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ChatGPT API: Brief overview and integration in Software Development

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Abstract: Powerful natural language processing (NLP) tools have experienced siginificant advancements, with ChatGPT emerging as the most successful NLP tool since late 2022. This paper provides an overview of the ChatGPT API, addresses how this API can be used effectively in software development, and highlights its key applications and advantages. The results highlight the potential of the ChatGPT API as a valuable tool in software development, offering intelligent and efficient solutions for a variety of applications. It emphasises the importance of understanding how to integrate and leverage this API effectively, and concludes that its proper implementation can significantly improve the quality and efficiency of software development projects.

Keywords ChatGPT · API · Software · Development · Review

1 Introduction

In recent years, Artificial Intelligence (AI) has evolved significantly and greatly impacts and drives innovation and change in all spheres of society, applications have been developed that provide quick solutions to everyday problems of people, from simple actions of everyday life[1].

To complex actions of large companies and industries [2], even in the academic and scientific field has noticed a large growth of applications with AI[3]. In [4], a literature review of AI, the authors state that AI and machine learning (ML) have demonstrated their potential to revolutionise industries, public services and society, reaching or even surpassing human levels of performance in terms of accuracy for a variety of problems. On the other hand, in [5] It is stated that AI has been closely related to automated reasoning and imitation of human intelligence since its inception, and that applications of this type have grown significantly.

One of the great AI breakthroughs that will succeed in 2023 is the development of ChatGPT (Generative Pretrained Transformer), an AI-based language model created by the company OpenAI [6], which is defined as an artificial intelligence chat system that is surprisingly powerful in its disruption of reality, defined as a "system" capable of responding to everything, by everything and for everything in a short time and with high levels of accuracy.

It is trained with an enormous amount of knowledge: 570 gigabytes of text and a model of more than 175 million parameters, according to data from Stanford University. Like any other current service, openAI provides its users with an Application Programming Interface (API) with which to invoke its different services, allowing developers and companies to integrate into their applications. Mobile applications have revolutionised the way we interact with technology and have proven to be powerful tools for solving a variety of problems in different areas of our lives [7]. These applications are designed to run on mobile devices, such as smartphones and tablets, allowing them to be accessible anytime, anywhere.

In this sense, this paper proposes a review of the current situation of mobile application development and its integration with the ChatGPT API [8], and all that is involved in its development, impact and benefits to society. The rest of the document is organised as follows: section 2 shows the overview of ChatGPT, section 3 the aspects to consider in software development, the discussion is shown in section 4 and finally the conclusions in section 5.

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2 Background: Brief review

In recent years, AI has generated a variety of tools, especially APIs, which have experienced remarkable growth worldwide. In 2023, the ChatGPT API and its functionalities have gained significant traction. This section presents a literature review of related work.

ChatGPT, an AI system created by OpenAI, falls under the category of natural language processing (NLP). Its purpose revolves around producing conversations that mimic human dialogue by comprehending the conversational context and formulating fitting replies. The foundation of ChatGPT rests on a deep learning architecture named GPT-3. This model has undergone training on an extensive collection of dialogues to achieve its capabilities [9].

The groundbreaking chatbot, possesses the ability to engage in meaningful conversations. This is capable of holding thoughtful dialogues with users, responding to inquiries, offering guidance, and elucidating intricate ideas[10]. ChatGPT, a NLP system, boasts a range of attributes that contribute to its prowess, including the ability to find bugs in code, compose poetry and sonnets, develop scripts, and generate school essays on various topics.

ChatGPT boasts a range of attributes that contribute to its prowess as an NLP (Natural Language Processing) system. It excels in comprehending conversational context and producing fitting replies. It exhibits proficiency in crafting responses across various languages like English, Spanish, French, and German. Moreover, This showcases versatility by generating responses in diverse tones, including formal, casual, and amusing styles.

These applications leverage the power of natural language processing to deliver richer, more personalized user experiences by incorporating ChatGPT's ability to understand human language and generate coherent responses.

In [11], they propose the evaluation of GUIs in mobile applications, through question and answer routines, automated GUI tests are performed using Chat GPT's large language model (LLM), so that it chats with mobile applications by passing the information from the GUI to the LLM and according to its stored information it identifies how effective the GUI of the application being analyzed is.

This model is widely used for programming. In [12], the author develops a guided mobile application with ChatGPT, asking questions throughout the development phase, in addition to using code as it provided ready-to-use code snippets. In [13], an empirical investigation is conducted, comparing the performance of software engineers and artificial intelligence systems, such as ChatGPT, through different evaluation metrics. The empirical study includes a case of evaluating code generated by it versus code produced by developers, the results demonstrate that automated systems such as ChatGPT can, in certain cases, outperform novice software engineers on specific tasks. This superiority was particularly evident in easy and medium-level problem solving.

On the other hand, in [14] explores the use of ChatGPT to resolve programming errors, the authors conclude that the use of ChatGPT as part of a comprehensive set of debugging tools and the benefits of combining its strengths with the strengths of other debugging tools to identify and correct errors more effectively.

In contrast, a case study involving collaboration between a novice software architect and ChatGPT to design a service-based software is proposed in [15]. The research focuses on leveraging empirical evidence on architect productivity and explores the socio-technical aspects of architecting with ChatGPT.

There are literature reviews where reviews on the importance of ChatGPT in software engineering are presented, where it is evident that emerging technologies such as ChatGPT propose a paradigm shift in the way software developers conceptualize, design and execute their projects, this new horizon of possibilities also brings challenges that researchers must overcome [16]. Similarly, a systematic literature review on the application of ChatGPT in software development is presented in [17]. The review identifies 12 studies using ChatGPT in some software development domains, the authors mention that the findings of this review offer significant contributions to the current understanding and future direction of ChatGPT use in the software development domain.

As this brief review identifies, the use of ChatGPT in software development has had a significant impact on the way development teams work and communicate, offering assistance with key tasks such as documentation, problem resolution, code generation and more. However, it is important to remember that these models are powerful tools, but they are not a substitute for the expertise and judgment of human developers. Their use complements and accelerates the software development process, but it is still essential to have competent professionals on the team.

3 Important aspects in software development

There are currently many programming languages in use, according to [18], and these can be integrated with

Table 1 Programming Language and ChatGPT

Programming Language	Advantages	Limitations	API ChatGPT
Python	Native OpenAI client support. Large ecosystem for machine learning and NLP. Many examples and tutorials are available.	Might be slower for real-time applications compared to some compiled languages. Not ideal for mobile applications.	API key of OPENAI pip install openai import openai
JavaScript (Node.js)	Suitable for web applications and real- time integrations. Asynchronous by nature. Expanding ecosystem with server-side libraries.	Less mature ML/NLP ecosystem compared to Python. Might require additional security considerations for client-side usage.	[Nodejs4](>= 18) and NPM5 npm i chatgpt import ChatGPTAPI from chatgpt;
Java	Strong performance for large- scale applications. Java libraries may exist for integration. Platform agnostic (can run anywhere with JVM). Mature ecosystem with solid community support	Verbose syntax could make integration more cumbersome. Might have less community support for ChatGPT specifically compared to Python. Start-up time and memory overhead due to the JVM might not be ideal for lightweight applications. Althoughs platform-agnostic, performance optimization might vary across platforms.	Java Development Kit (JDK) The URL for the ChatGPT API endpoint.
Rubi	Ruby on Rails makes it popular for web apps. Dynamic and object-oriented. Has libraries for making HTTP calls.	Slower performance than some languages. Less emphasis on ML/NLP compared to Python.	gem openai OPENAI API KEY=your api key

the chatGPT API, with certain configurations and tools. The advantages and disadvantages of each language and considerations for using chatGPT are detailed in [16], as shown in Table 1.

4 Discussion

The use of ChatGPT in software development is an interesting topic that has generated a lot of attention and debate in the developer community and in the technology industry in general. The following are some of the important points that have been identified.

Automation of repetitive tasks: Can be used to automate repetitive tasks in software development, such as basic code generation, documentation or unit test creation. This can increase developer productivity by allowing them to focus on more creative and complex tasks.

Troubleshooting support Developers can use it as a tool to get help with technical troubleshooting. They can ask specific questions about code bugs, performance issues or design issues, and get quick suggestions for addressing those problems.

Documentation generation: Can be used to create technical documentation more efficiently. It can generate detailed descriptions of functions, APIs and other software components, making it easier to keep the documentation up to date.

User interface design: Can help in the user interface design process by generating user descriptions, workflow definitions and design suggestions. This can be useful for UX/UI designers and front-end development teams.

Code review: Can perform automatic code reviews looking for common bugs, style conventions and security vulnerabilities. This can help improve code quality and reduce bugs before they reach production.

However, as with any emerging technology there are also concerns and challenges related to the use of ChatGPT in software development:

Quality and accuracy: Although ChatGPT can be useful, its quality and accuracy may vary. It may generate code or suggestions that are suboptimal or even incorrect. Developers should be cautious about relying entirely on model-generated responses.
Security: Security of data and intellectual property is a major concern when using ChatGPT for software development. Sensitive data can be leaked through conversations with the model, posing privacy risks.
Over-reliance: There is a risk that developers become too dependent on ChatGPT capabilities and stop developing their own skills and knowledge. This could lead to a decrease in the overall quality of software development.
Ethics and liability: The generation of code and other tasks by language models such as ChatGPT raises ethical and liability issues. Developers must ensure that decisions made with the help of the model are ethical and comply with applicable regulations.
In summary, the use of this model in software development has the potential to improve productivity and assist in a variety of tasks. However, it is important to use it with caution and understand its limitations. Human supervision and validation of model outputs are essential to ensure quality and safety in the software development process.

5 Conclusions

Software development is a constantly evolving field and ChatGPT can play an important role in various stages of this process, it can be a valuable tool in software development by providing assistance in various areas, from planning and design to implementation and troubleshooting.
The importance of ChatGPT in software development lies in its ability to provide assistance and support at various stages of the development process. By providing information and assistance quickly and accurately, it can help development teams overcome challenges, accelerate project delivery, and keep up with the latest trends and technologies in the software development field.
The evolution of GPT has been characterized by an increase in model size and capacity, leading to significant improvements in its ability to generate coherent text and perform more advanced natural language processing tasks. As these models continue to develop, they are likely to have an increasing impact on a wide variety of applications.

Conflict of interest

The authors declare that they have no conflict of interest.

References

1. D. D. Onthoni and P. K. Sahoo, "Artificial-intelligence-assisted activities of daily living recognition for elderly in smart home," *Electronics*, vol. 11, no. 24, p. 4129, 2022.
2. R. S. Peres, X. Jia, J. Lee, K. Sun, A. W. Colombo, and J. Barata, "Industrial artificial intelligence in industry 4.0-systematic review, challenges and outlook," *IEEE Access*, vol. 8, pp. 220 121–220 139, 2020.
3. Y. Xu, X. Liu, X. Cao, C. Huang, E. Liu, S. Qian, X. Liu, Y. Wu, F. Dong, C.-W. Qiu *et al.*, "Artificial intelligence: A powerful paradigm for scientific research," *The Innovation*, vol. 2, no. 4, 2021.
4. P. P. Angelov, E. A. Soares, R. Jiang, N. I. Arnold, and P. M. Atkinson, "Explainable artificial intelligence: an analytical review," *Wiley Interdisciplinary Reviews: Data Mining and Knowledge Discovery*, vol. 11, no. 5, p. e1424, 2021.
5. P. P. Angelov and X. Gu, "Toward anthropomorphic machine learning," *Computer*, vol. 51, no. 9, pp. 18–27, 2018.
6. B. D. Lund and T. Wang, "Chatting about chatgpt: how may ai and gpt impact academia and libraries?" *Library Hi Tech News*, vol. 40, no. 3, pp. 26–29, 2023.
7. D. Corral, R. M. Toasa, Y. Semblantes, and L. F. Aguas, "Propuesta de app móvil para la gestión de incidentes de tránsito," *Revista Ibérica de Sistemas e Tecnologias de Informação*, no. E55, pp. 67–76, 2023.
8. K. Vishal and A. S. Kushwaha, "Mobile application development research based on xamarin platform," in *2018 4th International Conference on Computing Sciences (ICCS)*. IEEE, 2018, pp. 115–118.
9. J. Deng and Y. Lin, "The benefits and challenges of chatgpt: An overview," *Frontiers in Computing and Intelligent Systems*, vol. 2, no. 2, pp. 81–83, 2022.
10. T. Phillips, A. Saleh, K. D. Glazewski, C. E. Hmelo-Silver, B. Mott, and J. C. Lester, "Exploring the use of gpt-3 as a tool for evaluating text-based collaborative discourse," *Companion Proceedings of the 12th*, vol. 54, 2022.
11. Z. Liu, C. Chen, J. Wang, M. Chen, B. Wu, X. Che, D. Wang, and Q. Wang, "Chatting with gpt-3 for zero-shot human-like mobile automated gui testing," *arXiv preprint arXiv:2305.09434*, 2023.
12. E. Seikkinen, "How to use chatgpt for programming," 2023.
13. N. Nascimento, P. Alencar, and D. Cowan, "Comparing software developers with chatgpt: An empirical investigation," *arXiv preprint arXiv:2305.11837*, 2023.
14. N. M. S. Surameery and M. Y. Shakor, "Use chat gpt to solve programming bugs," *International Journal of Information Technology & Computer Engineering (IJITC) ISSN: 2455-5290*, vol. 3, no. 01, pp. 17–22, 2023.

15. A. Ahmad, M. Waseem, P. Liang, M. Fahmideh, M. S. Aktar, and T. Mikkonen, "Towards human-bot collaborative software architecting with chatgpt," in *Proceedings of the 27th International Conference on Evaluation and Assessment in Software Engineering*, 2023, pp. 279–285.
16. W. Rahmaniar, "Chatgpt for software development: Opportunities and challenges," 2023.
17. A. Beganovic, M. A. Jaber, and A. Abd Almisreb, "Methods and applications of chatgpt in software development: A literature review," *Southeast Europe Journal of Soft Computing*, vol. 12, no. 1, pp. 08–12, 2023.
18. "The chaos report: Agile y el éxito en proyectos de ti — scrum colombia." [Online]. Available: https://www.forbes.com/sites/forbestechcouncil/2022/12/28/what-your-software-partner-should-know-the-top-programming-languages-of-2023/?sh=7770824f182b

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