plot with characters and events.

3. Text Editing: ChatGPT can help improve text by correcting grammatical errors and enhancing the narrative style.

Example: "Fix the grammar in this paragraph" - ChatGPT will correct errors and improve readability.

4. Translations: ChatGPT can translate texts from one language to another.

Example: *"Translate this sentence into French: 'Hello, how are you?'" - ChatGPT will provide the translation: " Bonjour, comment ça va?"*

5. Recommendations: ChatGPT can recommend books, movies, music, and more based on user preferences.

Example: *"Recommend a fantasy book" - ChatGPT will suggest popular fantasy books such as "The Lord of the Rings" by J.R.R. Tolkien and others.*

6. Learning and Explanations: ChatGPT can explain complex topics and assist in learning across various subjects.

Example: *"Explain how a neural network works" - ChatGPT will explain the principles of neural networks, such as layers and training.*

7. Programming Assistance: ChatGPT can help with writing and debugging code in various programming languages.

Example: *"Write a Python function that calculates the factorial of a number" - ChatGPT will provide the appropriate code.*

8. List and Plan Creation: ChatGPT can help create task lists, daily plans, recipes, and more.

Example: *"Create a workout plan for the week" - ChatGPT will suggest a detailed daily workout plan.*

==*The paid version of ChatGPT*== with the **Plus plan**, costing $20 per month, provides all the features of the free version **plus** unlimited access to GPT-4o, GPT-4, and expanded functionalities that are truly remarkable:

Image Processing
• Recognition and detailed description of image content
• Translation of text found on images
• Answering questions related to visual content
• Generating images based on text descriptions

Video Processing
• Understanding what is happening in a video without sound, based on visuals
• Recognizing individual objects in videos
• Generating videos, including 3D, based on text descriptions
• Commenting on what a camera is capturing in real-time (relevant for visually impaired individuals)
• Compressing videos and summarizing their content

Audio Processing
• Real-time speech recognition and transcription (with a delay of about 0.3 seconds)
• Generating speech with different emotional tones and intonations
• Detecting emotions based on a person's voice

Multimodal Integration
• Simultaneous work with text, images, and audio in a single query
• For example, you can ask a question about a picture and receive the answer as an audio message

Contextual Understanding
- The model considers previous conversation context when processing new information
- It can maintain a coherent dialogue for several minutes

Advanced Language Capabilities
- GPT-4o can help with learning over 50 foreign languages
- It can function as a simultaneous translator in dialogue
- It understands jokes in different languages and can detect the context of a conversation based on tone, including irony or sarcasm.

Areas of Application - today, ChatGPT is widely used in various fields, such as:

- **Education:** Developing educational apps and online courses with automated student work evaluation.
- **Content Creation:** Generating articles, reviews, advertising texts, and strategies.
- **Customer Service:** Creating intelligent virtual assistants for customer service in various businesses.
- **Medicine**: Assisting doctors in analyzing medical data and making diagnoses.

SearchGPT - it is a term that may refer to an advanced functionality or a special version of the GPT model being developed by OpenAI, which integrates with *internet search functions*. The goal of this integration is to improve and enrich responses to user queries by accessing real-time information.

Key features of SearchGPT:

- **Integration with search engines:**
SearchGPT can perform queries in search engines to find and analyze fresh information, providing answers based on the most up-to-date data.

- **Real-time data:**
Unlike standard GPT models, which are trained on data with a cutoff date, SearchGPT has the ability to access and use current data from the internet.

- **Extended functionality:**
SearchGPT can perform various tasks such as news searches, fact-checking, finding current events and trends, making it a useful tool for users who need timely and accurate answers.

- **Accuracy and reliability:**
Thanks to access to up-to-date information, SearchGPT can provide more accurate and relevant answers compared to basic models trained on static data.

Examples of SearchGPT usage:

- **News and Events:**
A user can request the latest news on a particular event, and SearchGPT will provide the most recent information from reliable sources.

- **Fact-checking:**
If a user wants to verify the accuracy of a statement, SearchGPT can search and analyze information from various sources to provide a well-founded answer.

- **Current trends and data:**
SearchGPT can be used to monitor current trends on social media, financial markets, or other areas where information relevance is critically important.

At present, to access features similar to those expected from SearchGPT, the best options are subscribing to ChatGPT Plus and using Microsoft's Bing Chat.

<mark>**Module 4:** Working with ChatGPT</mark>
- *Access to the service*
- *Interface*
- *Functionality*
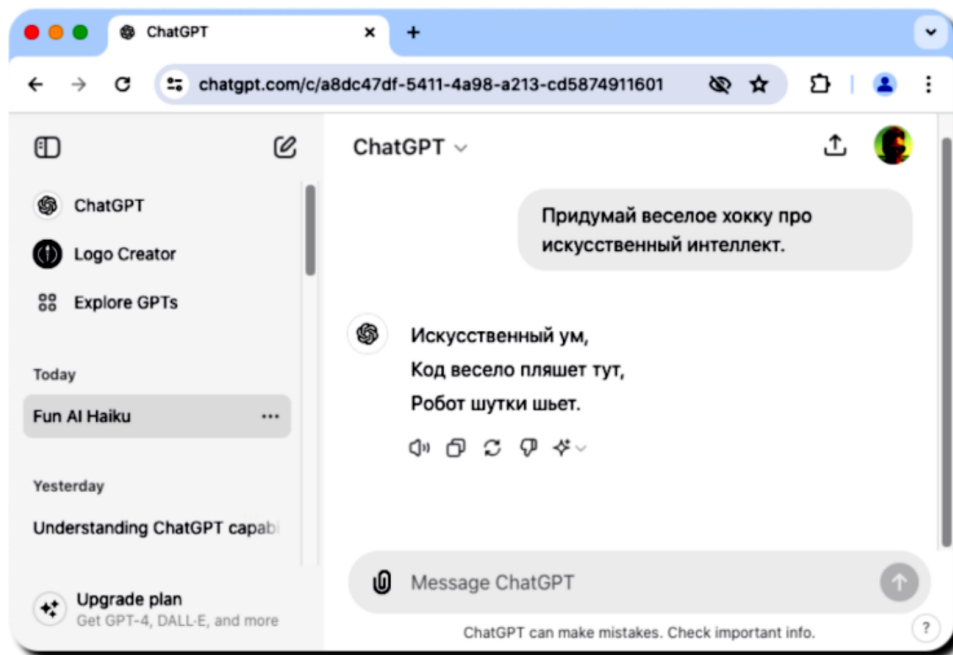- *Limitations*
- *Tips for use*

Currently, there are many Telegram channels that provide access to the ChatGPT service, but often with certain limitations, such as a limited number of requests within a specific time frame, or requiring payment to access advanced features like image creation and so on.

<mark>*Access to the service*</mark> via a web browser is available on the website: **https://chatgpt.com/**

In some cases, access to the service may be restricted. To avoid this, you can install a VPN application, or in the Google Chrome browser, go to Settings - Extensions, and then find and install the **DEEPRISM** or **Urban VPN Proxy extension**. Activate the extension and go to the ChatGPT website.

<mark>*The service's interface*</mark> is minimalistic yet intuitive:

- In the upper left part of the screen, there are links to the ChatGPT homepage, the Logo Creator page, and the GPT Agents "store" (see Module 6);

- Just above and to the right is a button to start a new conversation with ChatGPT;

- Below, on the left side of the screen, you can see the chat history in chronological order;

- In the bottom left corner, there is an "Upgrade plan" link offering the option to upgrade from the free plan to the Plus plan.
- In the center bottom of the screen is the field for sending requests (so-called "prompts," see Module 5 below).
- To the left of the request field is a button to upload text or image files for analysis by ChatGPT.
- The central and larger part of the screen is occupied by the field where ChatGPT's responses to the submitted requests are displayed.
- In the upper right corner, there is a button to create a link to the current conversation and share it with other users.
- In the very top right corner, there is a button for:

• Viewing GPT agents created by the user

• Customizing ChatGPT to your preferences

• Managing the interface appearance and additional settings

• Downloading the ChatGPT desktop application for macOS

• Logging out of the service

The service's functionality is also extremely simple and easy to understand:

- Enter your request or question in the text field in one or more sentences (see more details in Module 5 below) and press Enter or click the "up" arrow button to the right of the text field.
- Receive a response from ChatGPT, and if needed, clarify or ask a follow-up question related to the current topic.
- If the response is not entirely accurate, rephrase the request for a better result.

Despite its capabilities, ChatGPT has some **limitations**:

• **Accuracy**: AI can sometimes make mistakes or provide outdated information.

• **Context:** It can lose context during long conversations and may repeat itself.

• **Ethics and Rules**: The service follows ethical guidelines and does not support inappropriate or harmful requests.

Tips and recommendations for using the service - to get the most out of ChatGPT, follow these tips:

• **Be specific**: The more precise the request, the more accurate the response. For example, instead of "Tell me about dinosaurs," ask, "What dinosaurs lived in the Jurassic period?"

• **Use context**: If continuing a conversation, provide context. For example, "Continuing our conversation about dinosaurs..."

• **Try different phrasings**: If the first response isn't satisfactory, try rephrasing the question.

• **Be polite:** It's always nice, even for AI!

Module 5: Prompt Engineering

• *What it is*

• *Types of prompts*

• *Tips and recommendations for creating prompts*

Prompt engineering is the process of crafting and optimizing prompts to get the most accurate and useful responses from ChatGPT. Well-formulated prompts can significantly enhance the quality of interactions with AI and help you obtain the necessary information or results.

Types of Prompts

1. Informational prompts:

- Example: "Explain the causes of inflation in the economy."
- Purpose: To receive information or explanations on a given topic.

2. Text creation prompts:

- Example: "Write an introduction for an essay on the impact of technology on education."
- Purpose: To generate text on a specified topic.

3. Analysis and correction prompts:

- Example: "Check my text for grammatical errors."
- Purpose: To analyze and correct the provided text or code.

4. Creative prompts:

- Example: "Create a plot for a science fiction story."
- Purpose: To generate creative ideas or content.

Prompt Structure

1. Introduction:

- Example: "I need your opinion on..."
- Purpose: Briefly explain the context or goal of the prompt.

2. Clarification:

- Example: "Evaluate the following three startup ideas..."
- Purpose: Specify what exactly you want to receive.

3. Details:

- Example: "Considering current trends in technology and the economy."
- Purpose: Provide additional details for a more precise answer.

4. Response format:

- Example: "Give the answer in the form of a list/table."
- Purpose: Indicate the preferred response format.

Specifics of Prompts

1. Clarity and precision: Formulate prompts as clearly and specifically as possible.

- Example: Instead of "Tell me about science," use "Explain how quantum computers work."

2. Context and details: Add necessary details and context for more relevant answers.

- Example: "Describe cell structure from a biochemical perspective."

3. Targeted instructions: Specify the exact requirements for the response.

- Example: "Write a short introduction for a scientific article on global warming using an academic style."

4. Consistency: If the prompt is related to a previous conversation, mention it.

- Example: "Continuing our previous discussion on artificial intelligence..."

Prompt Limitations

1. Complex questions:

- ChatGPT may struggle with answering complex or ambiguous questions.

- Example: Complex philosophical or scientific questions may require detailed elaboration and sources.

2. Ethics and rules:

- Requests for inappropriate, harmful, or illegal actions are not supported.

- Example: You cannot request information on illegal activities or offensive language.

3. Lengthy prompts:

- Overly long or complicated prompts may be misinterpreted.

- Example: Break long prompts into shorter, sequential ones.

Tips and Recommendations for Prompts

1. Use simple and clear wording:

- The simpler and clearer the prompt, the easier it is for ChatGPT to understand the essence of the request.

- Example: "Explain how a solar panel works."

2. Try different approaches:

- If the first prompt doesn't yield the desired result, try rephrasing it.

- Example: Instead of "How can I improve my health?" ask "What exercises can improve cardiovascular health?"

3. Be specific in your expectations:

• Specify exactly what you want to get from the response.

• Example: "Create a list of the pros and cons of distance learning."

4. Use examples and analogies:

• Provide examples to clarify your requests.

• Example: "Write a script for a short film in the style of 'Black Mirror.'"

5. Ask follow-up questions:

• If the response is not fully satisfactory, ask follow-up questions.

• Example: "Tell me more about the first point in your response."

6. Maintain logic and consistency:

• Lead the conversation logically and consistently so that AI can follow your train of thought.

• Example: "First, explain how quantum entanglement works, and then discuss its applications."

By following these recommendations, you will be able to effectively use ChatGPT's capabilities and receive high-quality responses to your prompts!

Module 6: GPT Agents

• *What are GPT agents*
• *Types of agents*
• *Applications of agents*

GPT Agents are specialized programs built on GPT models, or in other words, pre-designed sets of prompts tailored to a specific theme or area of application. GPT Agents can work autonomously or be integrated into various systems to automate tasks and improve user interactions.

Types of GPT Agents

1. Chatbots:
• Example: Customer support on a website.
• Purpose: Communicating with users in real-time, providing information, and helping resolve issues.
2. Virtual Assistants:
• Example: Personal assistants like Siri or Google Assistant.
• Purpose: Performing tasks such as setting reminders, searching for information, and managing devices.
3. Content Generators:
• Example: Tools for writing articles, blogs, or marketing materials.
• Purpose: Creating text content based on given parameters and topics.
4. Code Assistants:
• Example: GitHub Copilot.
• Purpose: Assisting in writing and debugging code, generating code examples, and offering improvement suggestions.

5. Analytical Agents:
   • Example: Tools for data analysis and report generation.
   • Purpose: Processing and analyzing large amounts of data to provide insights and recommendations.

Why Use GPT Agents

GPT Agents are used to automate and enhance various processes in business, education, healthcare, and other sectors. Key reasons for their use include:

1. **Efficiency:** Speeding up the completion of routine tasks.
2. **Availability**: Constant availability, improving the user experience.
3. **Quality:** Enhancing service quality with accurate and fast responses to queries.
4. **Creativity**: Generating new ideas and content.

How GPT Agents Are Used

1. **System Integration:** GPT Agents are integrated into websites, applications, and other platforms for user interaction.
2. **Customization and Training**: Agents are tailored and trained based on specific data and tasks to meet the needs of a particular business or user.
3. **Monitoring and Optimization:** Ongoing monitoring of agents' performance and optimization to improve accuracy and efficiency.

Applications of GPT Agents

1. Business:
   • Customer support: Automating responses to frequently asked questions, handling requests, and resolving issues.
   • Marketing: Creating advertising texts, managing social media, analyzing customer feedback.

2. Education:
   • Learning support: Generating educational materials, helping with homework, conducting virtual lessons.
   • Data analysis: Assessing student progress, generating performance reports.

3. Healthcare:
   • Patient support: Answering health-related questions, reminding about medication, collecting symptom information.
   • Medical data analysis: Processing patient data, generating reports for doctors.

4. Software Development:
   • Assisting programmers: Generating code, providing improvement suggestions, debugging.
   • Documentation: Creating and maintaining technical documentation.

Examples of GPT Agent Use

1. Customer Support:
   • Example: An online store uses a GPT agent to answer product-related questions, track orders, and handle returns.
   • Benefit: Reducing the workload on operators and improving user experience with instant responses.

2. Content Creation:

• Example: A media company uses a GPT agent to write news articles based on given topics and keywords.
   • Benefit: Speeding up content creation and ensuring its relevance.

3. Code Assistants:
   • Example: Developers use GitHub Copilot to generate code and offer improvement suggestions.
   • Benefit: Increasing productivity and code quality, reducing time spent on routine tasks.

4. Educational Assistants:
   • Example: Educational platforms use GPT agents to conduct virtual lessons and assist with homework.
   • Benefit: Personalized learning and real-time support for students.

GPT Agents help save time, improve service quality, and provide new opportunities for user interaction.

Module 7: Conclusion

• *Summary*
• *Homework*
• *Announcement of the next lesson*

In this Lesson #1, you have learned:

1. What ChatGPT is, its history of creation, its capabilities, and how to work with it.

2. What prompt engineering is and why this topic is extremely important.

3. What GPT Agents are and their areas of application.

Homework
Your homework is to log into the ChatGPT service and interact with it:

1. Explore the interface of your ChatGPT dashboard.
2. Ask ChatGPT a few simple questions on different topics, and if necessary, ask follow-up questions.
3. Give ChatGPT a few simple tasks on various topics, providing detailed instructions if needed.

In the next Lesson №2, we will explore detailed examples of using ChatGPT in *educational processes* — translating texts into different languages, writing essays, articles, reports, papers, and tests, as well as analyzing information.