General Applications of AI

AI in Education & Content Creation

Education: Adaptive learning, proctoring

Content Creation: Text, images, music

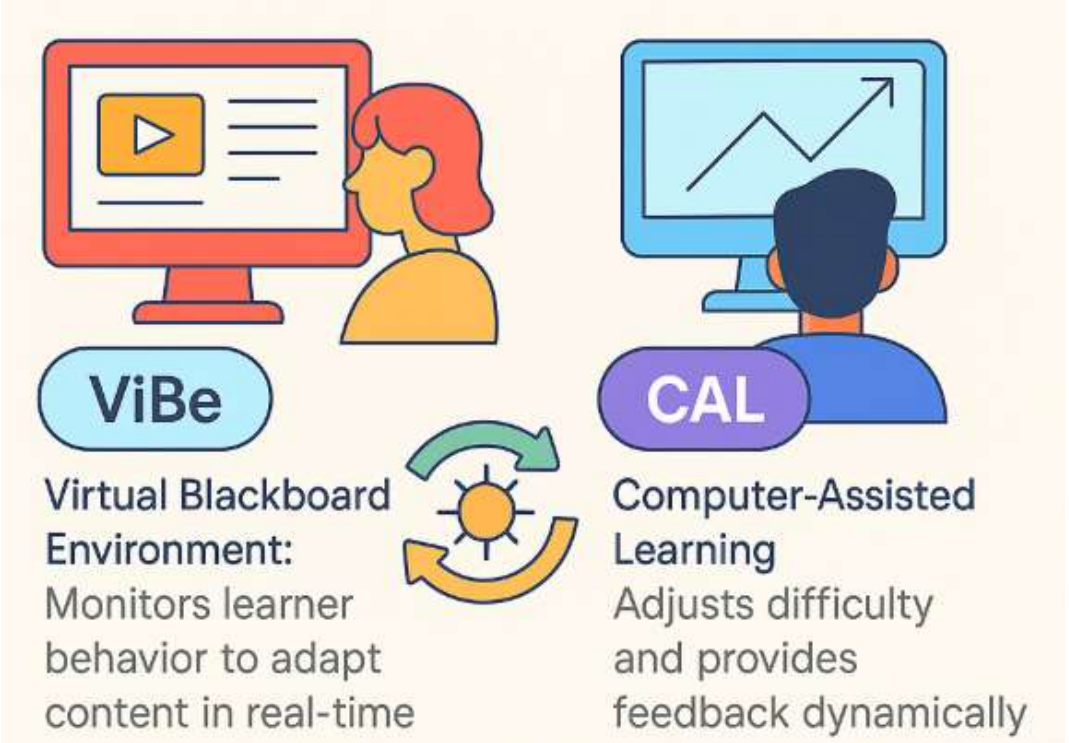
Outline

- **AI in Education**
  - Adaptive learning systems (e.g., ViBe, CAL)
  - Intelligent tutoring systems
  - Automated grading and proctoring (AI-based invigilation)
  - Personalized content generation (adaptive quizzes, learner profiling)
- **AI in Content Creation**
  - Generative AI for text (e.g., GPT-3)
  - AI-generated images (DALL·E)
  - AI-generated music (MusicGen, Jukebox)
  - Ethical considerations: authorship, plagiarism, bias
  - GPT-based quiz generator, DALL·E / Craiyon, and MusicGen

AI in Education

Adaptive Learning Systems (e.g., ViBe, CAL)

- AI tailors the learning path based on each student's performance, pace, and preferences.
- **ViBe (Virtual Blackboard Environment):** Monitors learner behavior to adapt content in real-time
- **CAL (Computer-Assisted Learning):** Adjusts difficulty and provides feedback dynamically
- **Tech Used:** Decision trees,



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ViBe: Virtual Blackboard Environment

- What is ViBe?
- ViBe is an AI-powered adaptive learning platform designed to monitor student behavior in real-time and adjust instructional content accordingly. It simulates the interactivity of a physical classroom in a digital setting

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ViBe: Core Features

- **Behavior Monitoring:** Tracks clicks, pauses, replays, and navigation patterns to infer engagement and confusion.
- **Content Adaptation:** Dynamically adjusts video segments, quiz difficulty, or supplemental materials based on learner progress
- **Real-Time Feedback:** Alerts instructors about at-risk students or knowledge gaps instantly.
- **Data-Driven Personalization:**

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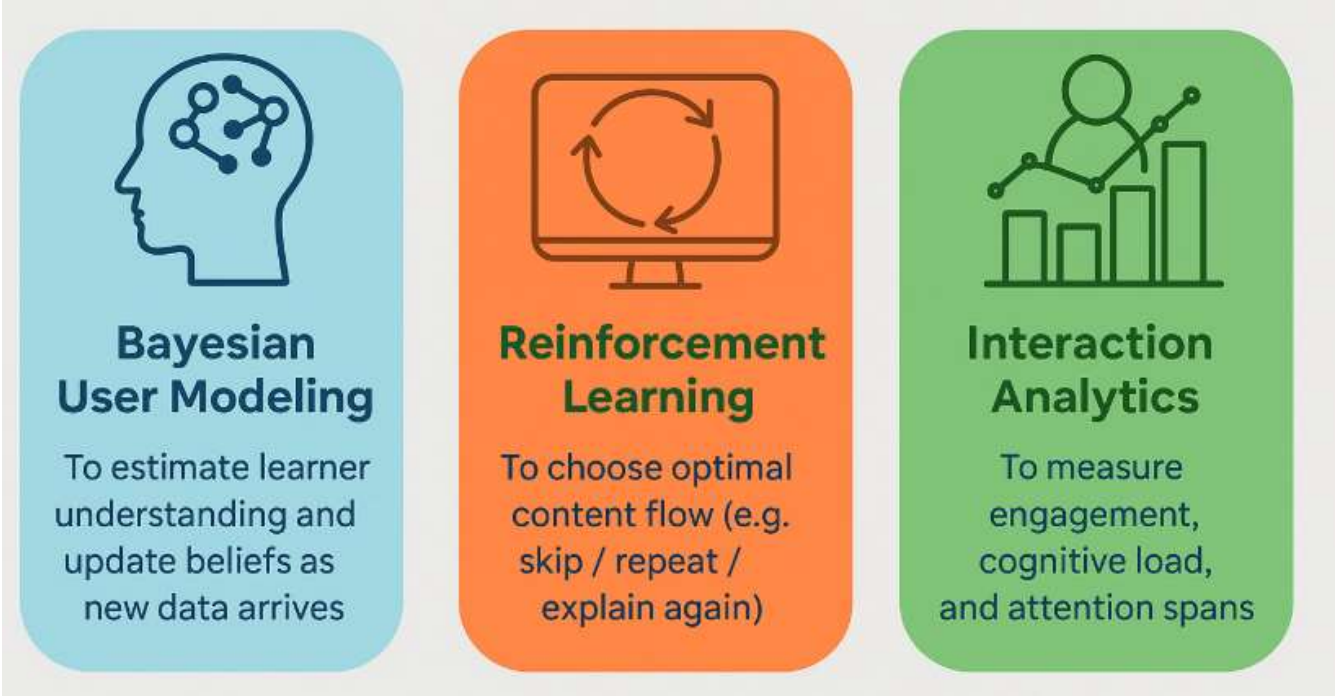
ViBe: AI Technologies Used

- **Bayesian User Modeling** – To estimate learner understanding and update beliefs as new data arrives
- **Reinforcement Learning** – To choose optimal content flow (e.g., skip/repeat/explain again)
- **Interaction Analytics** – To measure engagement, cognitive load, and attention spans.



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CAL: Computer-Assisted Learning

- **What is CAL?**
- **CAL** refers to the integration of computer technology and software to enhance traditional teaching and learning processes. CAL systems deliver instructional content, exercises, and feedback — often adapting based on learner input.

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CAL: Key Components

Multimedia Lessons: Videos, animations, and interactive diagrams to explain complex concepts

Self-Paced Exercises: Learners progress at their own speed with immediate feedback.

Assessment Tools: Embedded quizzes and tests that adapt in real time.

Feedback Engine: Automated hints, error-specific responses, and performance analytics.

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CAL: AI in CAL

- **Decision Trees:** Navigate learners through content based on responses
- **Bayesian Inference:** Estimate learner knowledge and predict next steps
- **Rule-Based Systems:** Trigger specific content or feedback for common mistakes.
- **Reinforcement Learning:** Optimize content delivery for retention and mastery.

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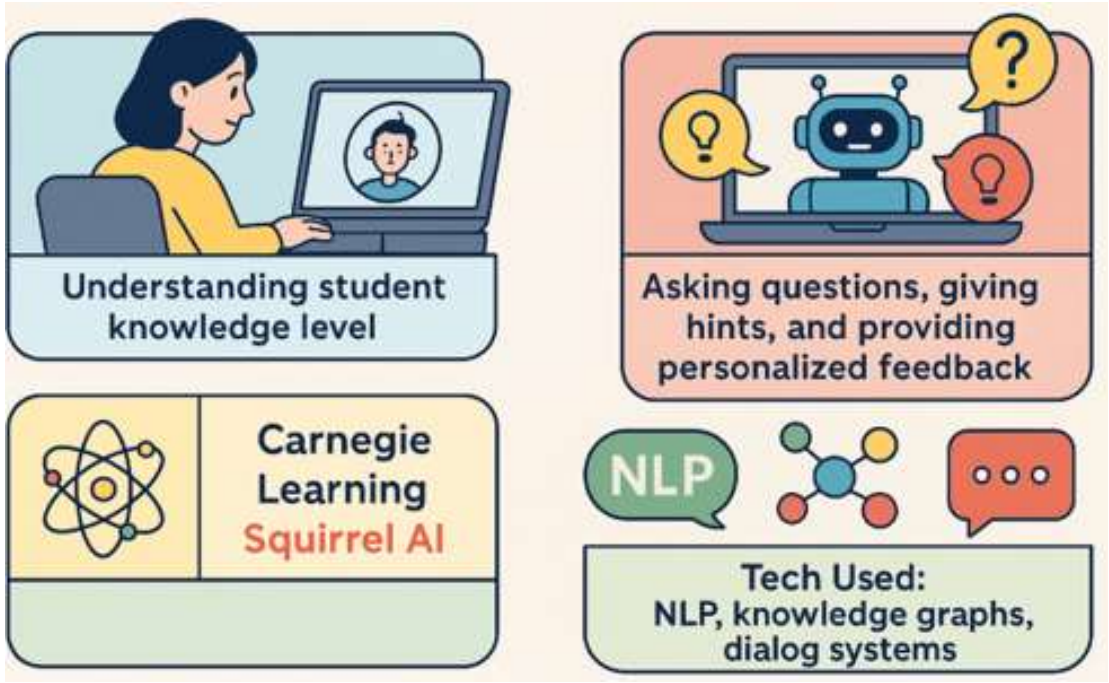
Intelligent Tutoring Systems (ITS)

- AI mimics human tutors by:
- Understanding student knowledge level
- Asking questions, giving hints, and providing personalized feedback
- Common examples: Carnegie Learning, Squirrel AI
- **Tech Used**: NLP, knowledge graphs, dialog systems



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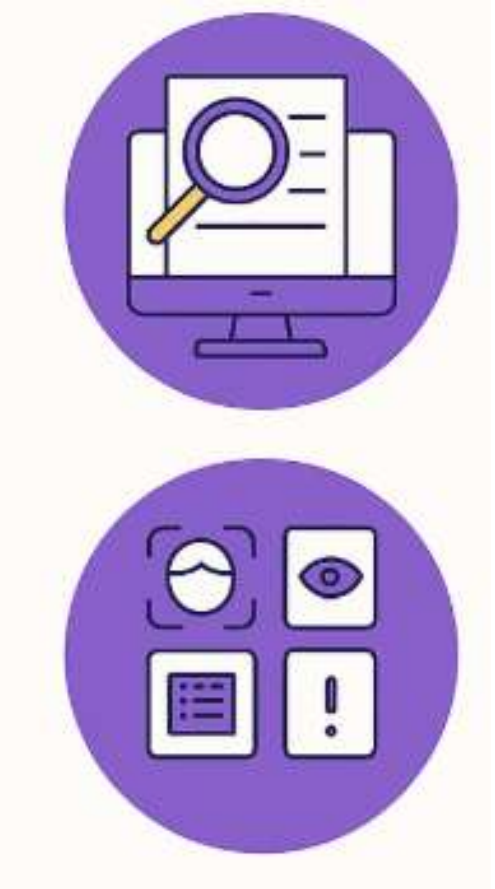
Automated Grading and Proctoring

- AI automates assessment and examination monitoring:
- **Grading**: Short answer and essay scoring using NLP models (e.g., BERT, RoBERTa)
- **Proctoring**: Face detection, gaze tracking, keystroke analysis, anomaly detection
- **Tools**: Mettl, ProctorU, Examity
- **Benefits**: Scalable, time-saving, real-time cheating alerts



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AI Tools for Proctoring & Assessment

- **Mettl (by Mercer)**
- **Face & Voice Detection:** Ensures candidate identity and monitors for impersonation
- **Browser Lockdown:** Prevents switching tabs, copy-paste, or external software.
- **AI + Human Proctoring:** Combines automation with live invigilators for high-stakes assessments.
- **Cheating Flags:** Suspicious movement, multiple people,

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AI Tools for Proctoring & Assessment

- **ProctorU (now Meazure Learning)**
- **Live or AI-Only Options:** Choose between fully automated or human-monitored exam settings
- **ID Verification:** Government-issued ID validation before exam start
- **Real-Time Chat:** Proctor can interact instantly if a violation is detected.
- **Behavioural Analysis:** Tracks head position, eye movement, and audio for anomaly

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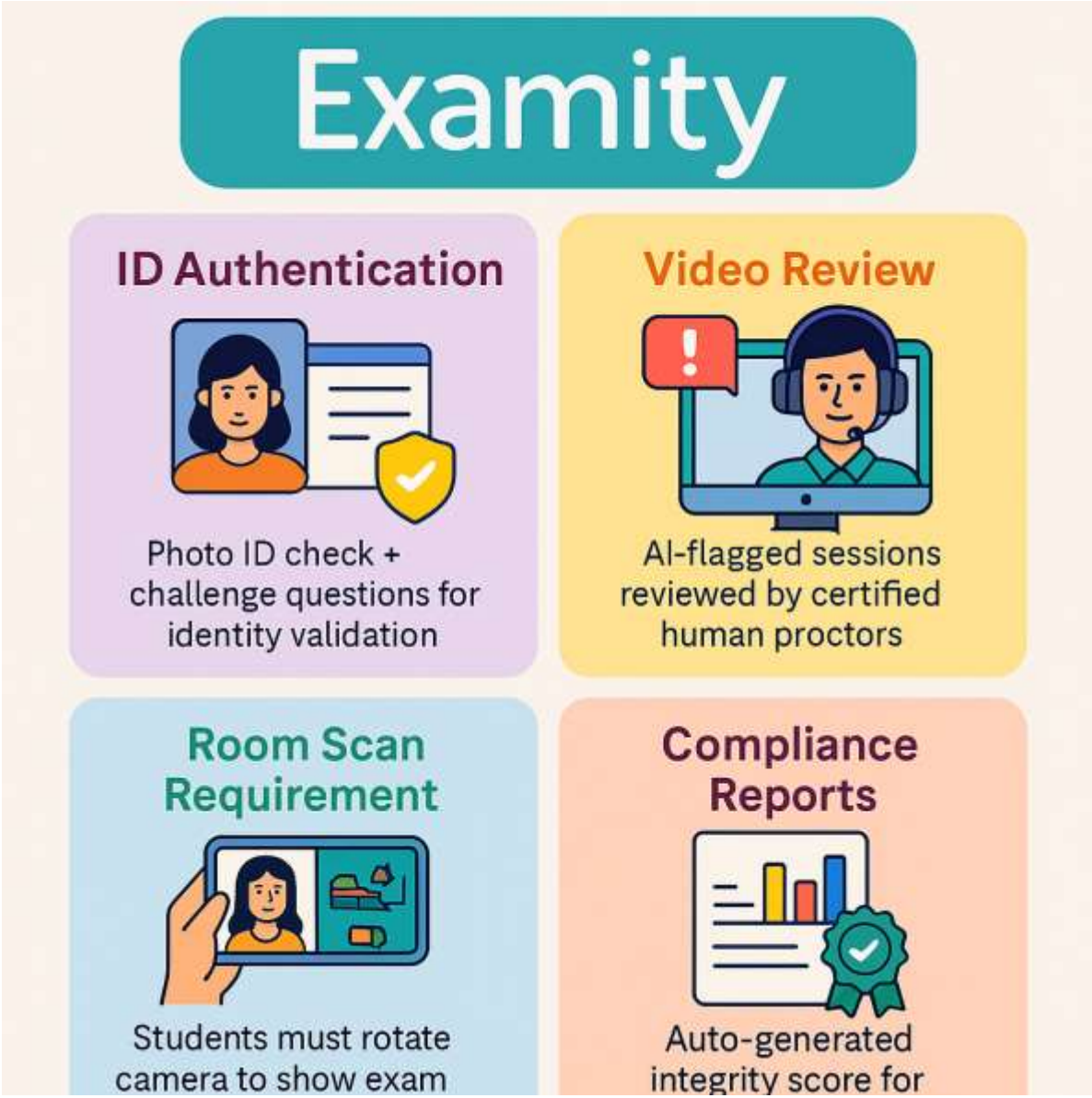
AI Tools for Proctoring & Assessment

- **Examity**
- **ID Authentication:** Photo ID check + challenge questions for identity validation
- **Video Review:** AI-flagged sessions reviewed by certified human proctors.
- **Room Scan Requirement:** Students must rotate camera to show exam space before starting
- **Compliance Reports:** Auto-generated integrity score for each session



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Personalized Content Generation

- AI generates or adapts content to suit the learner:
- **Adaptive Quizzes**: Adjust difficulty level based on performance (Item Response Theory + ML)
- **Learning Profiles**: Track progress, recommend topics, or re-teach forgotten concepts
- **Tools/Models**: GPT-3, Bloom, Quizizz AI

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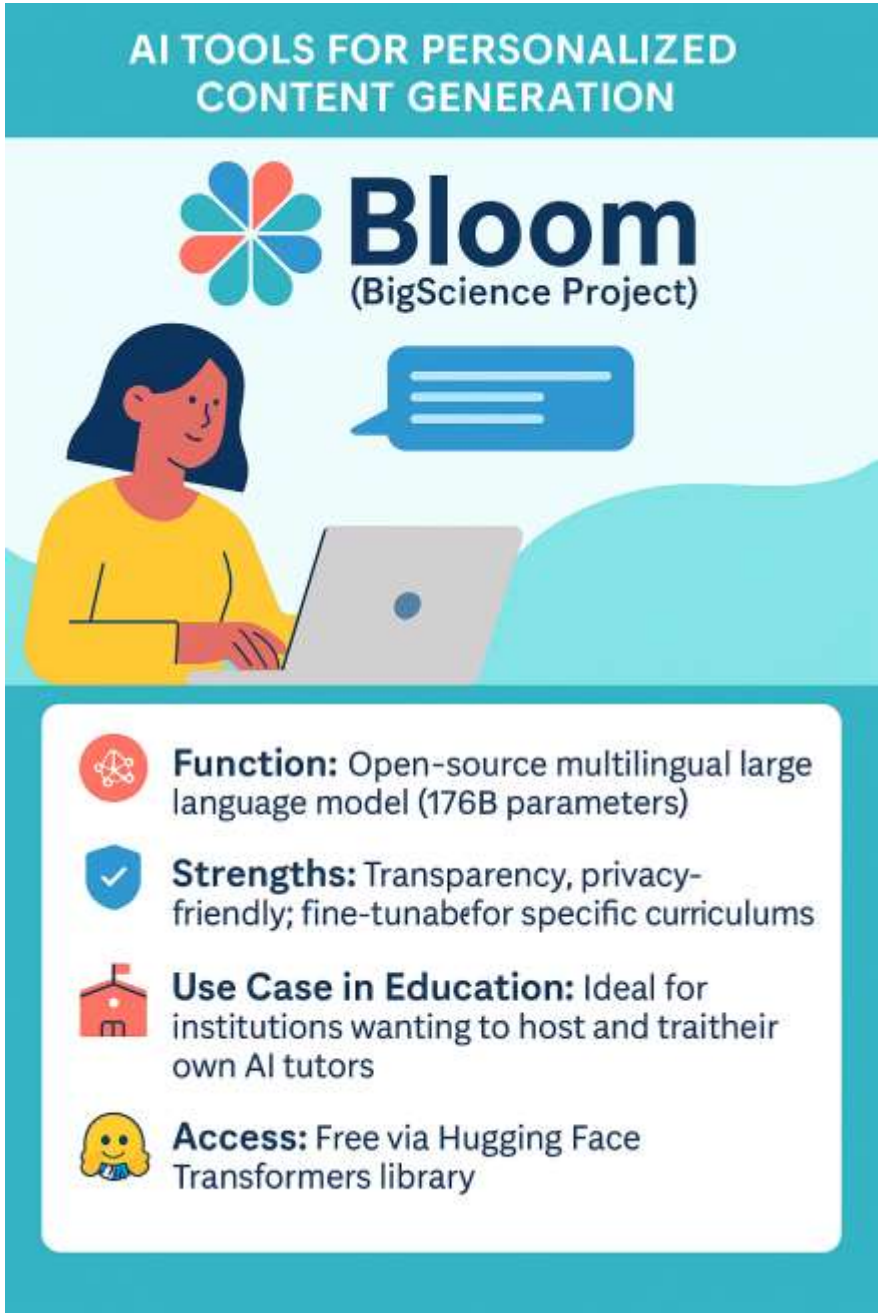
AI Tools for Personalized Content Generation

- Bloom (BigScience Project)
- **Function:** Open-source multilingual large language model (176B parameters)
- **Strengths:** Transparency, privacy-friendly; fine-tunable for specific curriculums.
- **Use Case in Education:** Ideal for institutions wanting to host and train their own AI tutors.
- **Access:** Free via Hugging Face Transformers library.



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AI Tools for Personalized Content Generation

- Quizizz AI
- **Function:** AI-powered quiz creation platform that adapts questions based on student responses.
- **Strengths:** Interactive, gamified quizzes with auto-feedback and performance tracking.
- **Use Case in Education:** Real-time adaptive assessments, student engagement tools.
- **Access:** Web-based, free and

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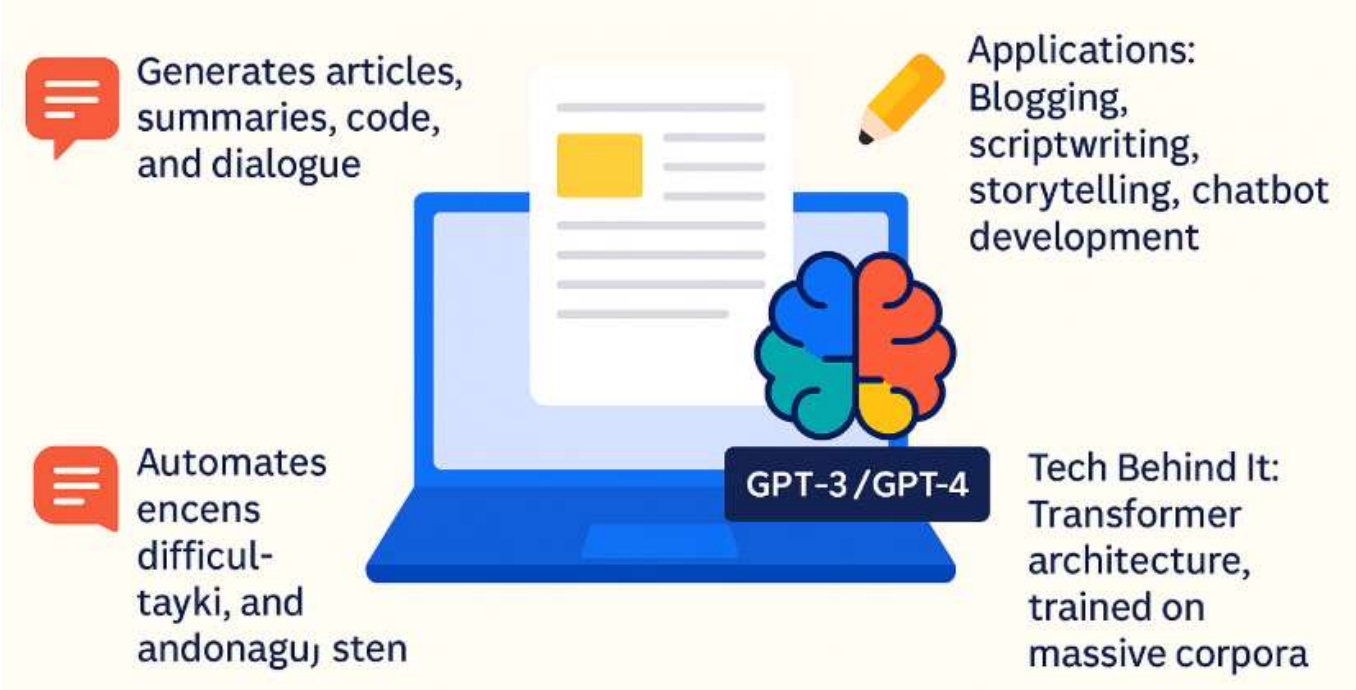
Generative AI for Text

- **GPT-3 / GPT-4:** Generates articles, summaries, code, and dialogue
- **Applications:** Blogging, scriptwriting, storytelling chatbot development
- **Tech Behind It:** Transformer architecture, trained on massive corpora



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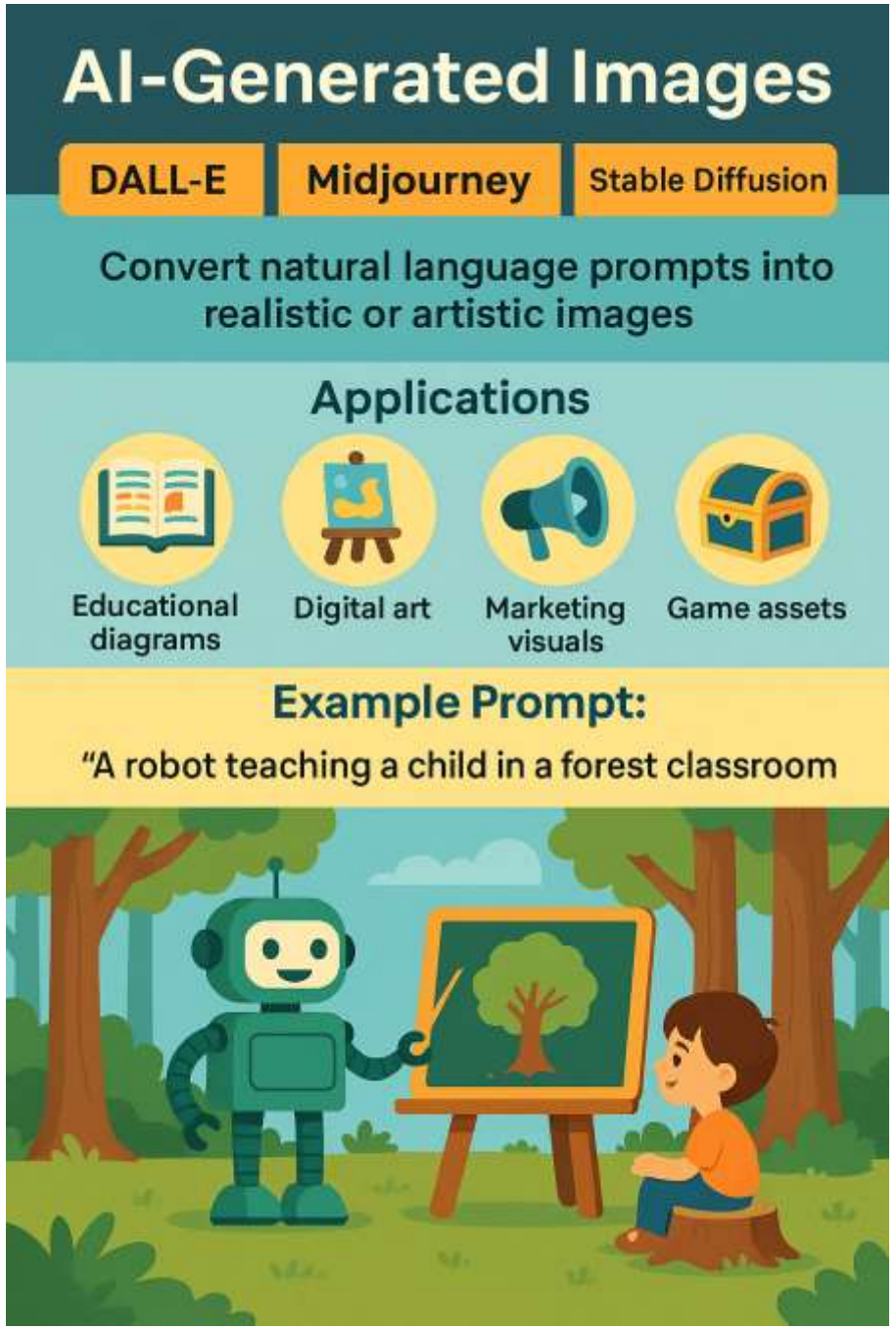
AI-Generated Images

- **DALL·E / Midjourney / Stable Diffusion:** Convert natural language prompts into realistic or artistic images
- **Applications:** Educational diagrams, digital art, marketing visuals, game assets
- **Example Prompt:** *"A robot teaching a child in a forest classroom"*



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AI-Generated Music

- **MusicGen / OpenAI Jukebox:** Generate melodies, background scores, and entire music tracks
- **Applications:** E-learning content, background scores, meditation apps

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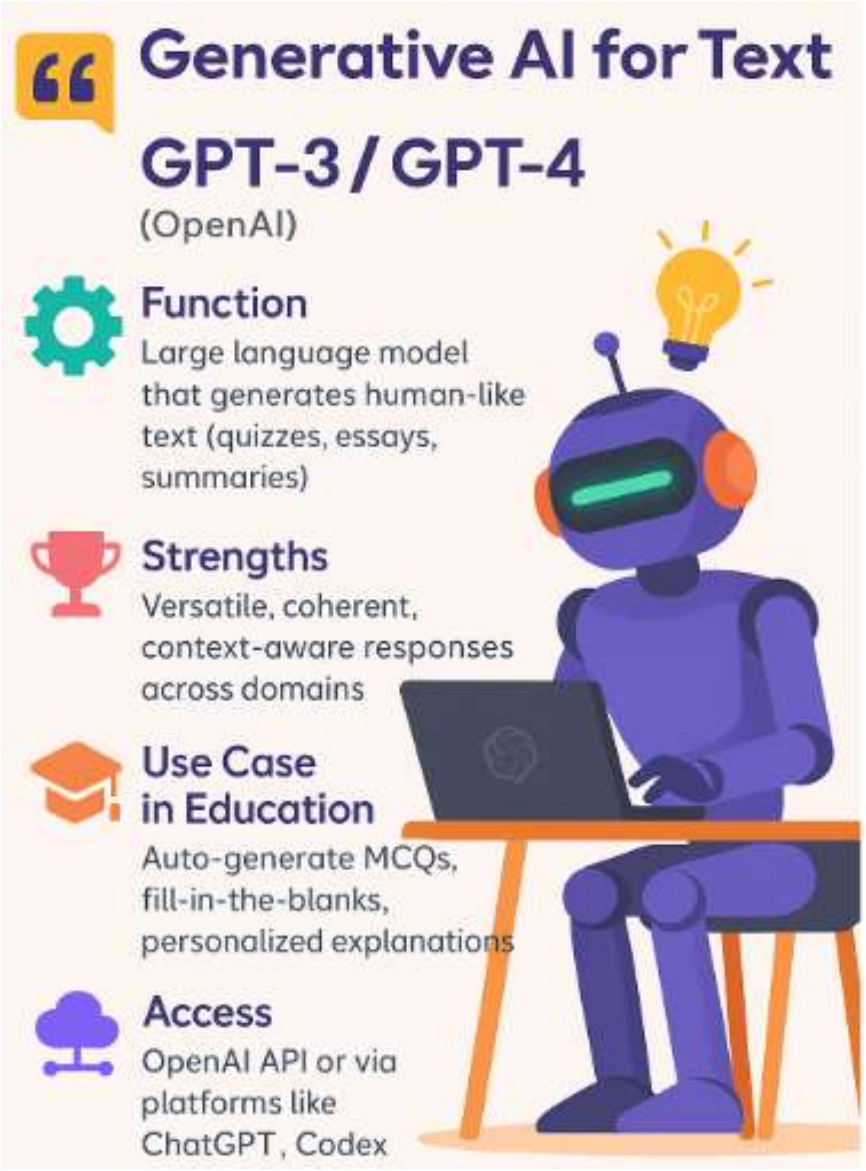
Generative AI for Text

- **GPT-3 / GPT-4 (OpenAI)**
- **Function:** Large language model that generates human-like text (quizzes, essays, summaries)
- **Strengths:** Versatile, coherent, context-aware responses across domains.
- **Use Case in Education:** Auto-generate MCQs, fill-in-the-blanks, personalized explanations.
- **Access:** OpenAI API or via platforms like ChatGPT, Codex.



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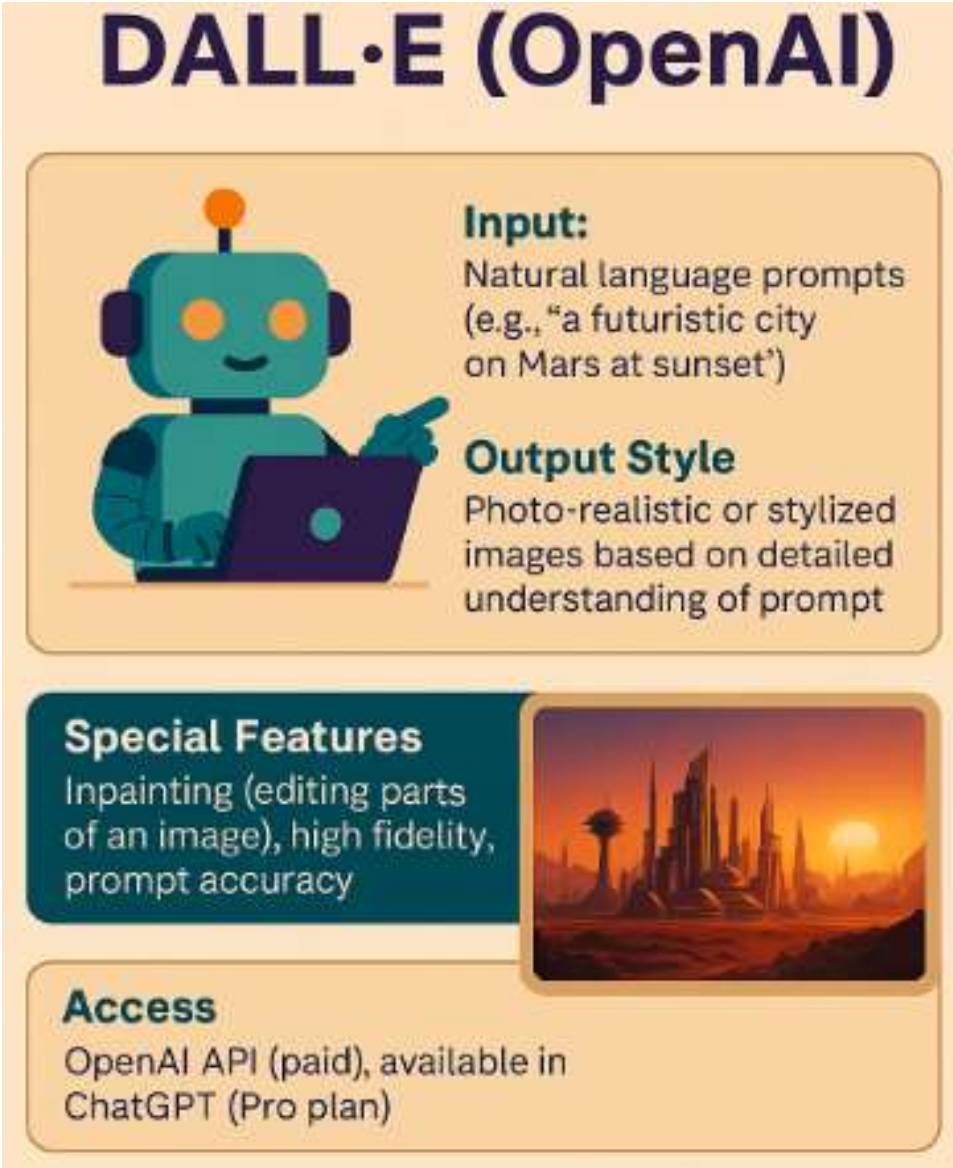
AI Tools for Image Generation

- DALL·E (OpenAI)
- **Input:** Natural language prompts (e.g., *"a futuristic city on Mars at sunset"*)
- **Output Style:** Photo-realistic or stylized images based on detailed understanding of prompt
- **Special Features:** Inpainting (editing parts of an image), high fidelity, prompt accuracy.
- **Access:** OpenAI API (paid), available in ChatGPT (Pro plan)



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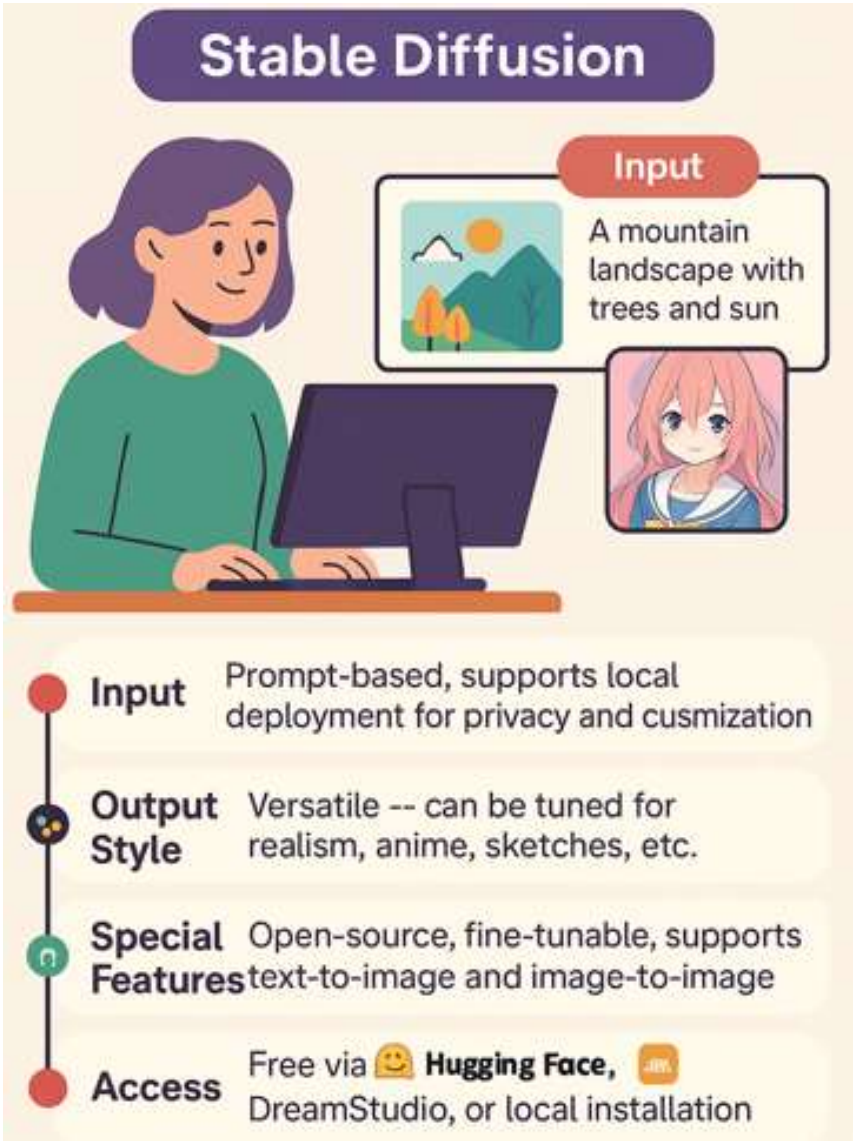
AI Tools for Image Generation

- Stable Diffusion
- **Input:** Prompt-based, supports local deployment for privacy and customization
- **Output Style:** Versatile — can be tuned for realism, anime, sketches, etc.
- **Special Features:** Open-source, fine-tunable, supports text-to-image and image-to-image.
- **Access:** Free via Hugging Face, DreamStudio, or local installation



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AI Tools for Music Generation

- MusicGen (Meta AI)
- **Model Type:** Transformer-based text-to-music model
- **Input:** Text prompts (e.g., *"energetic hip-hop beat with electric guitar"*)
- **Output:** Audio clips (high-quality, up to 15–30 seconds) in MP3/WAV format
- **Special Features:** Prompt-conditioned music generation, optionally with melody guidance.
- **Use Cases:** Jingles, background music, education tools, podcast intros
- **Access:** Free demo on Hugging Face

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AI Tools for Music Generation

- OpenAI Jukebox
- **Model Type:** VQ-VAE + Transformer for raw audio modelling
- **Input:** Genre, artist, and lyrics (e.g., *"a pop song in the style of The Beatles"*)
- **Output:** Vocals + instruments (full songs, stylized and coherent)
- **Special Features:** Generates music with lyrics and realistic vocals in specific artist styles.
- **Use Cases:** Music prototyping, artist emulation, AI music research
- **Access:** Model weights open,

AI in Content Creation

Ethical Considerations

Authorship: Who owns the content — the user, the model, or the company?

Plagiarism: AI may unintentionally reproduce training data.

Bias: Content may reflect social/cultural biases present in training data

Misuse: Deepfakes, fake news, and malicious content generation

THANK YOU