

Using Generative AI in teaching and assessment in software engineering: ChatGPT example



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Introduction:
In recent days Artificial Intelligence (AI) has been employed in every area of science, business and everyday life. It is essential for the students in Software Engineering to be experts in the area of AI and Machine Learning (ML), which are highly required skills nowadays from the software industry.

Generative AI (ChatGPT):
The MSc students in Software Engineering at Cardiff University have been enjoying active learning based on Generative AI methods of teaching and assessment. The students were introduced to ChatGPT as one of the most popular generative AI during in-person sessions



ChatGPT and main features

ChatGPT is an AI language model developed by OpenAI that is designed to understand and generate human-like text based on the input it receives. It uses machine learning, particularly a type of neural network called a Transformer, to generate coherent and contextually relevant responses. Trained on vast amounts of text data from various sources, it can assist with a wide range of tasks, including answering questions, providing explanations, generating creative content, coding, tutoring, and more.

<http://chatgpt.com/>

Key features of ChatGPT include:

- **Natural Language Processing (NLP):** ChatGPT can understand and generate text in a conversational style, making interactions feel more human-like.
- **Wide Range of Topics:** It is knowledgeable in many areas, such as science, history, technology, arts, entertainment, and much more.
- **Context Awareness:** ChatGPT tries to maintain context during a conversation, allowing for follow-up questions and more dynamic interactions.
- **Customization and Use:** It can be embedded in various applications or used for specific tasks like writing, customer service, and content creation.
- **Limitations:** While powerful, it may produce incorrect information, lacks real-time awareness, and has no understanding or awareness of personal context unless specifically shared during the conversation.

It is like an advanced chatbot with diverse applications in customer support, education, entertainment, and productivity.

Example of using ChatGPT to design a simple static web page:

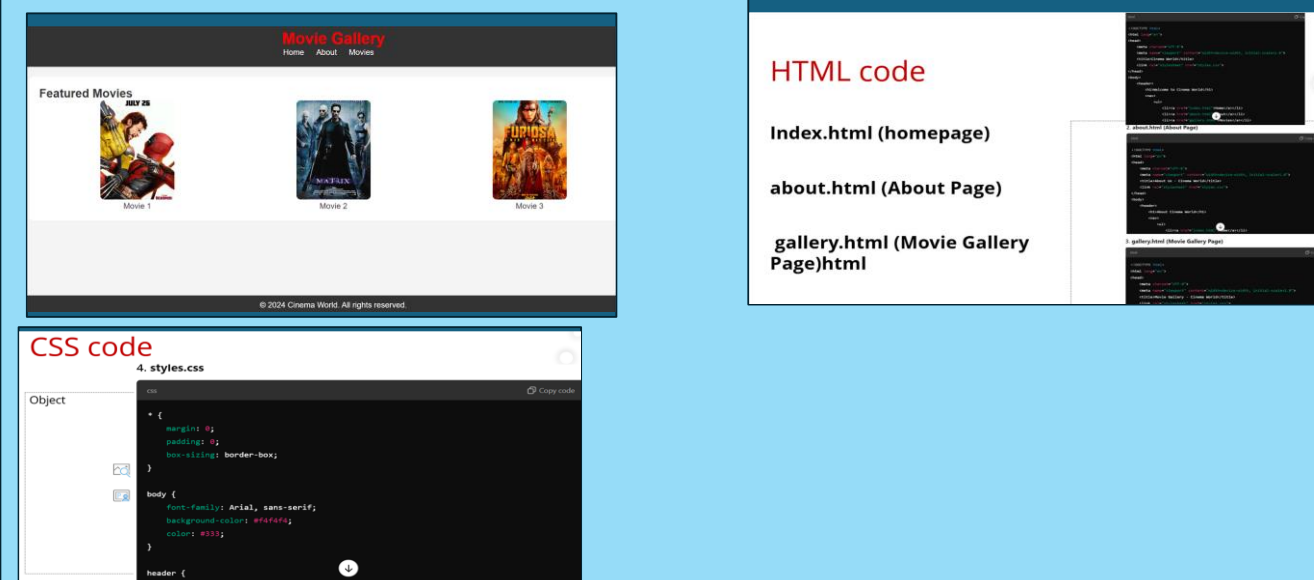
Application:

The MSc students in COMSC have been taught how to use ChatGPT during in person session working in pairs. In addition, they had to apply ChatGPT while performing one of the tasks in their coursework assessment.

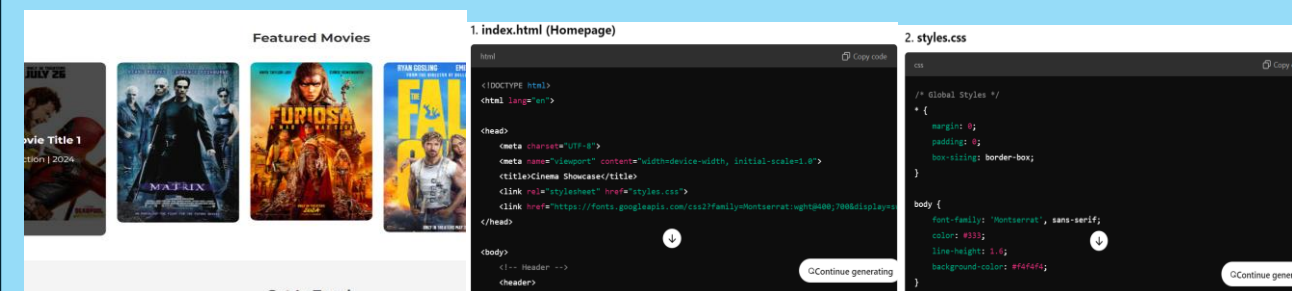
Application 1: Class session, working in pairs exercise:

Task: Working individually create a static website with HTML and CSS using ChatGPT about your favorite hobby.

- Test the generated HTML and CSS code and define what needs to be improved. Modify the code as required and compare the results.
- Working in pairs, show the website you created to your colleague and reflect on the use of ChatGPT sharing your experience. Give each other feedback about your websites,



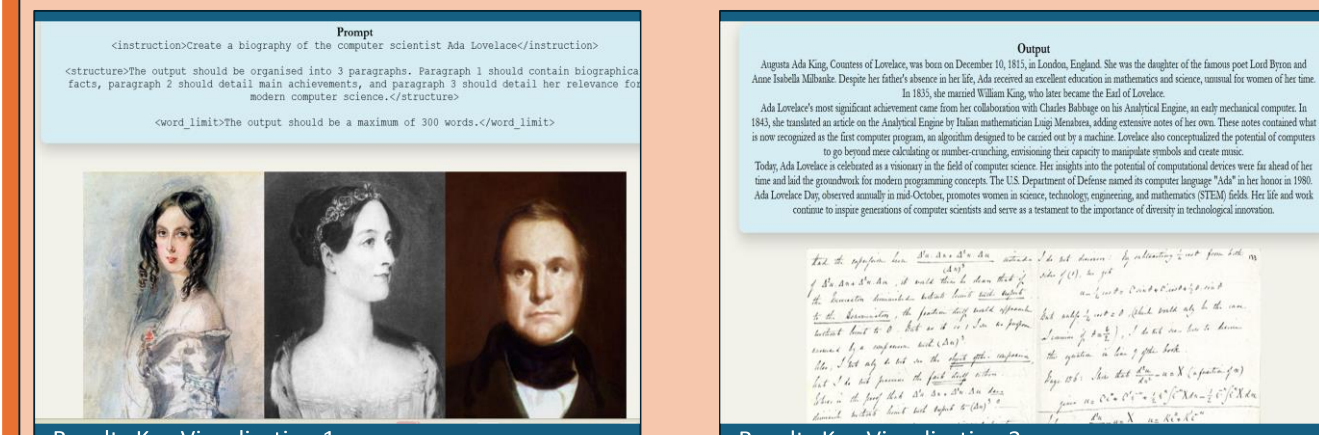
The initial results of generating a simple static web page about cinema by ChatGPT are presented above including the HTML and CSS code.



Task: Generate a beautiful impressive complicated static website with HTML and CSS for cinema - The images above demonstrate a more advanced and visually impressive static website for a cinema using HTML and CSS with multiple sections:

Key Features of the improved CSS code:

1. **Hero Banner:** A full-screen background image with an overlay and a prominent call-to-action button.
2. **Movie Gallery:** A grid of movie posters with hover effects revealing movie titles and genres.
3. **Contact Form:** A clean form with fields for name, email, and message, styled with a simple modern design.
4. **Responsive Layout:** The design uses a grid layout, which will adapt to different screen sizes.
5. **Hover Effects & Animation:** Movie posters have a smooth hover effect to reveal details, and buttons change colors on hover.

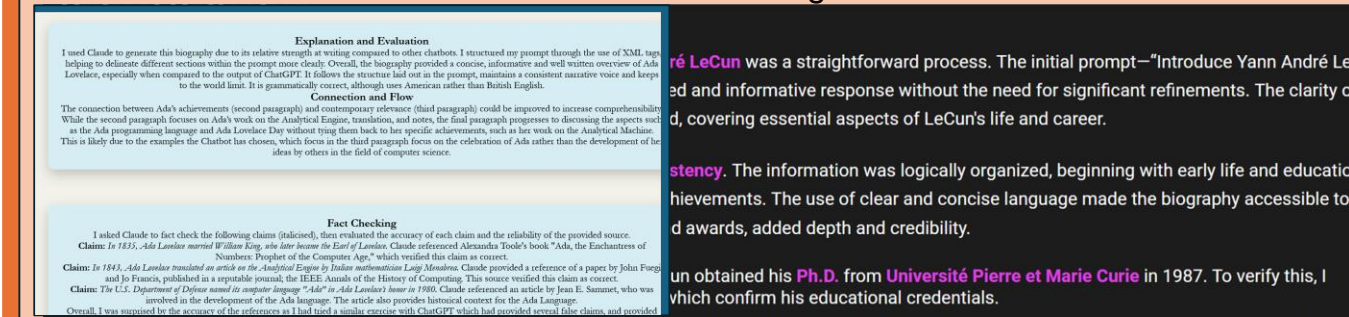


Application 2: Assessment through a coursework:

One of the tasks was to use ChatGPT to create a short biography of a computer scientist that they find inspiring. On their designed webpage they had to present the prompt that they used to generate the biography, and the generated biography in a nice form. In addition, they had to discuss their experience critically. Another aspect was to identify in a report three important facts in the biography that they had to fact-check and see if ChatGPT gave them the sources for the claim and if those sources are reliable, and can be verified.

Generative AI Competency task. Use ChatGPT or another free chatbot of your choice to create a short biography of a computer scientist that you find inspiring. The biography should be organized into three sections containing biographical facts (first paragraph), main achievements (second paragraph) and relevance for modern computer science (third paragraph). The generated biography should be at most **300 words** long.

Can you get the Chatbot to give you the sources for the claim? If so, could you find the information on the source to verify it? Would you consider the source reliable? Your discussion should be at most **500 words** long.



Student insights and feedback:

This experience with teaching and assessment employing ChatGPT was successful and had positive feedback from the students, who found this approach engaging and interesting.

Reflection and conclusions:

- ChatGPT can be used as a tool to create the skeleton of your website
- There is usually a need for further adjustment of the elements and their styling
- Often the website structure has to be improved to correspond to the desired result
- If references have been provided, they need to be validated and checked. ChatGPT can generate fake references.

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