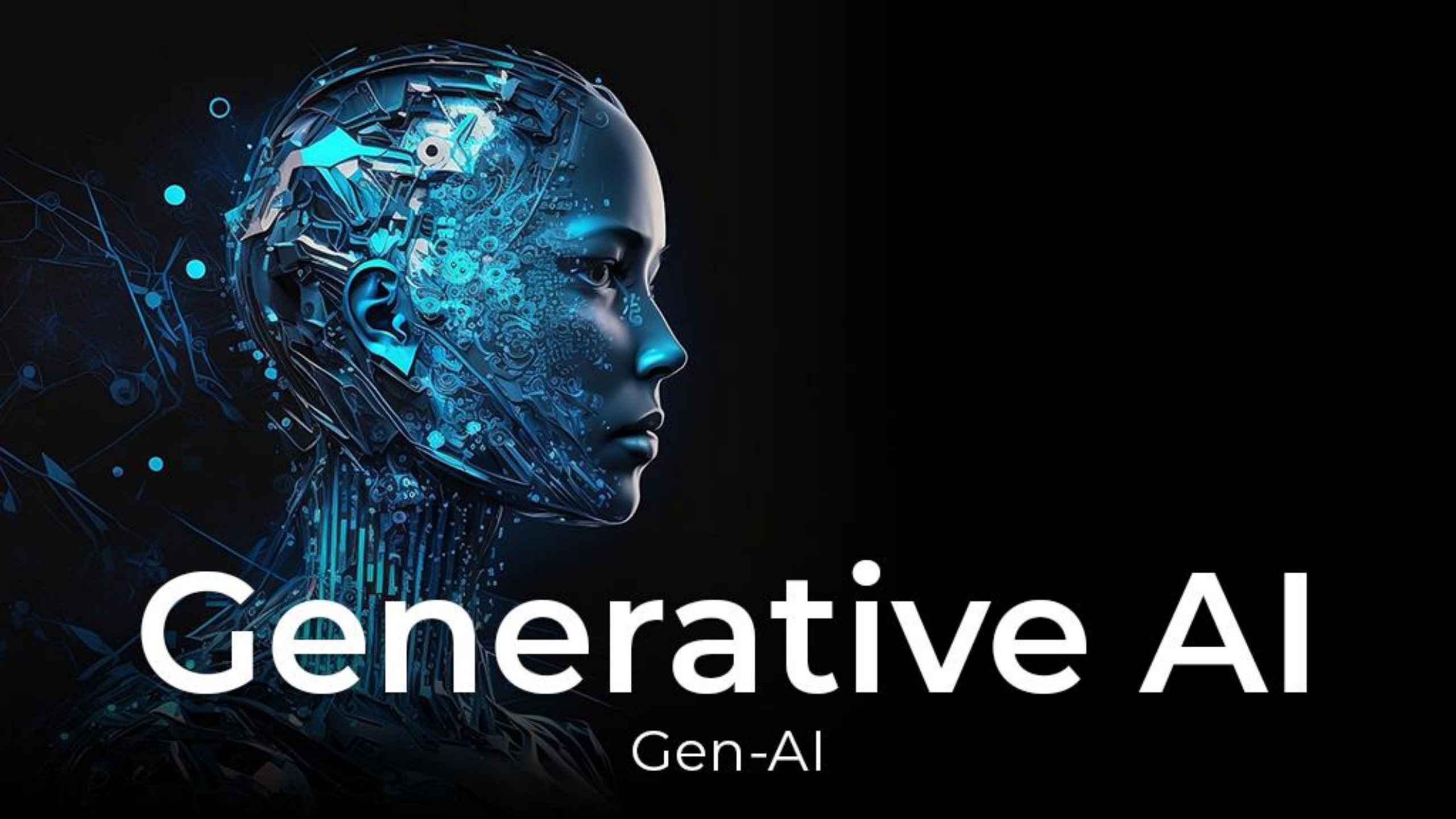

Generative AI
Gen-AI

Agenda

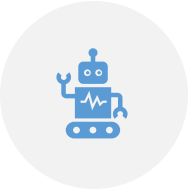
- What is Generative AI?
- Generative AI Examples
- Why Generative AI ?
- Generative AI Architecture
- Generative AI Principles

Agenda

Applications of Generative AI

Types of Generative Models

Machine Learning Algorithms with GenAI



Generative AI: Advantages and Disadvantages

Generative AI Ethical Considerations

What is Generative AI?

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International Corporate Trainer

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What is Generative AI?

Branch of Artificial Intelligence

Focuses on developing

Models and Algorithms

Capable of generating

New content.

What is Generative AI?

Producing
Original outputs

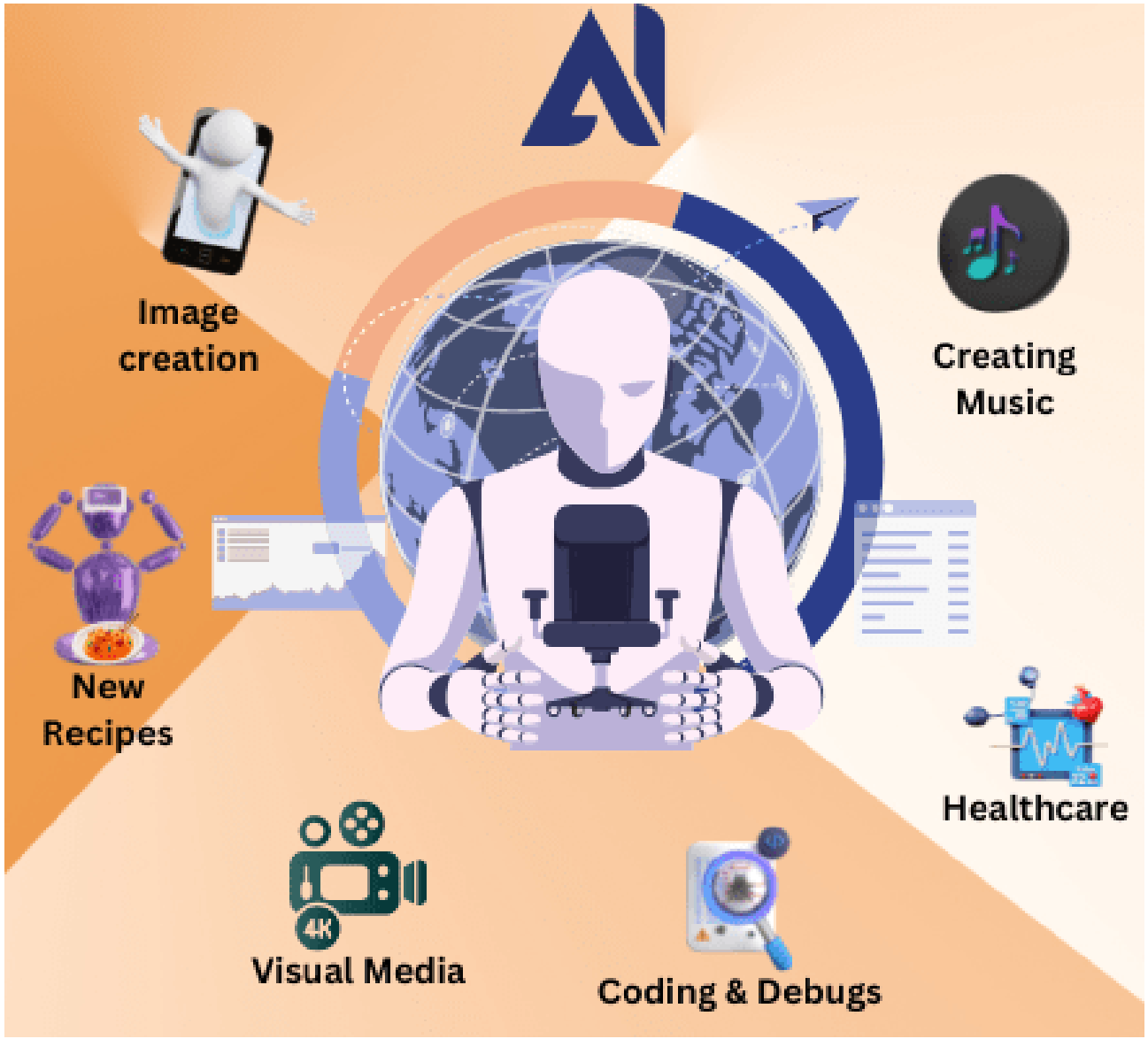
Image
generation

Text creation

Music
composition

Video Game
Content

Drug Discovery


AI
Image creation
Creating Music
New Recipes
Healthcare
Visual Media
Coding & Debugs

Generative AI Examples

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Generative AI Examples

- DeepDream by Google
- StyleGAN and StyleGAN2
- OpenAI's GPT-3 (Generative Pre-trained Transformer 3)
- DALL-E by OpenAI

Generative AI Examples

- Music Generation with Magenta by Google
- DeepArt.io
- GANPaint Studio
- GAN-generated Human Faces

DeepDream by Google

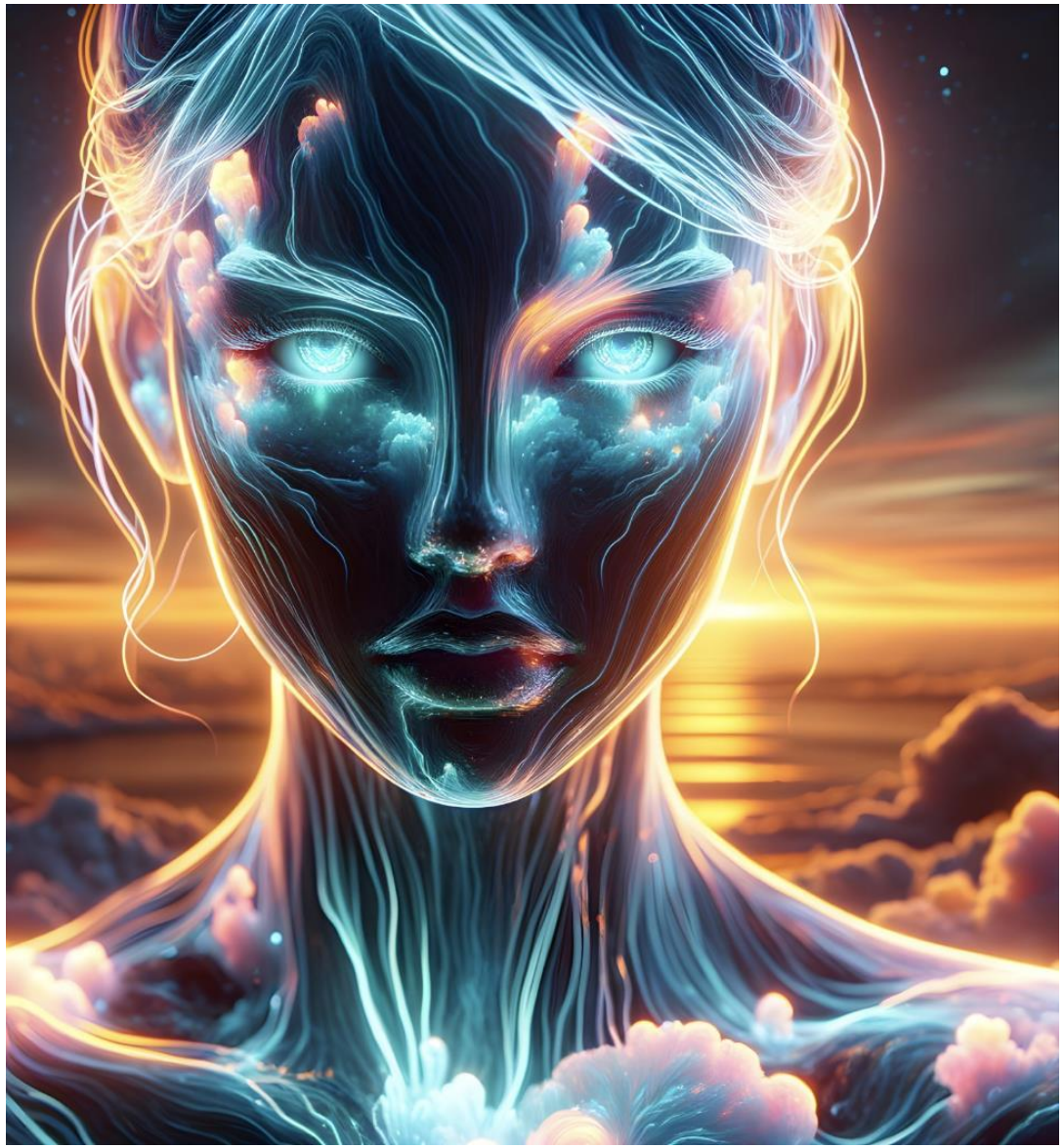
Image Generation and Modification

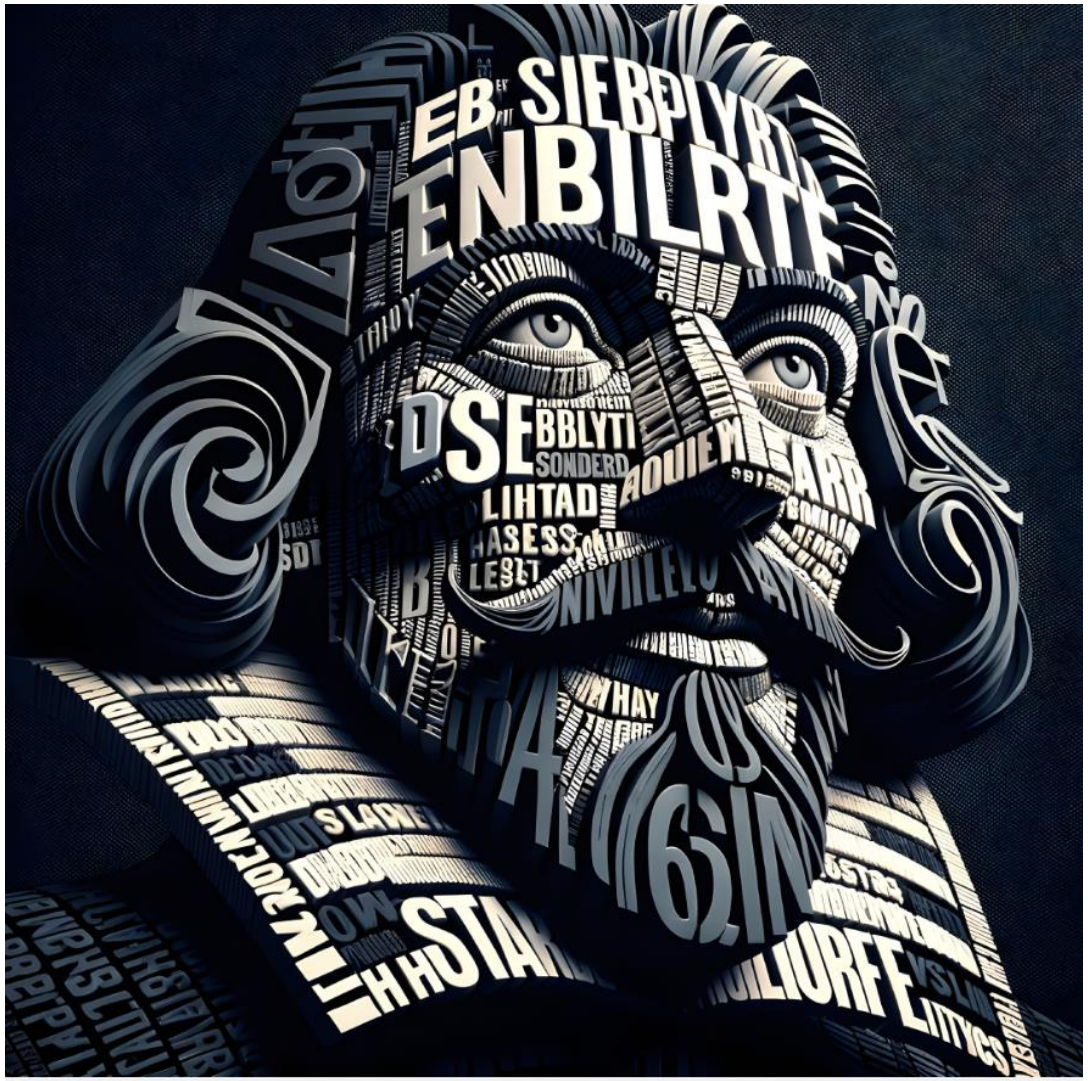
DeepDream is a computer vision algorithm

Uses a convolutional neural network

to find and enhance patterns in images.

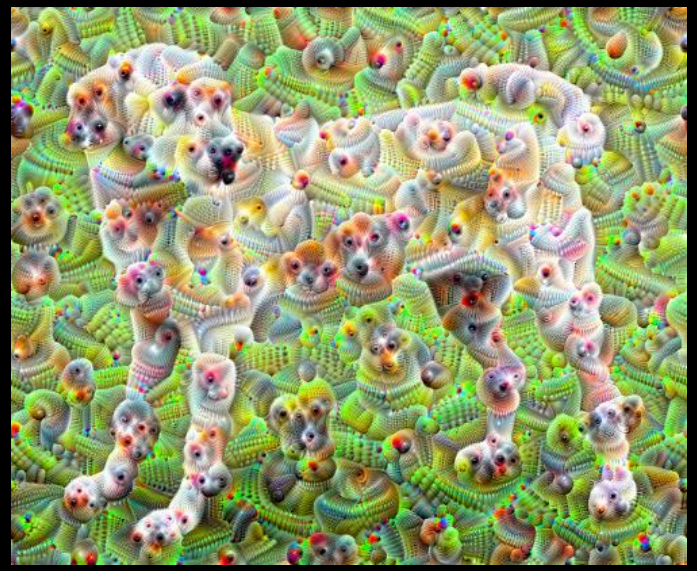
https://deepdreamgenerator.com/





William Shakespeare

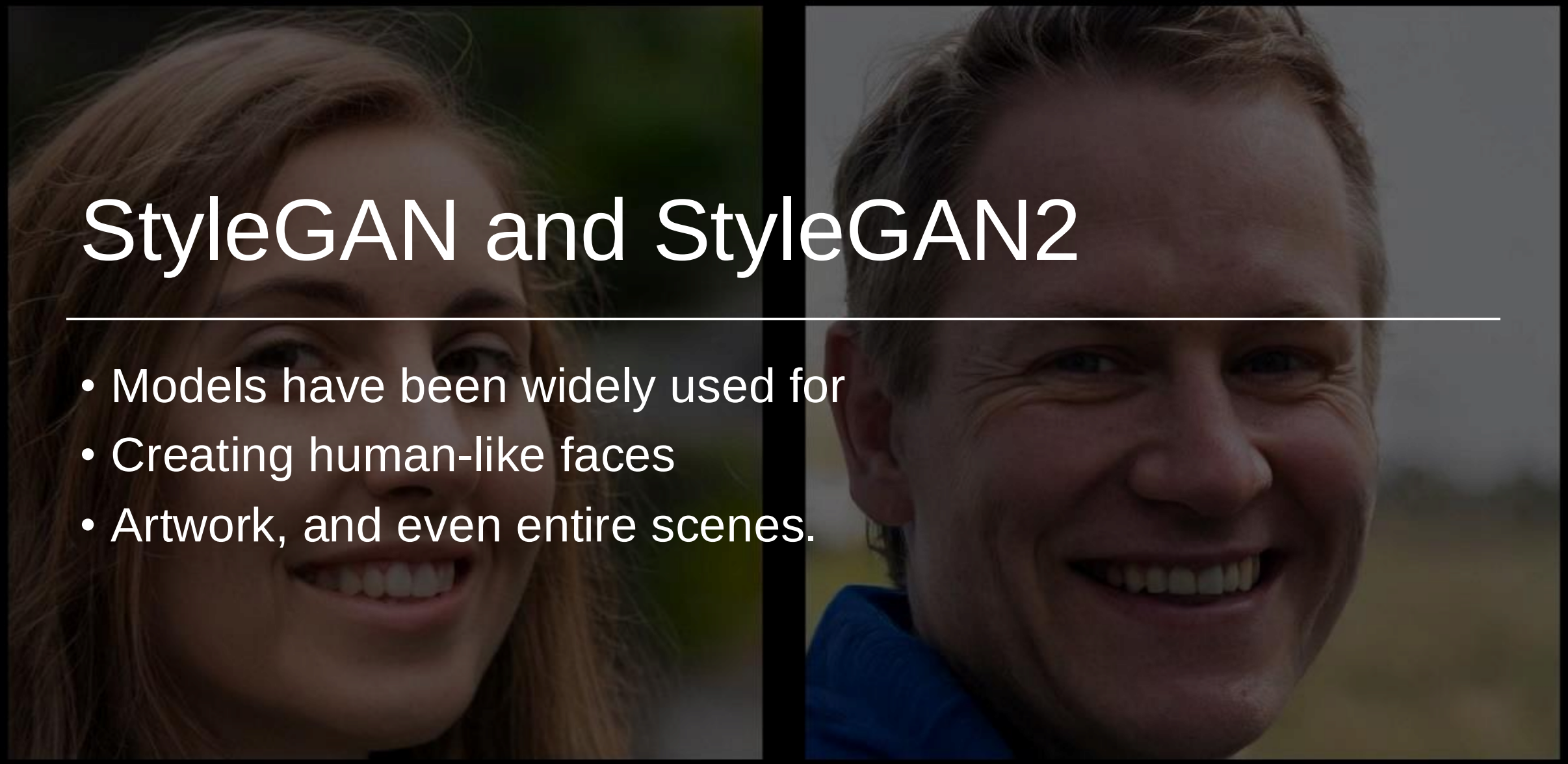
DeepDream by Google



- Transforms images into
- dreamlike, psychedelic visuals
- by iteratively amplifying patterns
- detected by the neural network.
- https://www.tensorflow.org/tutorials/generative/deepdream

StyleGAN and StyleGAN2

- Image Generation
- Developed by NVIDIA,
- StyleGAN and StyleGAN2 are generative models
- Generate high-quality, realistic images.



StyleGAN and StyleGAN2

- Models have been widely used for
- Creating human-like faces
- Artwork, and even entire scenes.

StyleGAN and StyleGAN2

OpenAI's GPT-3

- Generative Pre-trained Transformer 3
- GPT-3, developed by OpenAI
- Powerful language model
- Perform a wide range of
- Natural Language Processing tasks

OpenAI's GPT-3

Trained on Large Text data

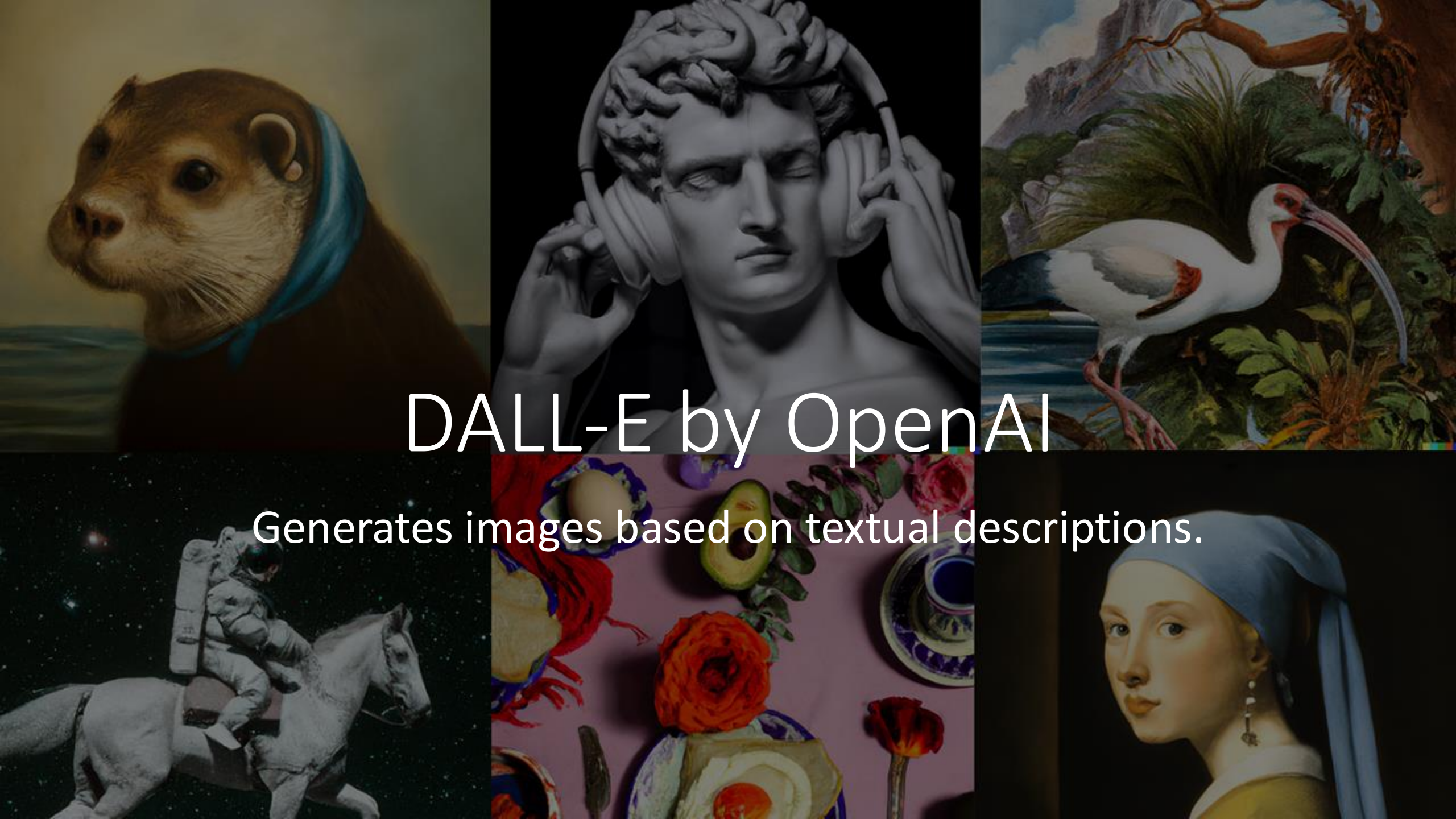
Generate Human-like text

Answer questions

Translate languages

Write articles

Create code snippets



DALL-E by OpenAI

Generates images based on textual descriptions.

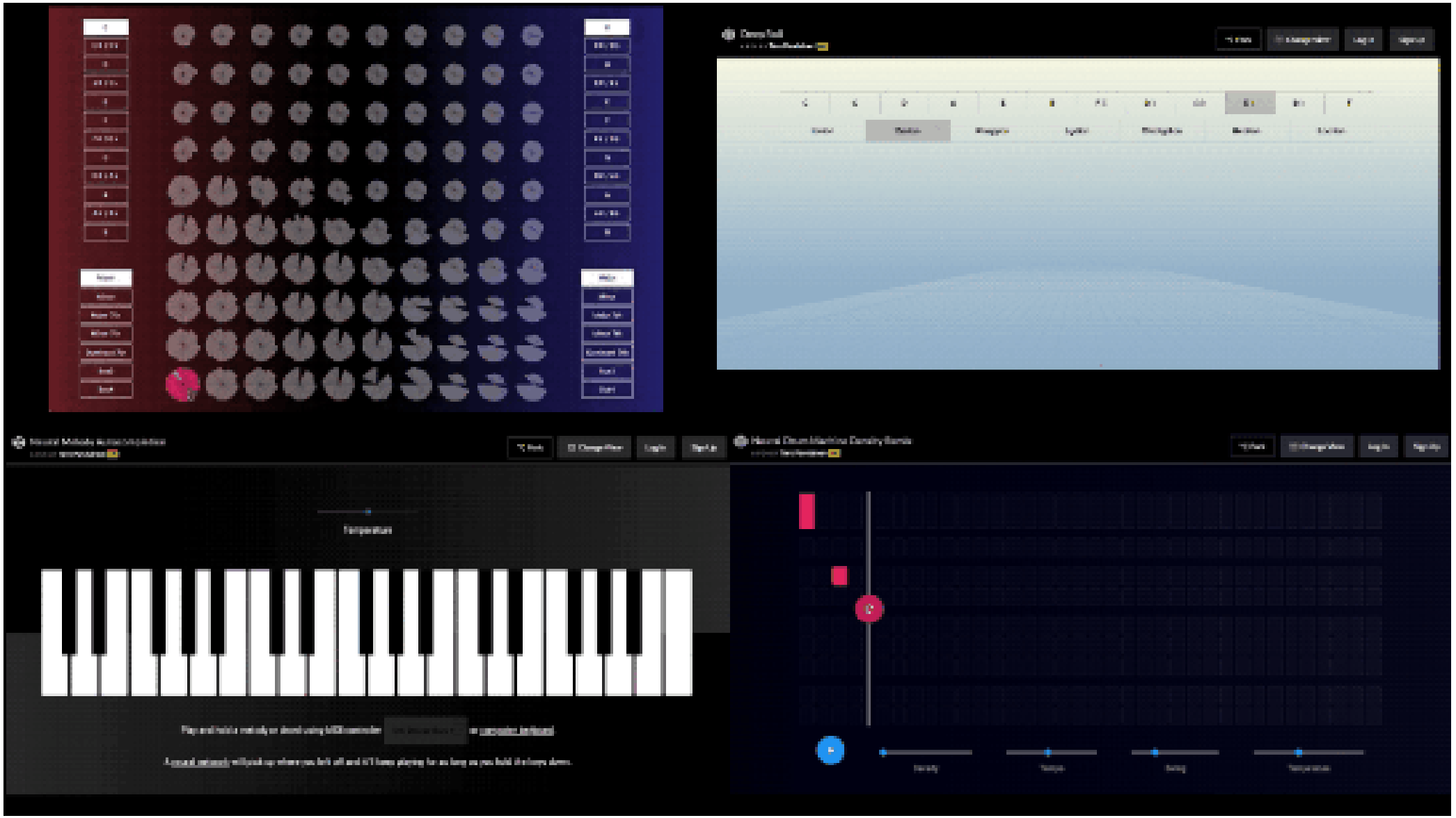
magenta

Music Generation with Magenta

- Music Composition
- Open-source research project by Google,
- Explores the intersection of Art and Machine learning.
- Includes models for
- Generating Music and art.

Music Generation with Magenta

- Generate New musical compositions
- Create harmonies
- Assist musicians in
- Generating creative content.
- https://magenta.tensorflow.org/demos/



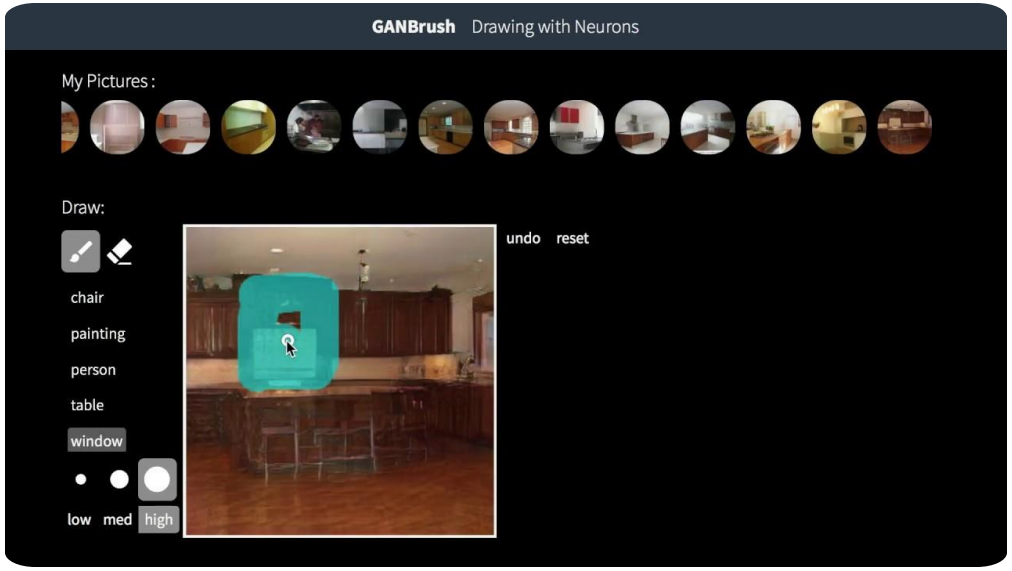
DeepArt.io

https://creativitywith.ai/deepartio/

DeepArt.io

- Online platform
- Uses neural networks
- Apply artistic styles to photographs.

GANPaint Studio



- Based on GANs
- Allows users to interactively edit
- Manipulate images in real-time

GANPaint Studio

- Users can add or remove
- Objects from images
- Change the color of specific objects
- Paint new objects into a scene

GAN-generated Human Faces

Facial Image Generation

- Various GAN models,
- including StyleGAN,
- have been trained
- to generate highly realistic human faces.

GAN-generated Human Faces

These generated faces

can be indistinguishable from

real ones and have been used in

research, art, and even as

placeholders in design mockups.

Summary And Conclusion

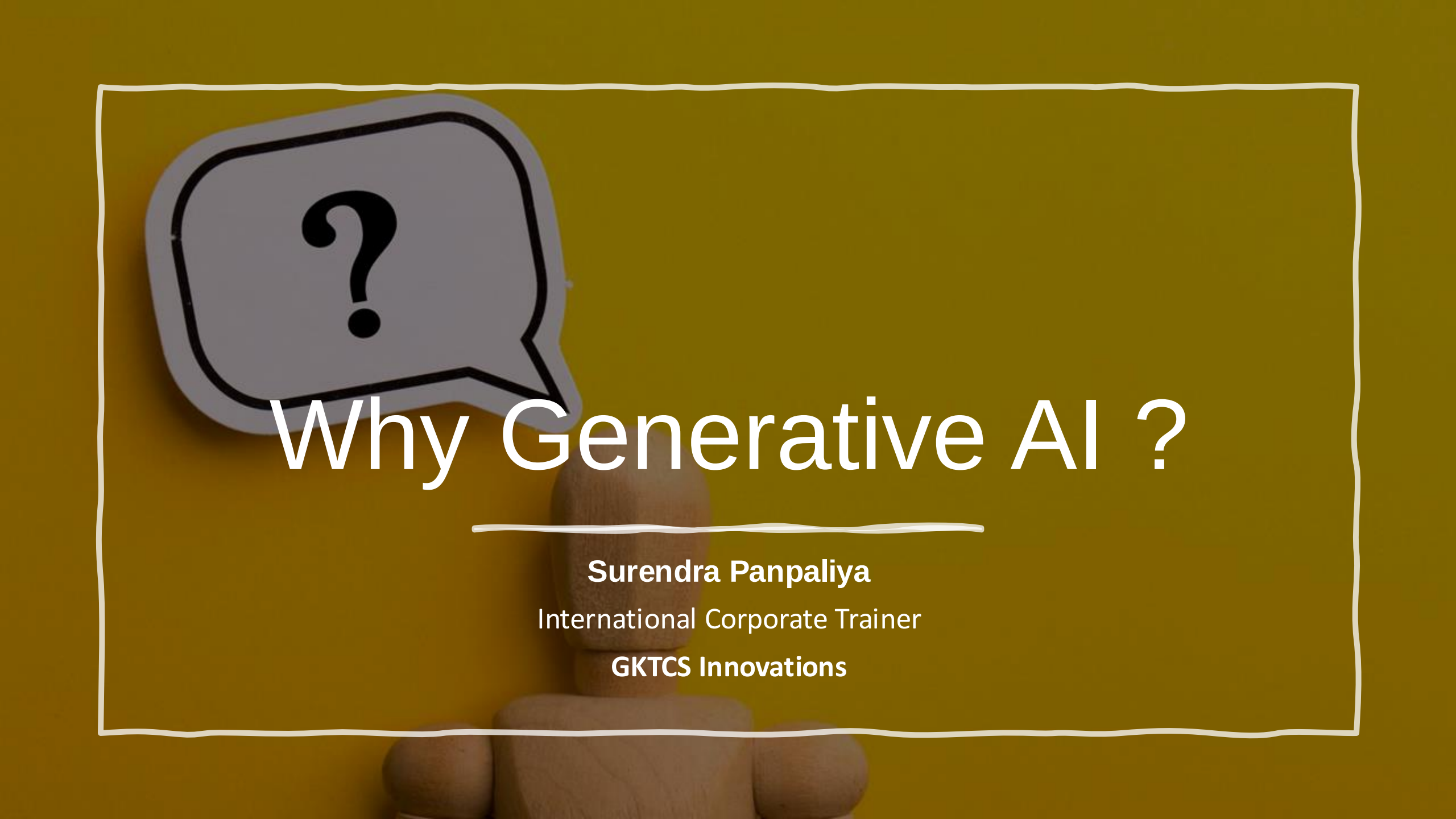
Examples showcase

the versatility

Creativity of

generative AI

across different domains



Why Generative AI ?

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International Corporate Trainer

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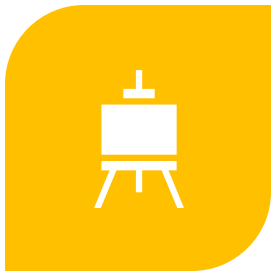
Creative Content Generation

- Generative AI models
- GANs and StyleGAN
- Generate realistic
- Creative images
- Artwork
- Designs

Creative Content Generation

APPLICATIONS IN

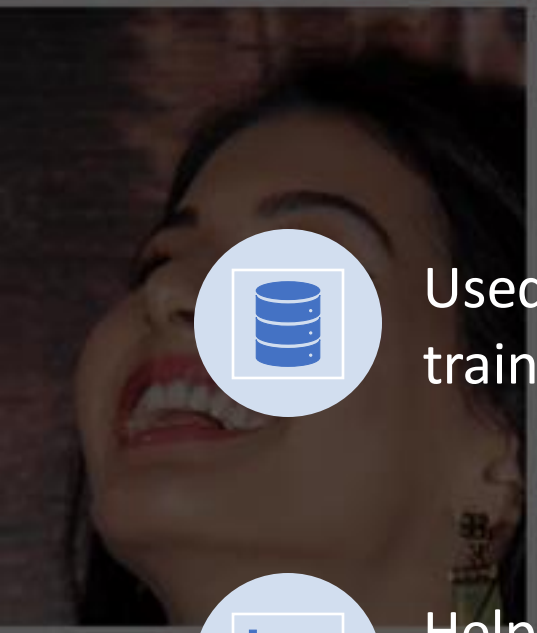
GRAPHIC DESIGN



DIGITAL ART

NOVEL VISUAL CONTENT

Data Augmentation



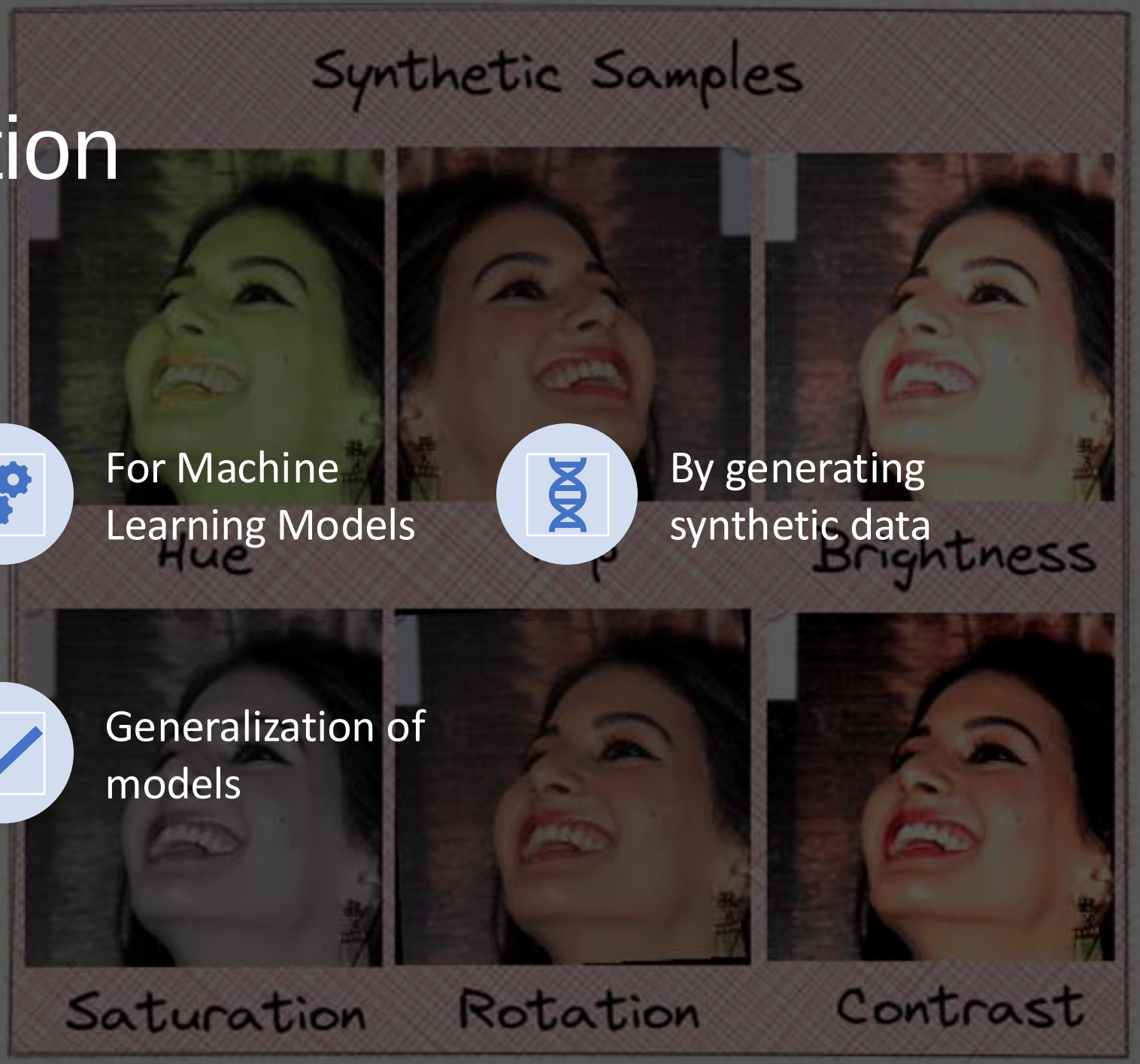
Used to augment training datasets

For Machine Learning Models

By generating synthetic data

Help improve the performance

Generalization of models



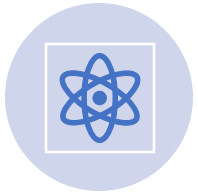
Innovation in Product Design

In fields like

Fashion, Product design

Assist in the creation of

Innovative designs



Prototypes.

Natural Language Processing (NLP)

GPT-3, can generate

Human-like text

Automated Content creation

Language translation

Code generation

Personalization & Recommendation Systems

Improvement of

Recommendation systems

Personalized Content

Suggestions based on

User preferences

Personalization & Recommendation Systems

Enhances

User experience

E-commerce,

Streaming services

Content platforms

Drug Discovery and Molecular Design

Helps researchers generate

Novel molecular structures

with desired properties,

Accelerating

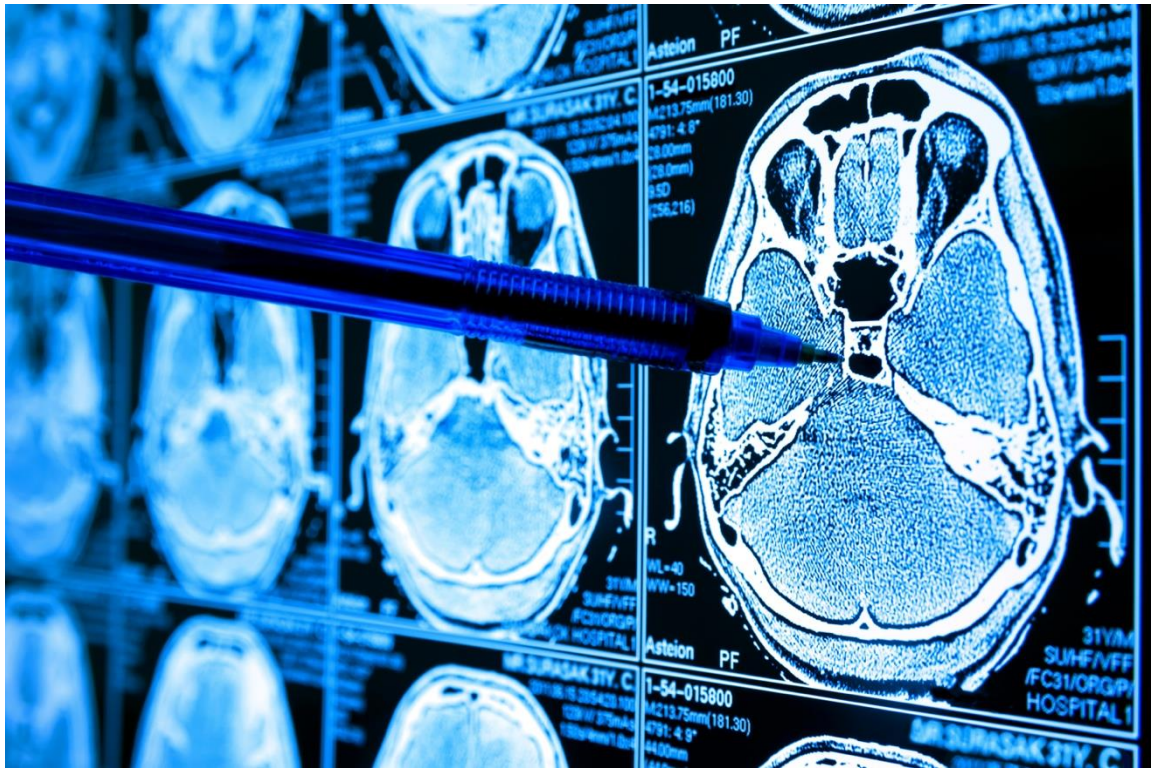
Drug development process

Content Creation for Games & Virtual Reality

- Creating virtual environments
- Characters
- Content for video games
- Virtual reality applications

Artificial Creativity

- By autonomously generating
- Music compositions
- Poetry
- Creative Expression



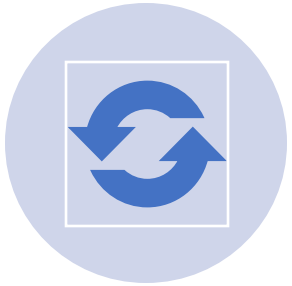
Medical Imaging and Diagnosis

- Image reconstruction
- Enhancement
- Synthesis
- Help in the diagnosis

Interactive Content Generation

Feedback Mechanisms

Users can influence



Iterate on generated content

In real-time

Summary and Conclusion

Presents Exciting opportunities

Ethical considerations and challenges

Issues related to Bias,

Transparency

Responsible use

Generative AI Architecture

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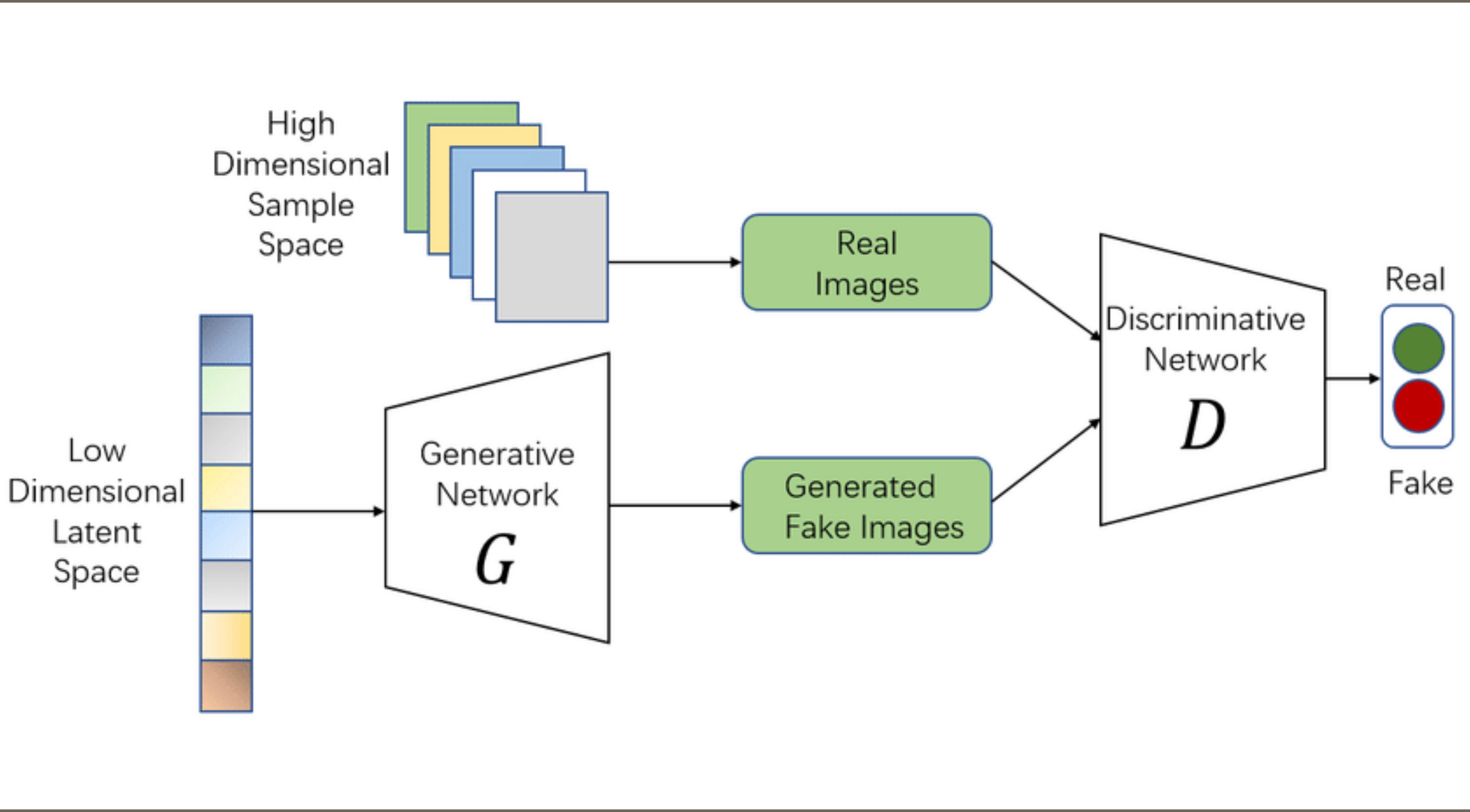

High
Dimensional
Sample
Space
Real
Images
Discriminative
Network
D
Real
Low
Dimensional
Latent
Space
Generative
Network
G
Generated
Fake Images
Fake

Generative Adversarial Networks

Generator

Input

Random noise or a latent vector

Output

Synthetic data (e.g., images).

Generative Adversarial Networks

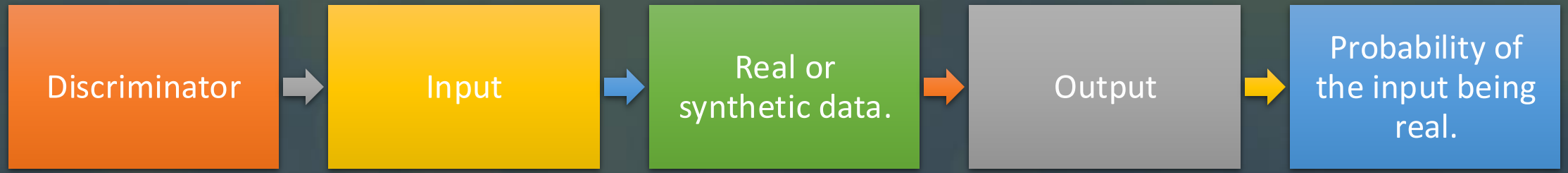
FUNCTIONALITY

GENERATES DATA THAT MIMICS

THE DISTRIBUTION OF

THE TRAINING DATA.

Generative Adversarial Networks



Generative Adversarial Networks

Functionality:

Learns to

distinguish between

Real and synthetic data.

Training Process

The generator and discriminator

trained simultaneously

in a competitive manner.

Training Process

THE GENERATOR AIMS

TO PRODUCE SYNTHETIC DATA

THAT IS INDISTINGUISHABLE

FROM REAL DATA.

Training Process

- The discriminator
- Learns to
- Differentiate between
- Real and Generated data

Training Process

The model converges when

the generator creates data

that is realistic enough

to fool the discriminator.

Loss Function

The generator aims

to minimize

the log probability of

the discriminator

making a correct classification.

Loss Function

The discriminator aims

to maximize

the log probability

of correct classification.

Generative AI Principles

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1. Ethical Considerations

- GenAI Practitioners
- Consider the ethical implications of their work
- Like potential biases in training data,
- Impact of generated content
- Misuse of the technology

2. Transparency

STRIVE FOR TRANSPARENCY

IN THE DEVELOPMENT

DEPLOYMENT OF

GENERATIVE AI MODELS.

3. User Consent and Privacy

Obtain informed consent

Generating and using data

Ensure Privacy concerns

are addressed

4. Fairness and Avoiding Bias

Be Aware of

Actively work

To mitigate biases in

Training data

Model outputs

5. Security and Robustness

PRIORITIZE THE SECURITY

OF GENERATIVE AI

MODELS

SYSTEMS

6. Responsible Deployment

Deploy generative AI

Responsibly

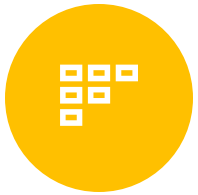
Taking into account

Potential societal impacts

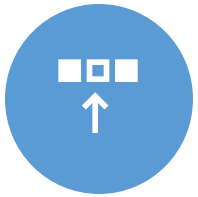
7. Accountability

Establish clear lines of

Accountability



For the Development



Deployment

Outcomes

8. Collaboration and Multidisciplinary Approaches

ENCOURAGE COLLABORATION

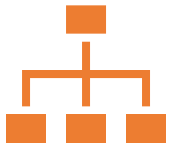
ACROSS DIVERSE DISCIPLINES,

INCLUDING ETHICS

SOCIAL SCIENCES

HUMANITIES

9. Continuous Monitoring and Evaluation



Continuously

Monitor

Performance

Impact of generative AI

10. Education and Public Awareness

PROMOTE EDUCATION

AWARENESS

ABOUT GENERATIVE AI

AMONG DEVELOPERS

GENERAL PUBLIC

11. Legal and Regulatory Compliance

ADHERE TO

RELEVANT LAWS

REGULATIONS

ETHICAL GUIDELINES.

12. Human-in-the-Loop

Consider the role of

Human oversight

Involvement in

Generative AI process

Summary and Conclusion

THESE PRINCIPLES UNDERSCORE

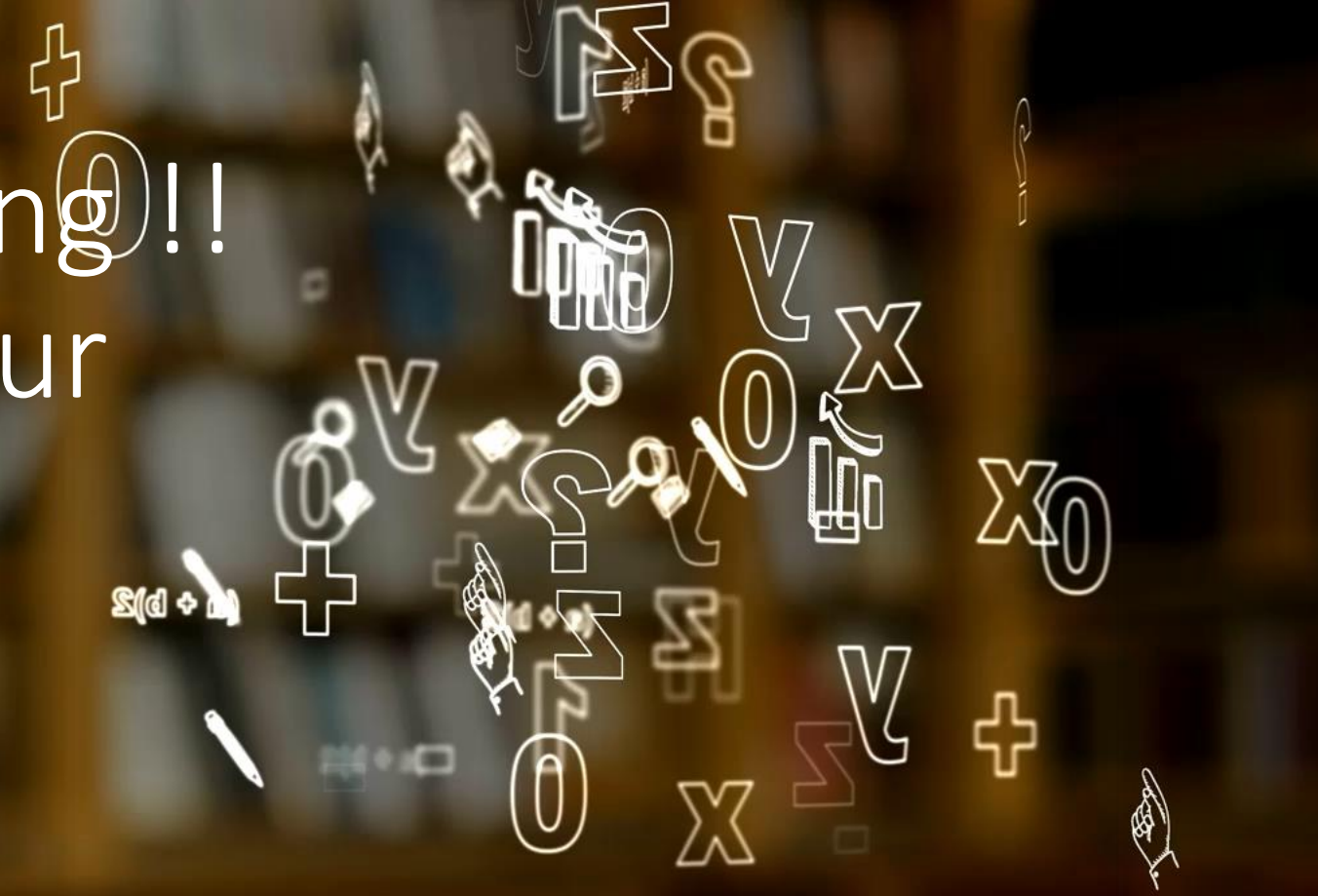
IMPORTANCE OF

APPROACHING GENERATIVE AI

WITH A COMMITMENT

TO ETHICAL PRACTICES

Happy Learning !!
Thanks for Your Patience ☺



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