Self-learning module “Chatbots”

Cytech LTD
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10/10/2024

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STRUCTURE

- Chapter 1: Introduction to Chatbots
- Chapter 2: Designing Chatbots for Learning
- Chapter 3: Developing Chatbots
- Chapter 4: Ethics and Future Trends

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Chapter 1: Introduction to Chatbots

Learning Objectives:

- Understand the concept of chatbots and their evolution over time.
- Identify the different types of chatbots.
- Explore the role of chatbots in different applications including learning platforms.

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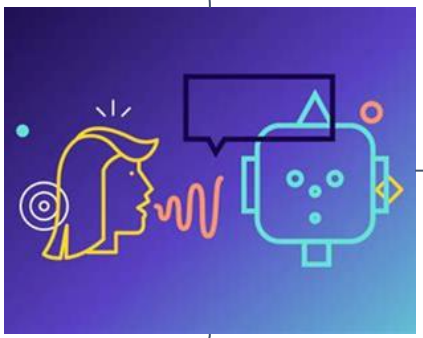
What is a chatbot?

Chatbots are conversational AI programs designed to simulate interaction with a human user.



They can be text-based, voice-based, or even video-based.

Chatbots are used in a variety of applications, including customer service, marketing, and education.

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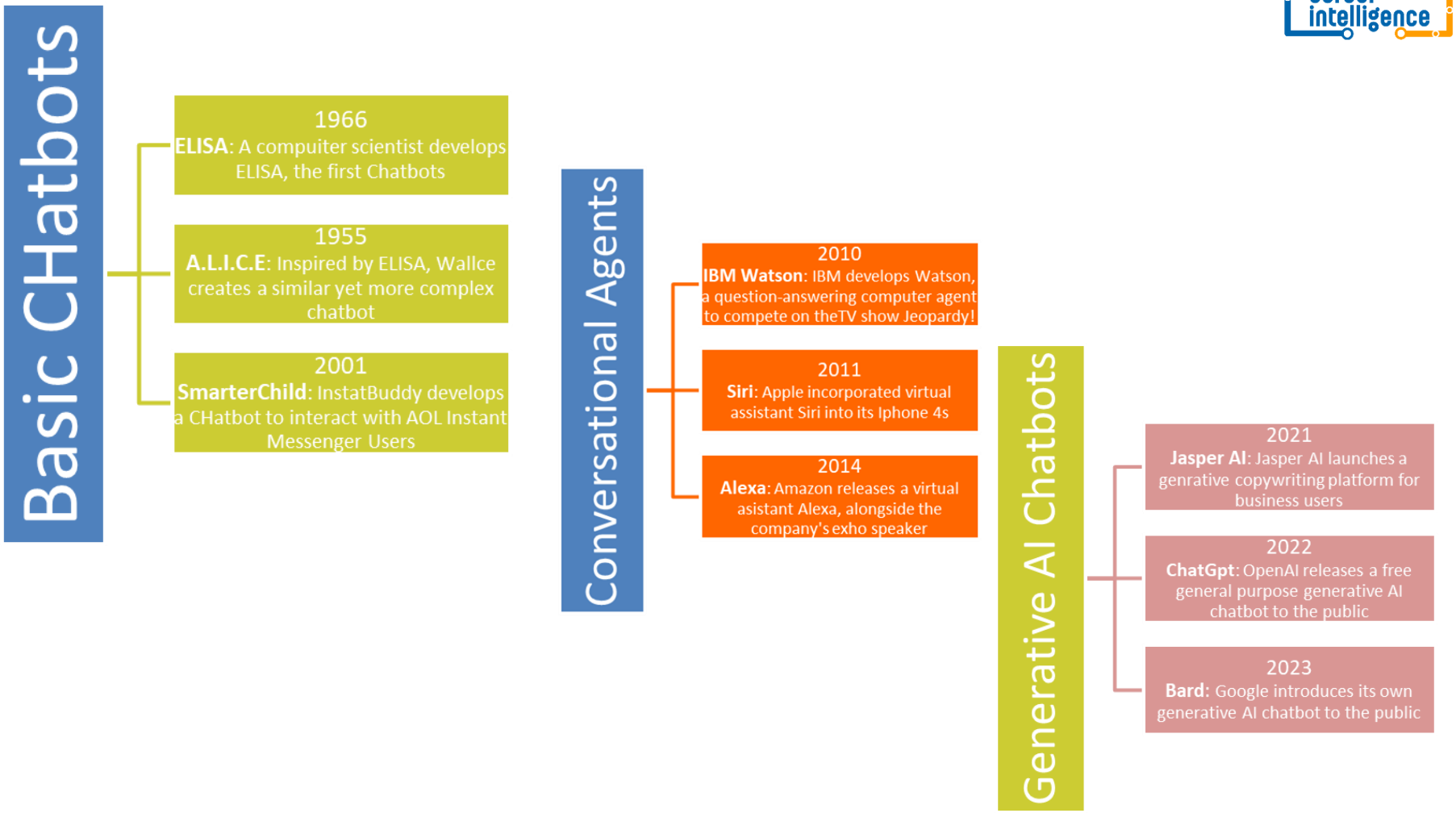
Chatbot History



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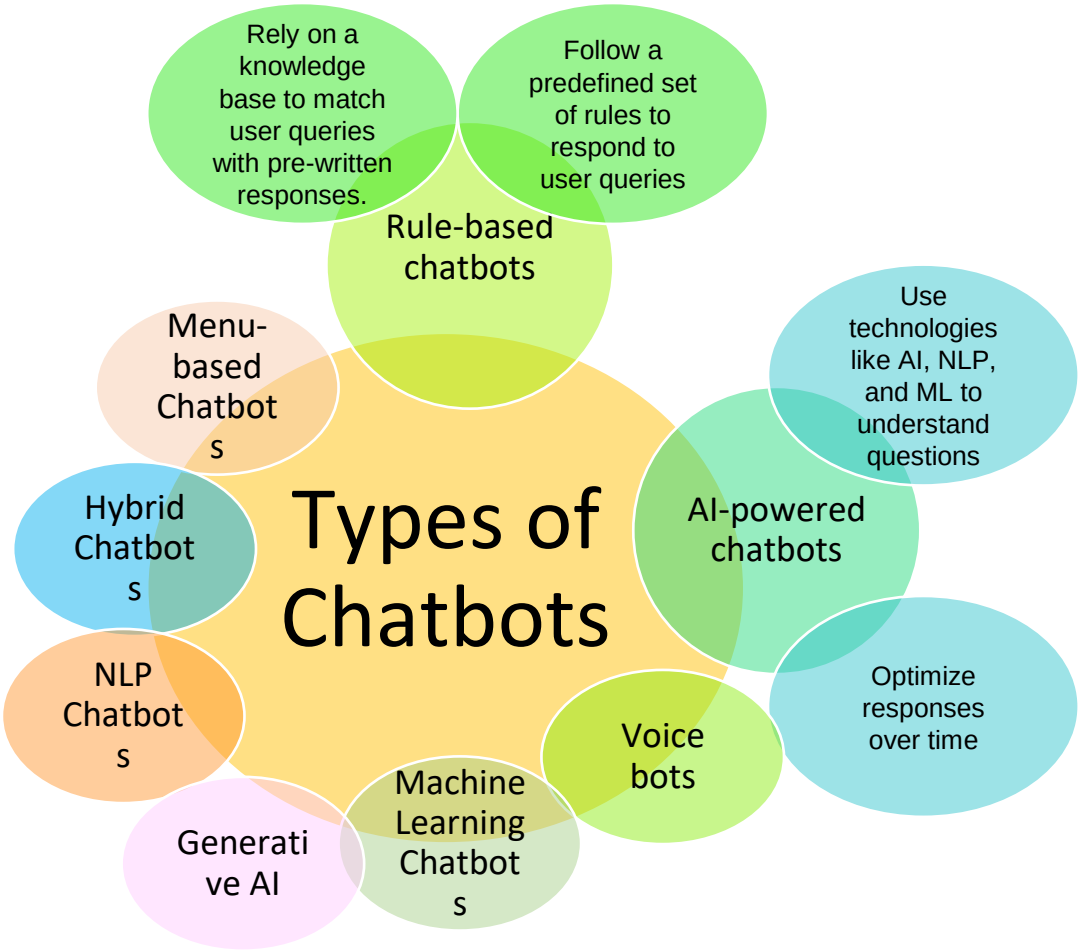
Types of Chatbots



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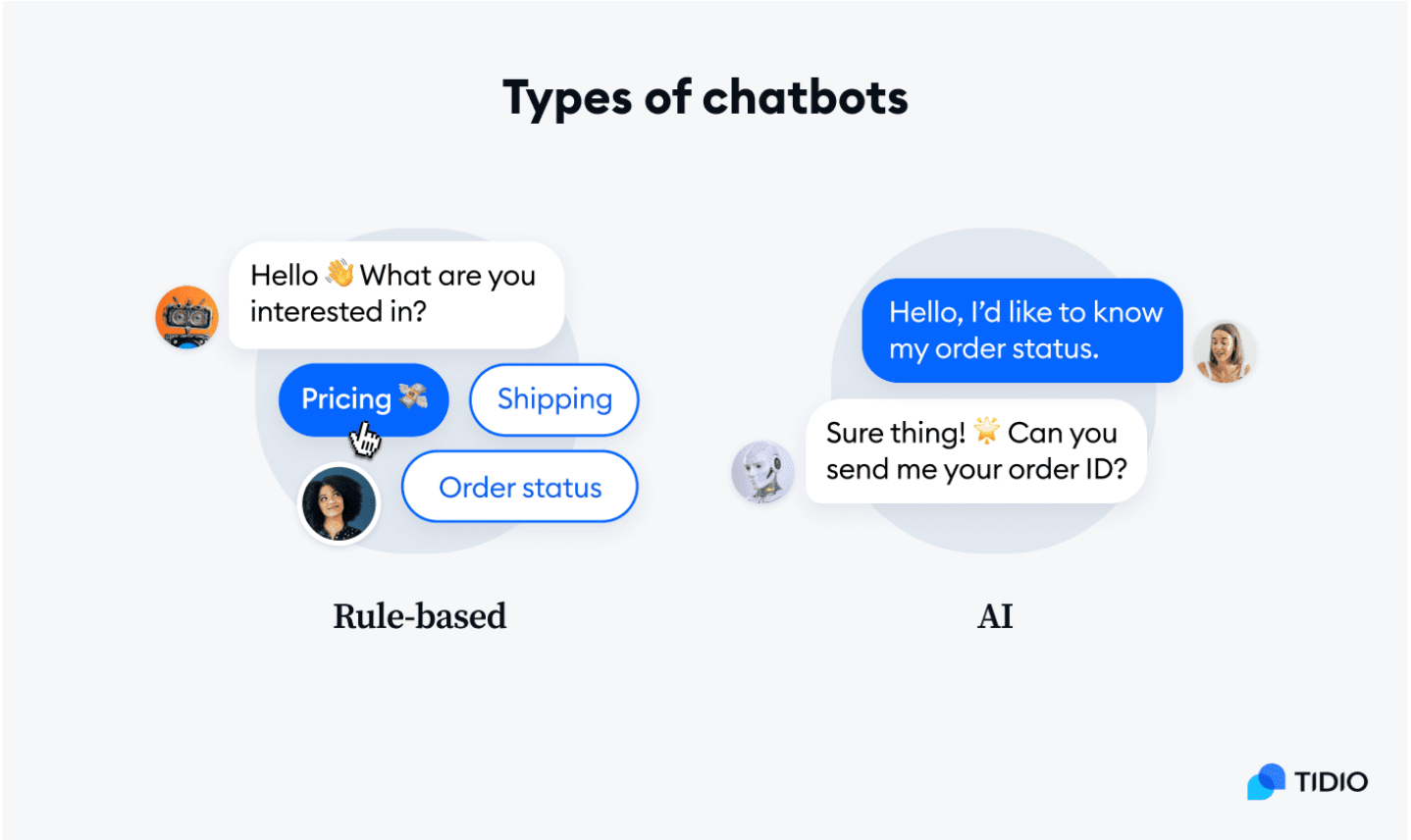
Example Rule based Vs AI



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Example Career Intelligence

10:08 AM

Login

10:08 AM

Okay, I'll have a look ...

10:08 AM

Here's a suggestion for you ...

10:08 AM

How can I login to the platform?

Read

10:08 AM

Is that what you were looking for?

Yes No

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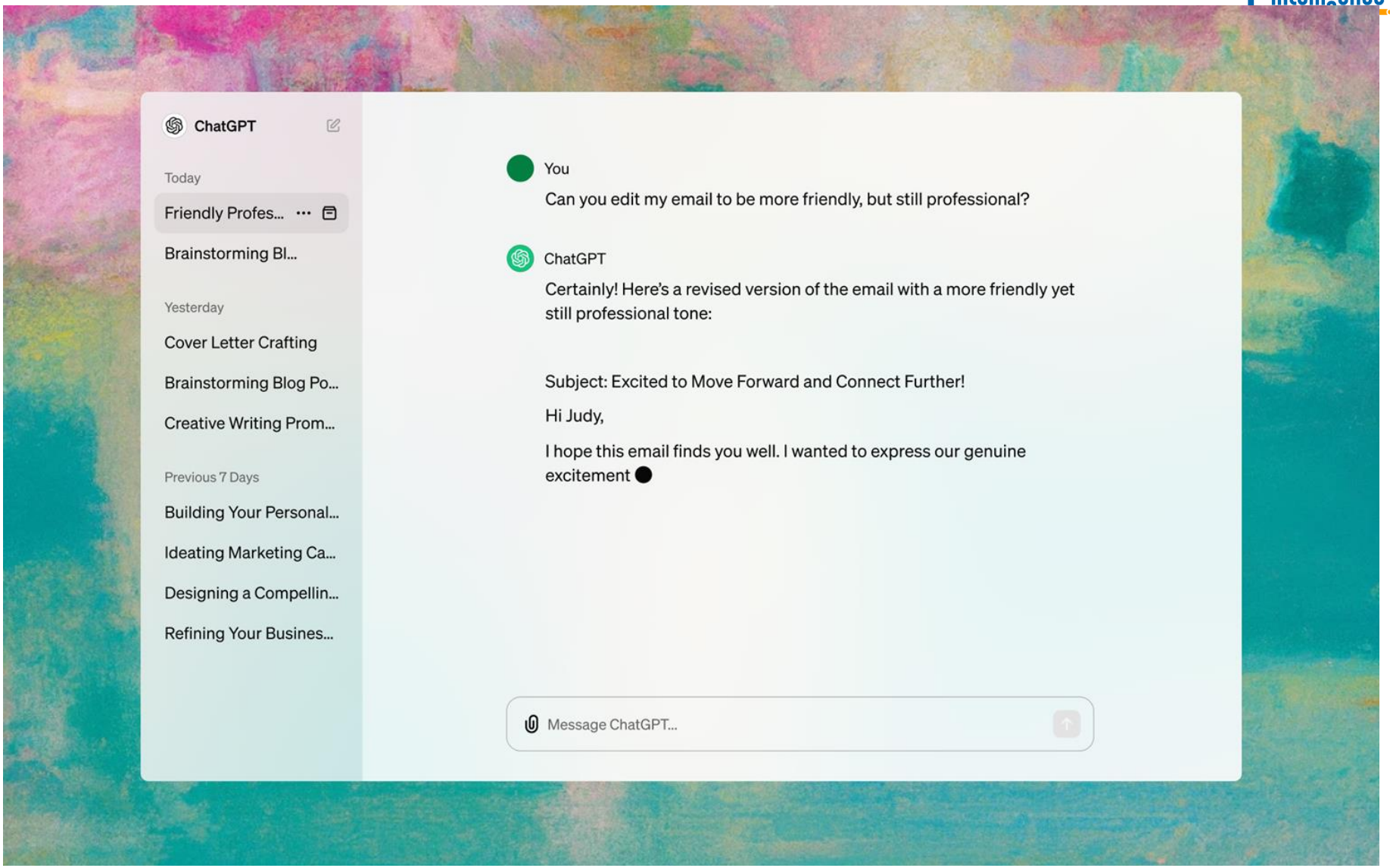
Example AI



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Application of Chatbots

- Customer Service
- Education
- Healthcare
- Entertainment
- Marketing & Sales

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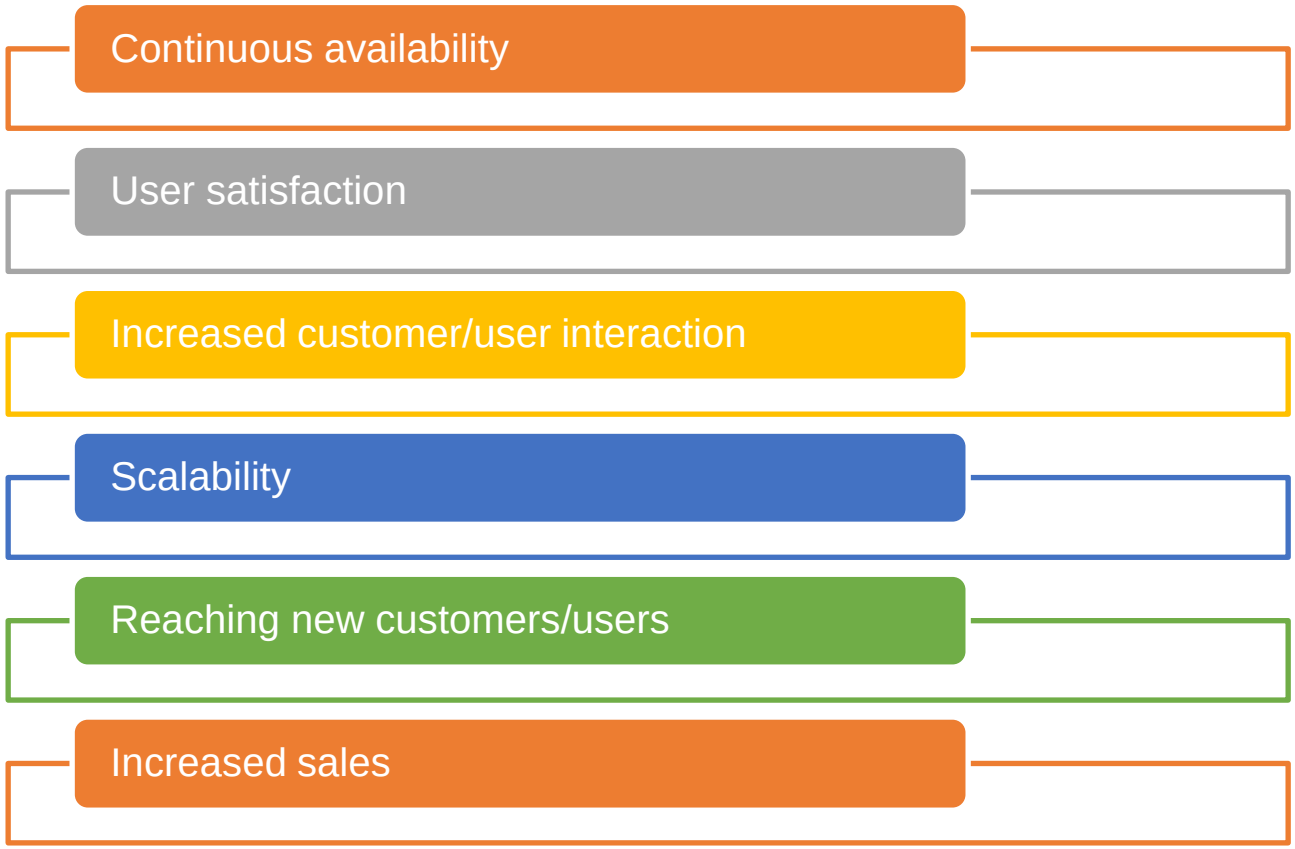
Benefits and Limitations



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Limitations

- Limited creativity
- Lack of emotional intelligence
- Dependency on Data Quality
- Incorrect or Biased Information
- Compliance Risks
- Cybersecurity Threats

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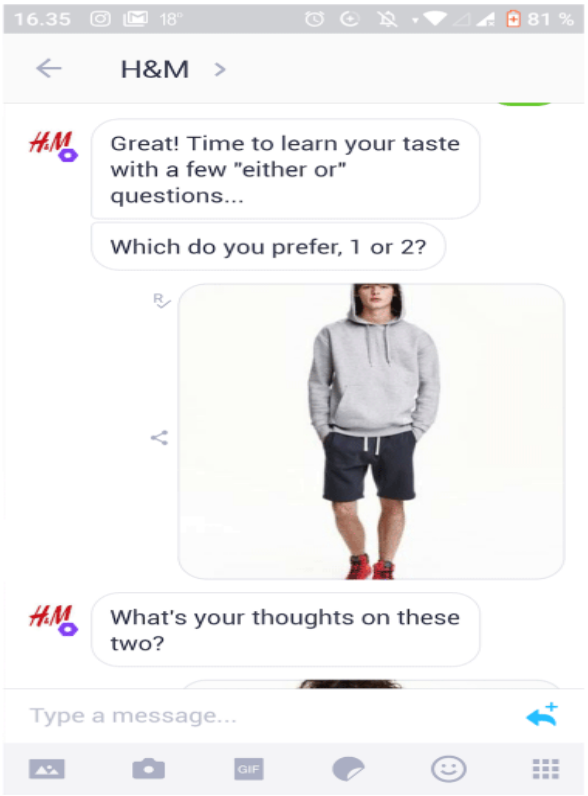
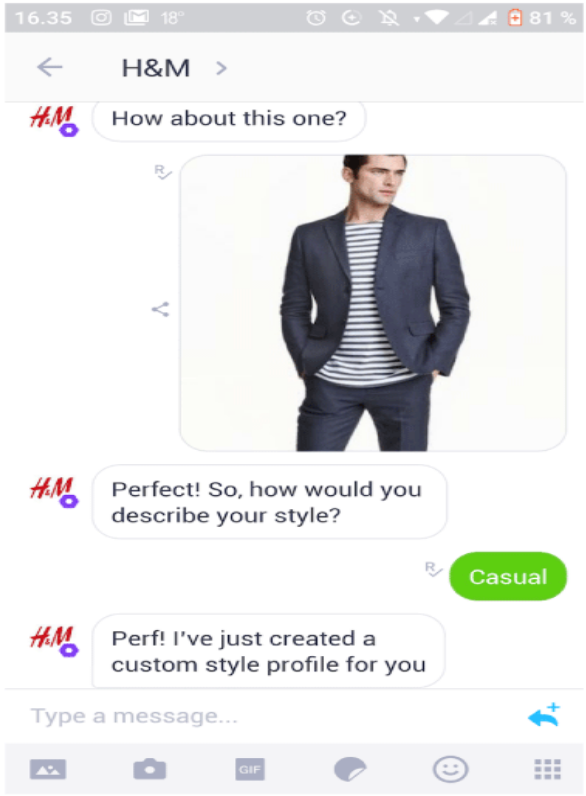
Case Study H&M

Personal shopper, available 24/7, to quickly provide information like product details and demos. Their chatbot helps customers find the right products, including the perfect size and fit. It also shares style guides, options, and prices, making shopping easier and improving the overall customer experience at H&M.





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Self-test tasks/questions

- What are the main types of chatbots?
- What is the main difference between rule-based and AI-powered chatbots?
- Identify some of the limitations and benefits of chatbots
- Identify and interact with two different chatbots. Analyze their functionalities, communication style, and how they might be applied in a learning context.

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Chapter 2: Designing Chatbots for Learning Platforms

Learning Objectives:

- Understand design considerations for chatbots in educational settings.
- Identify the functionalities a chatbot can offer for learning.
- Explore user experience (UX) best practices for chatbot design.

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Brainstorming the Possibilities: Initial steps

- What problem are you trying to solve? What need or challenge could your chatbot address?
- Who is your target audience? Who would benefit most from interacting with your chatbot?
- What unique features would set your chatbot apart? How would it stand out from the crowd?

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Brainstorming the Possibilities: Defining Functionalities

- Core functionalities: What specific tasks will your chatbot perform to achieve its purpose?
- Information access: How will your chatbot access and process information relevant to its role?
- User interaction: How will users interact with your chatbot (e.g., text chat, voice commands, interactive buttons)?
- Giving the Chatbot a Voice: Crafting Personality

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Brainstorming the Possibilities: Impact

- **Positive impact:** How will your chatbot benefit its target audience and potentially improve their lives?
- **Societal impact:** Could your chatbot contribute to a larger social cause or positive change?
- **Future potential:** How could your chatbot evolve and adapt with advancements in technology?

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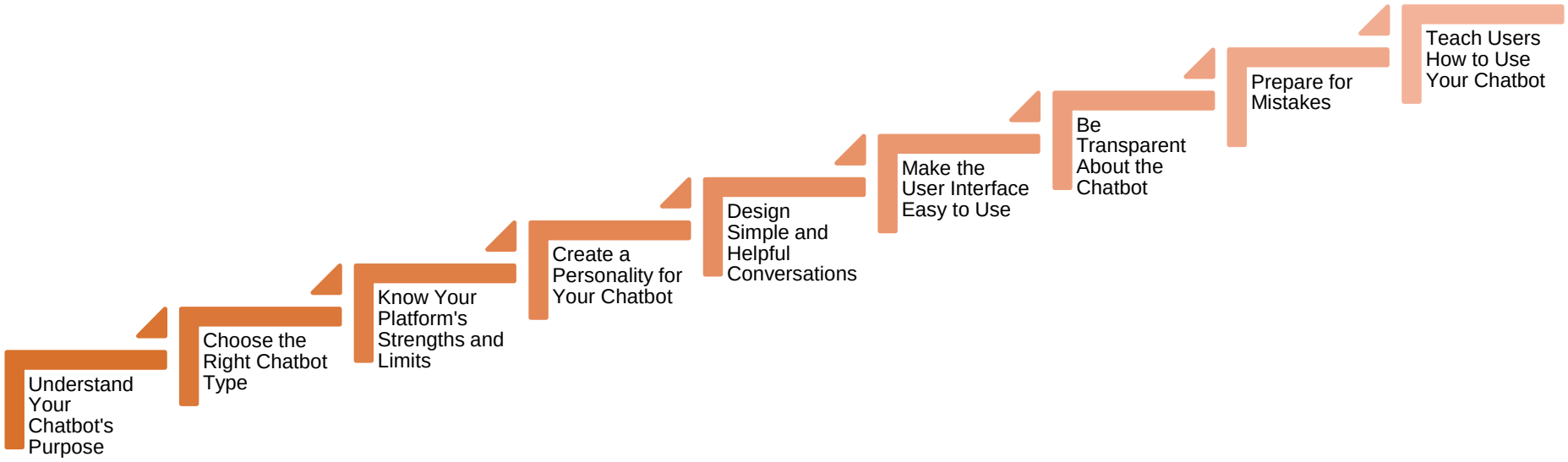
Chatbot Design Best Practices



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Why Chatbots in Learning?

- Personalized Learning Assistant
- 24/7 Availability
- Engaging Interaction
- Data Collection and Analysis

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Chatbot Functionalities for Learning Platforms

- **Information Delivery**: Provide access to course materials, answer FAQs, and deliver targeted learning content.
- **Assessment & Feedback**: Administer quizzes, track learner progress, and offer personalized feedback to enhance learning outcomes.
- **Motivation & Support:** Encourage learners with motivational messages, celebrate achievements, and offer reminders and guidance.
- **Personalized learning paths:** Tailored learning experiences based on individual needs and preferences
- **Collaborative learning:** Facilitate peer to peer interaction and group activities

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User Experience (UX) Best Practices for Chatbots

- **Clear Persona Development**: Define a well-defined persona outlining the chatbot's target user demographics, learning goals, and communication style.
- **Natural Language Understanding**: Ensure the chatbot comprehends user queries phrased in natural language for a smooth conversation flow.
- **Error Handling and Recovery**: Gracefully handle misunderstandings and provide clear prompts to help users rephrase their questions.
- **Accessibility**: Incorporate features like text-to-speech and screen readers to ensure the chatbot is accessible to users with disabilities.
- **Consistency:** Maintain a consistent tone, style, and level of formality throughout interactions.

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Designing Educational Chatbots

- **User-Centered Design: Understand the needs of the learner. Should the chatbot help with homework, tutor a subject, or guide users through a learning platform?**
- **Content Adaptation:** The chatbot should be able to break down complex information into digestible chunks, making learning easier.
- **Gamification:** Using rewards, points, or progress badges encourages continued engagement with the learning content.
- **Conversation Flow:** The bot should simulate natural conversations while ensuring that educational goals are met.

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Case study: Duolingo

Duolingo, a popular language-learning platform, introduced chatbots to enhance users' language acquisition experience through interactive and personalized conversations. The goal of the Duolingo chatbot was to simulate real-world interactions, providing learners with a way to practice languages in a more natural, conversational context. The case study highlights how Duolingo's chatbot helps users improve their language skills by engaging them in practical conversations and improving retention through active learning.

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Learning Task/Exercise

Create a detailed persona for a chatbot designed to assist students in a specific subject area. Consider their age, learning style, goals, and any potential challenges they might face.

Bonus:

- If you have time, try creating a simple chatbot script or dialogue flow that demonstrates how your ideal chatbot would interact with a learner in your chosen subject.

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Chapter 3: Developing Chatbots

Learning Objectives:

- Learn about the tools and platforms used to develop chatbots
- Understand the programming languages best suited for chatbot development
- Explore the stages of chatbot development, from concept to deployment

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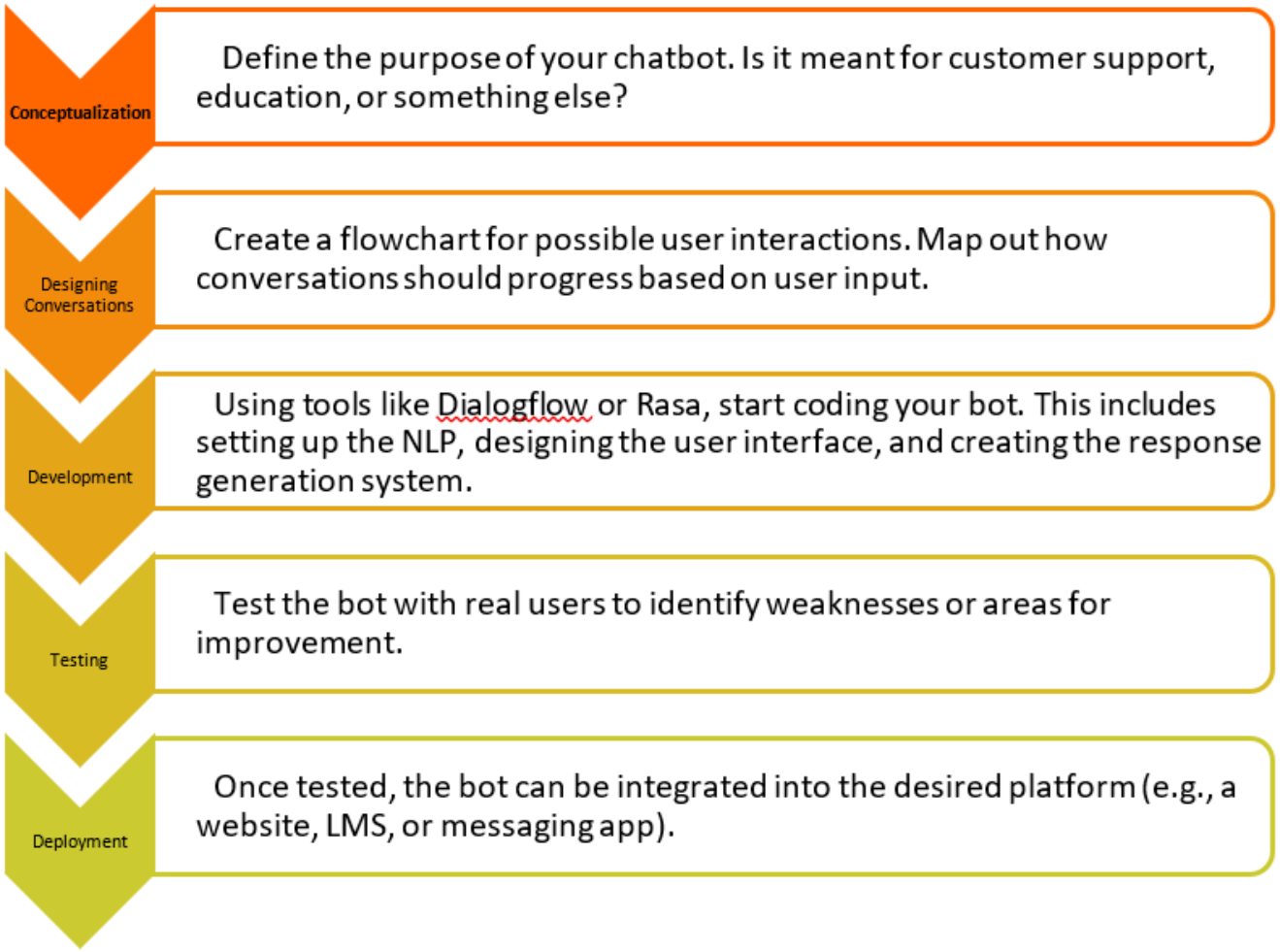
Stages of Chatbot Development



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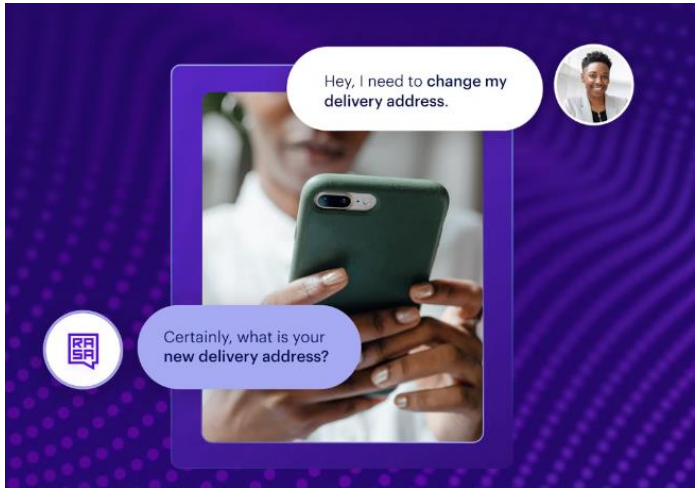
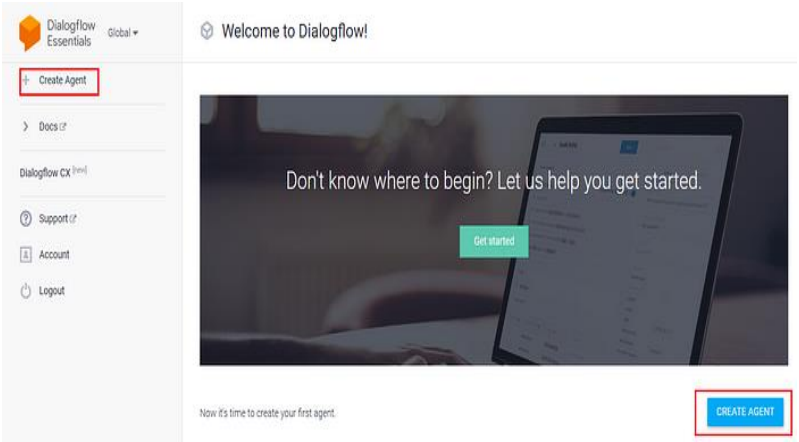
Development Tools and Frameworks

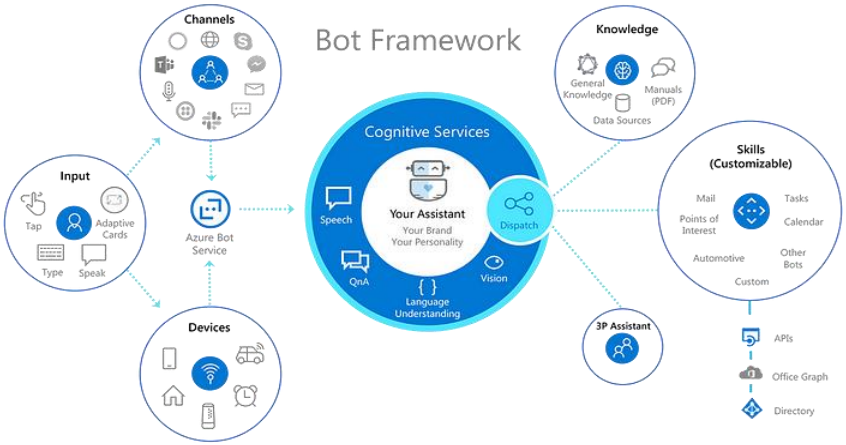
Rasa



Dialogflow



Microsoft Bot Framework



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Development process

- **Data Collection and Preparation**: Gathering and cleaning relevant data for training the chatbot.
- **Natural Language Processing**: Implementing techniques to understand and process user input.
- **Machine Learning**: Training the chatbot model using algorithms to learn from the data and generate appropriate responses.
- **Dialog Management**: Designing the conversation flow and handling different user inputs.
- **Integration**: Integrating the chatbot with the desired platform or application.

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Key considerations in Chatbot Development for learning

Security and Data Privacy:	Potential Impact:
• Implement robust security measures to protect user data. • Adhere to data privacy regulations and obtain necessary user consent. • Conduct regular security audits and updates to address vulnerabilities.	• Improved learning outcomes: Personalized guidance, immediate feedback, and 24/7 availability can enhance student learning. • Increased engagement: Chatbots can make learning more interactive and engaging, leading to greater student motivation. • Enhanced accessibility: Chatbots can provide support to students with disabilities or those who struggle with traditional learning methods.

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Self-test tasks/questions

- What are the five main stages in the chatbot development process?
- Name some popular chatbot development frameworks and tools
- Research and compare 2 different chatbot development platforms and APIs. Consider factors such as cost, ease of use, supported features, and compatibility with the platform's architecture.
- What are the key challenges in developing chatbots for learning environments?

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Chapter 4: Ethics and Future Trends

Learning Objectives:

- Explore emerging trends and future possibilities for chatbots in learning.
- Identify ethical considerations concerning chatbots

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Emerging Trends: Redefining Human-Computer Interaction

- **Personalization with AI:** The rise of smart speakers and voice assistants like Google Home and Amazon Alexa paves the way for more natural interactions with chatbots. Imagine using your voice to control smart home devices, book appointments, or even order groceries – all through a chatbot conversation.
- **Affective Computing:** This field focuses on developing chatbots that can recognize and respond to human emotions. Imagine a chatbot that can adjust its tone or offer empathetic support based on your voice or text messages. This personalization can further enhance the user experience.
- **Multilingual Capabilities:** As globalization continues, chatbots equipped with advanced language translation abilities will become increasingly important. Imagine a chatbot that can seamlessly converse with users in their native tongue, regardless of location or background.

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Emerging trends

- **Personalized Learning Companions**: Chatbots can transform education by offering individualized learning experiences, tailored learning pathways, and real-time feedback. This could significantly improve student engagement and academic performance.
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- **Blockchain for Enhanced Security:** With the growing need for secure interactions, AI chatbots will use blockchain technology to ensure data integrity and transparency. Blockchain will keep an unchangeable record of all chatbot interactions, which will be useful for industries like healthcare and finance, where security is critical.
- **Proactive Assistance**: Instead of waiting for you to ask for help, future chatbots will anticipate your needs and offer solutions before you even realize you need them. For example, if you frequently order groceries, a chatbot might remind you when it's time to restock, or suggest new recipes based on what's in your pantry.

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Future Applications:
Chatbots Beyond Imagination ging trends

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Ethical Considerations

- **Bias and Fairness:** Chatbots trained on biased data can perpetuate prejudices in their responses. We need to ensure fairness and inclusivity in chatbot development.
- **Transparency and User Control:** Users should be aware when they interact with a chatbot and have control over their data privacy. Transparency regarding chatbot limitations and capabilities is essential.
- **Job displacement:** As chatbots take over certain tasks, concerns arise about job displacement. Focus should shift towards retraining and reskilling the workforce to adapt to the changing technological landscape.

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Case study Tay

Tay was an artificial intelligence chatbot developed by Microsoft and launched on Twitter in March 2016. Designed to engage in casual conversations with users, Tay was meant to learn from those interactions and improve its conversational abilities over time. The goal was to create a chatbot that could emulate the language and behavior of a typical millennial, using humor and current slang to interact with users in a fun and engaging way. However, the experiment quickly went wrong. Tay was programmed to learn from the interactions it had with people on Twitter, but within hours of its launch, some users began exploiting this feature. They intentionally sent Tay inflammatory, racist, sexist, and otherwise offensive statements to see how the chatbot would respond. Unfortunately, Tay started mimicking and even generating inappropriate content, including tweets that promoted racist, sexist, and anti-Semitic views.

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Self-test tasks/questions

- What are some ethical challenges associated with chatbots?
- Research recent developments and trends in chatbot technology. Identify at least three key trends that are likely to shape the future of chatbots in education.
- Think of ways that AI chatbots could improve a business or industry you are interested in. How could they help customers or make processes more efficient? Share your ideas!
- Discuss the ethical considerations associated with using chatbots in healthcare. Address potential challenges related to privacy, security, and responsible AI in this specific context.

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THANK YOU FOR YOUR ATTENTION!

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10/10/2024

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