

GENERATIVE AI WITH LARGE LANGUAGE MODELS INTRODUCTION

GEN IA IS DEVELOPING VERY FAST= THE FUTURE

HELLO FRIEND



WELCOME TO MY WORLD

AGENDA

Exploring the Impact of Generative AI in Real Word !

1

Introduction : Generative AI
with Large Language Models

2

Evolution of LLMs

3

How LLMs Work

4

Applications of LLMs

5

Ethical Considerations

6

Advantages and
Limitations

7

Future Potential & Public
Perception and Acceptance



Insilico Medicine



General Motors



Goldman Sachs



Google



Salesorce

Real-Life Examples of Businesses Employing Generative AI



Insilico Medicine



General Motors



Goldman Sachs



Google



Salesorce



Title: Definition of Generative IA

- GENERATIVE AI, ALSO KNOWN AS GENERATIVE INTELLIGENCE, IS A SUBSET OF ARTIFICIAL INTELLIGENCE (AI) FOCUSED ON GENERATING NEW AND ORIGINAL DATA OR CONTENT.
- IT LEVERAGES ADVANCED DEEP LEARNING ARCHITECTURES LIKE GENERATIVE ADVERSARIAL NETWORKS (GANs), AUTOREGRESSIVE MODELS, AND TRANSFORMERS.
- GENERATIVE AI MODELS ARE TRAINED ON EXISTING DATA TO LEARN PATTERNS AND THEN GENERATE NEW DATA INSTANCES SUCH AS IMAGES, TEXT, AUDIO, OR VIDEO THAT RESEMBLE THE PATTERNS OBSERVED IN THE TRAINING DATA.
- UNLIKE TRADITIONAL AI MODELS THAT FOCUS ON CLASSIFICATION OR PREDICTION TASKS, GENERATIVE AI IS CAPABLE OF CREATING DIVERSE AND REALISTIC OUTPUTS.
- IT FINDS APPLICATIONS IN VARIOUS DOMAINS INCLUDING IMAGE AND VIDEO SYNTHESIS, NATURAL LANGUAGE GENERATION, MUSIC COMPOSITION, AND CREATIVE DESIGN.

What is Generative AI?



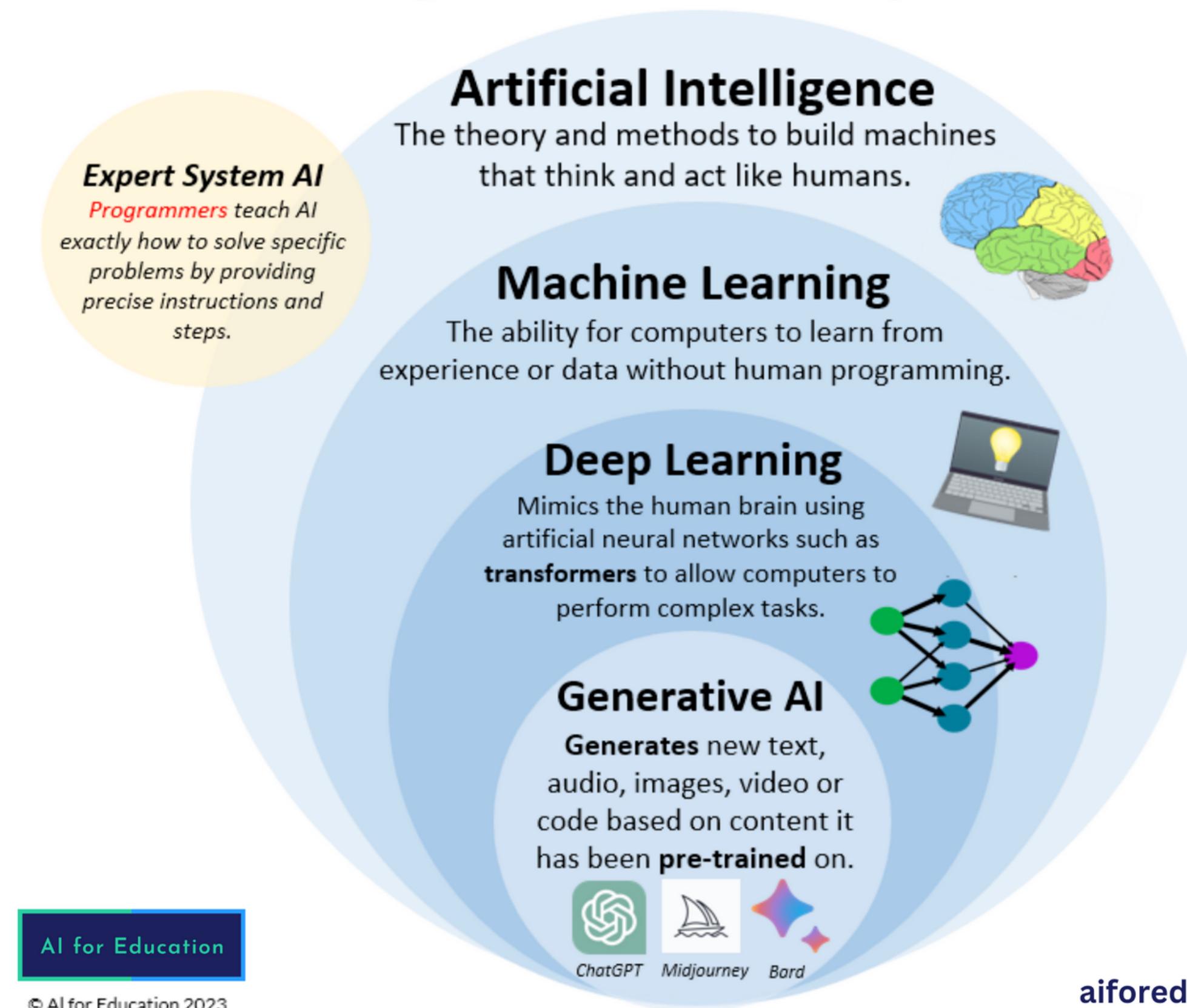
Generative artificial intelligence (AI) uses algorithms, such as neural networks, to generate new content or data based on patterns it learns from existing data, producing outputs that can closely mimic human-created content.

This image was created using a generative AI image platform with a simple prompt:

“Someone holding a sign saying AI”

Defining Generative AI

To understand generative artificial intelligence (GenAI), we first need to understand how the technology builds from each of the AI subcategories listed below.





Generative AI

Generative AI



GPT

Human-like language generation

DALL-E

Realistic image generation

Codex

Advanced code generation

Vision

Speech

Language

Decision

OpenAI Service

Cognitive Search

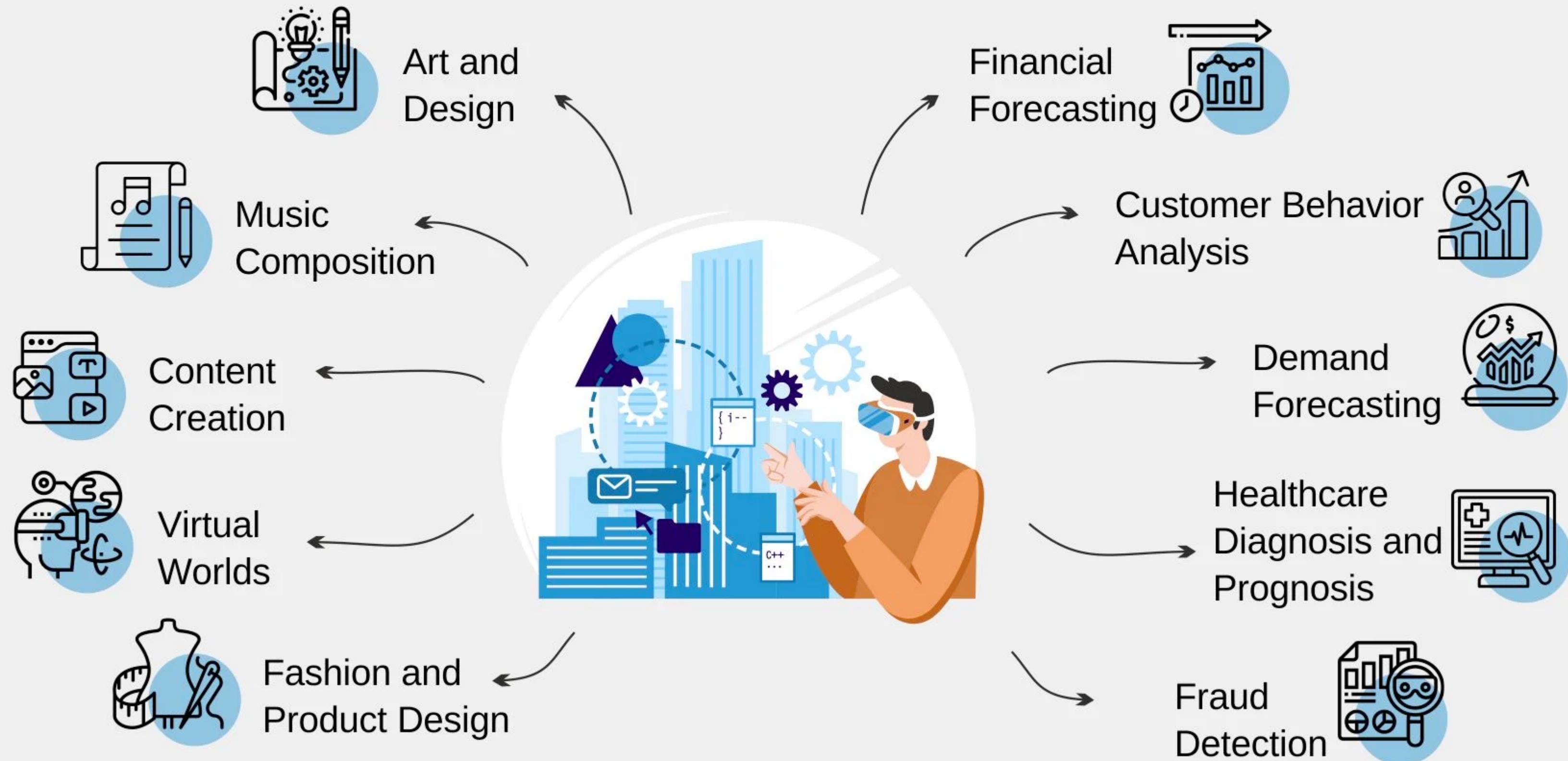
Form Recognizer

Immersive Reader

Bot Service

Video Analyzer

Generative AI Applications



5 Generative AI Use Cases Companies Can Implement Today

01

Build more efficient workflows for knowledge workers

02

Automate engineering and data processes

03

Democratize data with the rest of your company

04

Scale customer support

05

Support translation and language services

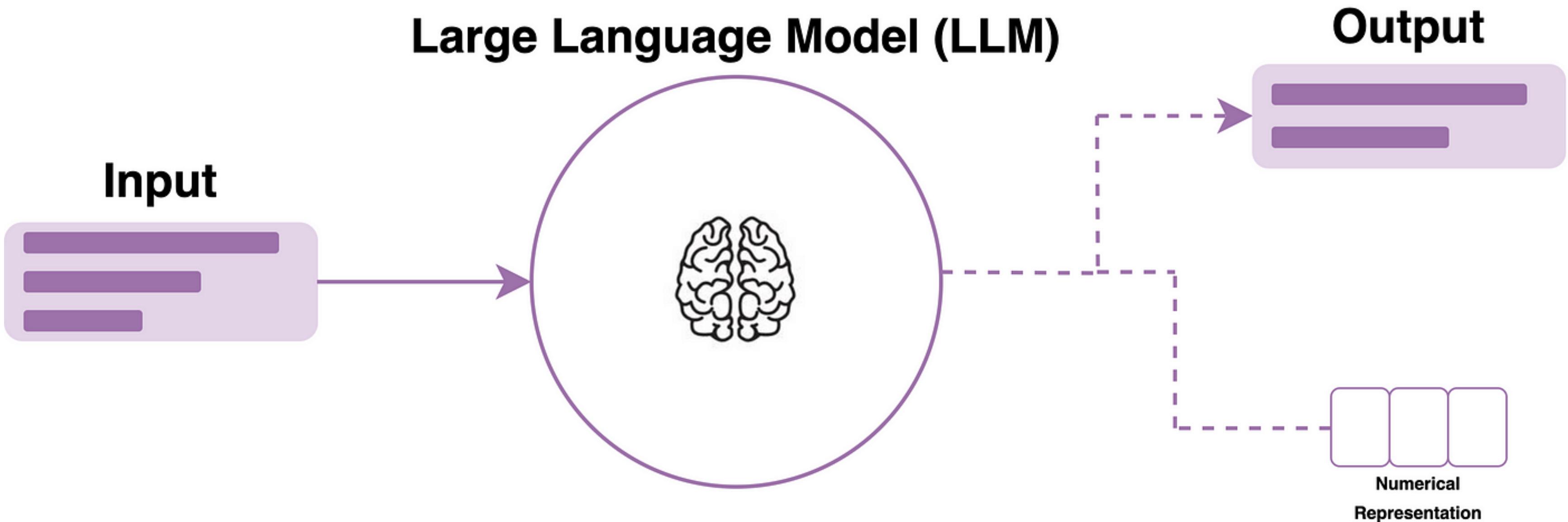
Introduction

Exploring the Impact of Advanced AI in Language Processing



- 1 Definition of Large Language Models (LLMs)
 - 2 Overview of their significance in AI development
 - 3 Importance of language comprehension in modern technology

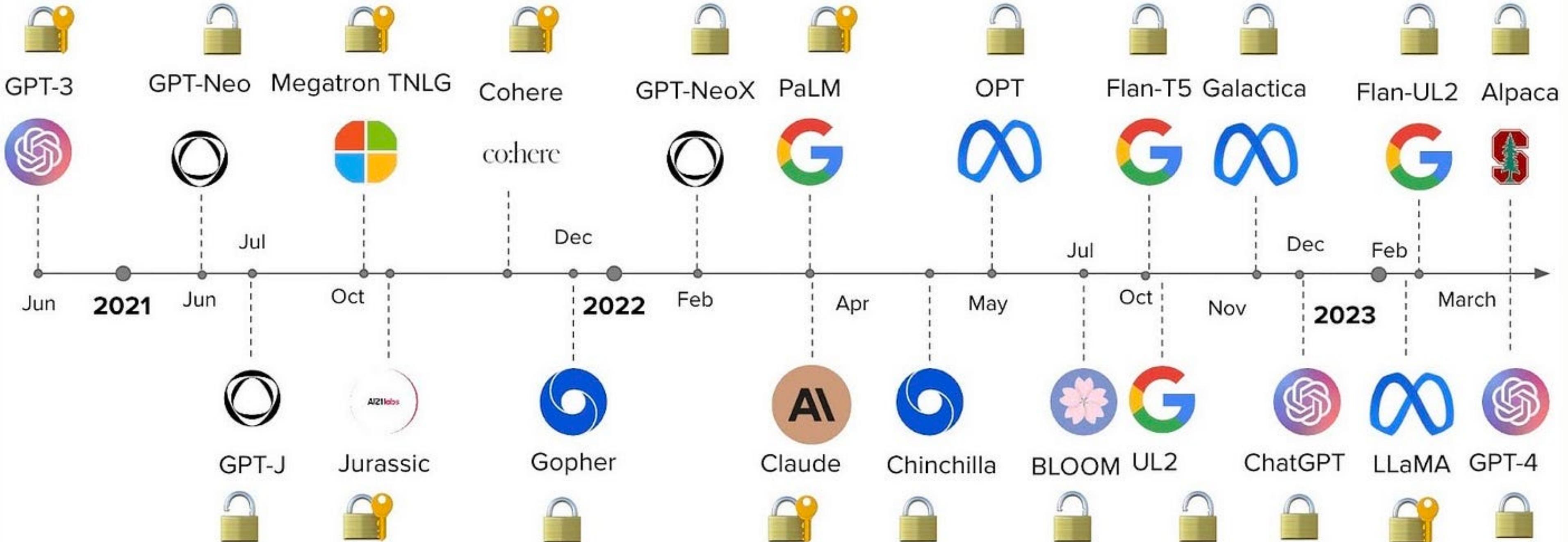
Large Language Model (LLM)





Title: Definition of Large Language Models (LLMs)

LARGE LANGUAGE MODELS (LLMs) REPRESENT A BREAKTHROUGH IN ARTIFICIAL INTELLIGENCE, ENCOMPASSING POWERFUL NEURAL NETWORKS TRAINED ON EXTENSIVE DATASETS. THESE MODELS, SUCH AS GPT (GENERATIVE PRE-TRAINED TRANSFORMER), ARE CAPABLE OF UNDERSTANDING, PROCESSING, AND GENERATING HUMAN-LIKE TEXT. THEY UTILIZE DEEP LEARNING TECHNIQUES AND MASSIVE AMOUNTS OF TEXT DATA TO COMPREHEND CONTEXT, STRUCTURE, AND LINGUISTIC PATTERNS.





Title: Overview of their Significance in AI Development

THE EMERGENCE OF LLMS SIGNIFIES A MONUMENTAL ADVANCEMENT IN AI DEVELOPMENT. THESE MODELS HAVE SHIFTED THE LANDSCAPE OF NATURAL LANGUAGE PROCESSING, ENABLING MACHINES TO COMPREHEND AND GENERATE LANGUAGE WITH IMPRESSIVE ACCURACY. THEY'VE REVOLUTIONIZED VARIOUS LANGUAGE-RELATED TASKS, INCLUDING TEXT GENERATION, TRANSLATION, SUMMARIZATION, AND SENTIMENT ANALYSIS. THEIR SIGNIFICANCE LIES IN THEIR ABILITY TO UNDERSTAND CONTEXT, NUANCES, AND COMPLEXITIES OF HUMAN LANGUAGE, MARKING A CRUCIAL MILESTONE IN AI EVOLUTION.

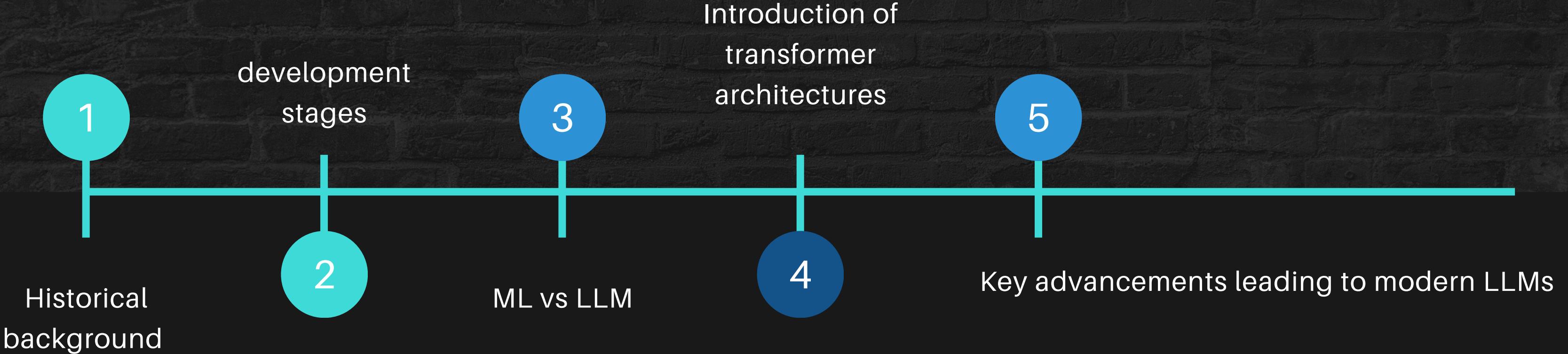


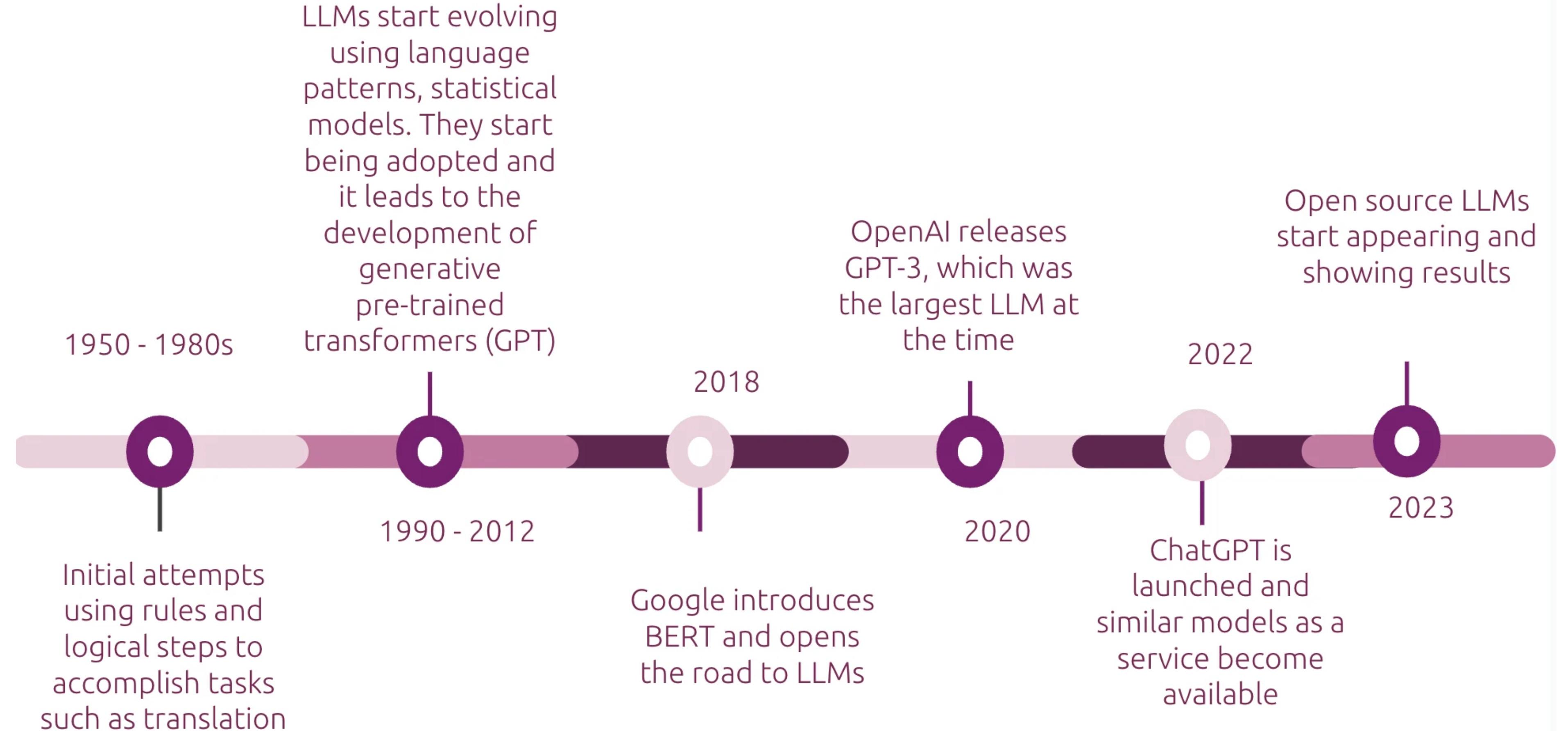
Title: Importance of Language Comprehension in Modern Technology

LANGUAGE COMPREHENSION HOLDS IMMENSE IMPORTANCE IN MODERN TECHNOLOGY. LLMS PLAY A PIVOTAL ROLE IN BRIDGING THE GAP BETWEEN HUMAN COMMUNICATION AND TECHNOLOGICAL INTERACTION. THEIR PROFICIENCY IN COMPREHENDING LANGUAGE NUANCES FACILITATES MORE INTUITIVE AND EFFECTIVE HUMAN-COMPUTER INTERACTIONS. THIS CAPABILITY ENHANCES USER EXPERIENCES ACROSS APPLICATIONS, FROM CHATBOTS AND VIRTUAL ASSISTANTS TO CONTENT CURATION AND INFORMATION RETRIEVAL SYSTEMS. LLMS SIGNIFICANTLY CONTRIBUTE TO MAKING TECHNOLOGY MORE ACCESSIBLE, EFFICIENT, AND USER-FRIENDLY IN OUR DIGITAL LANDSCAPE.

Evolution of LLMs

Exploring the Impact of Advanced AI in Language Processing



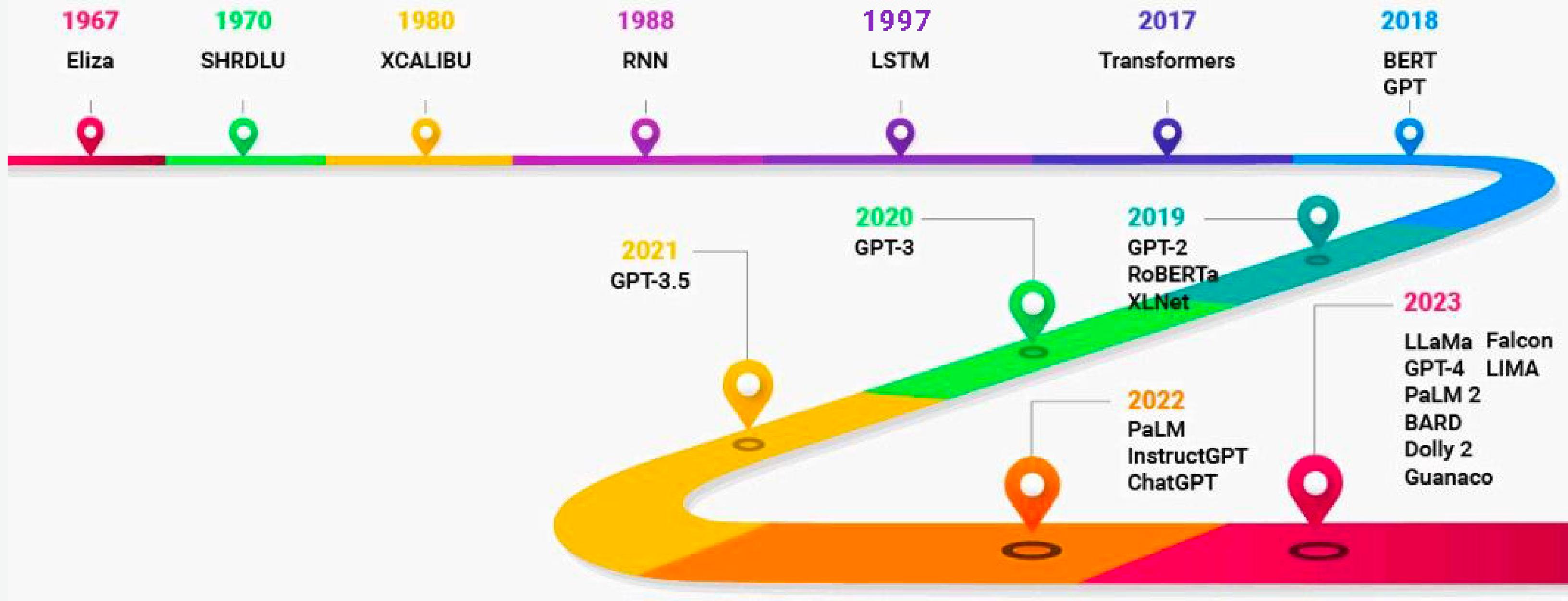




Title: Historical Background and Development Stages

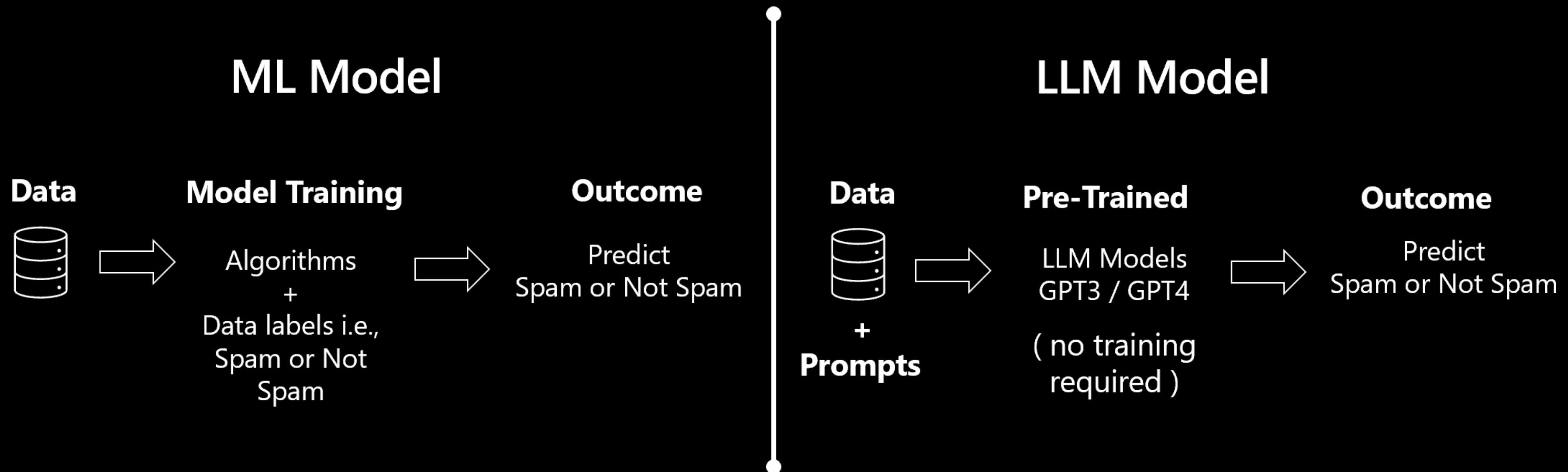
THE EVOLUTION OF LARGE LANGUAGE MODELS (LLMS) TRACES BACK TO EARLY DEVELOPMENTS IN ARTIFICIAL INTELLIGENCE AND NATURAL LANGUAGE PROCESSING. INITIAL STAGES INVOLVED FOUNDATIONAL RESEARCH IN MACHINE LEARNING AND LANGUAGE MODELING. OVER TIME, ADVANCEMENTS IN NEURAL NETWORK ARCHITECTURES PAVED THE WAY FOR MORE SOPHISTICATED MODELS CAPABLE OF HANDLING VAST AMOUNTS OF TEXTUAL DATA.

Evolution of Large Language Models

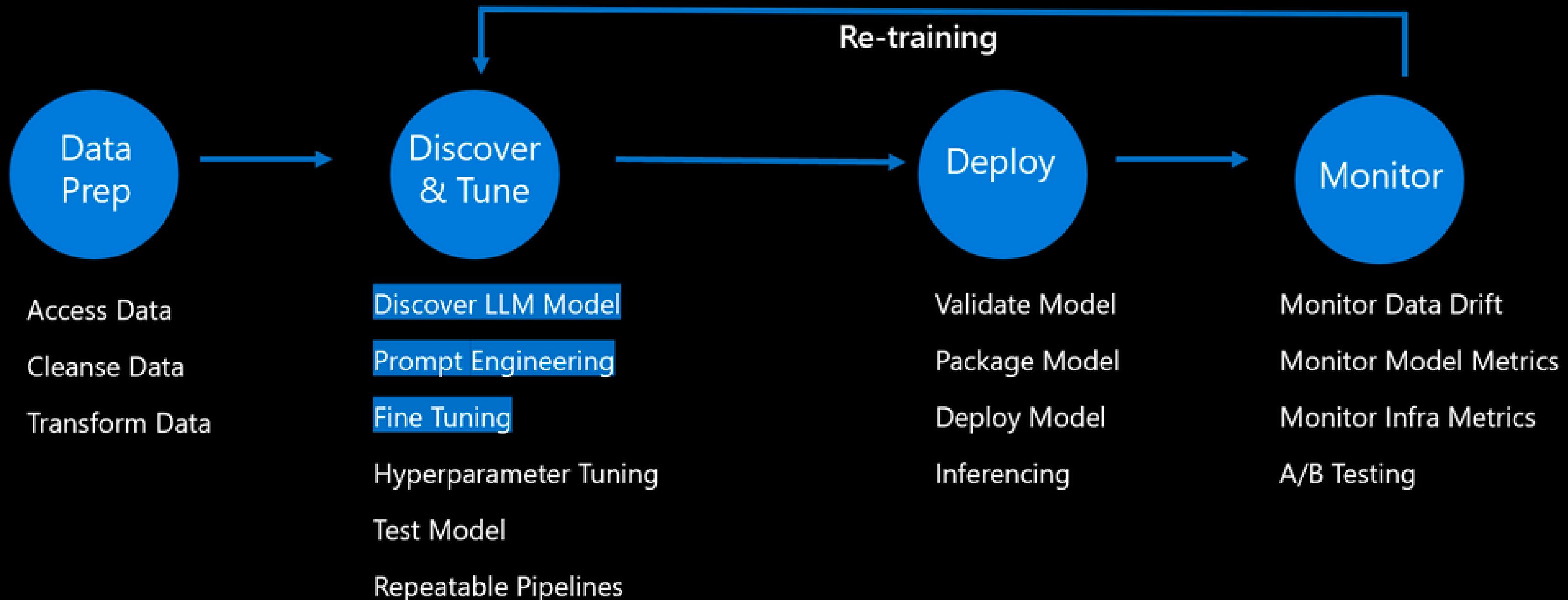


ML Model vs Large Language Model (LLM)

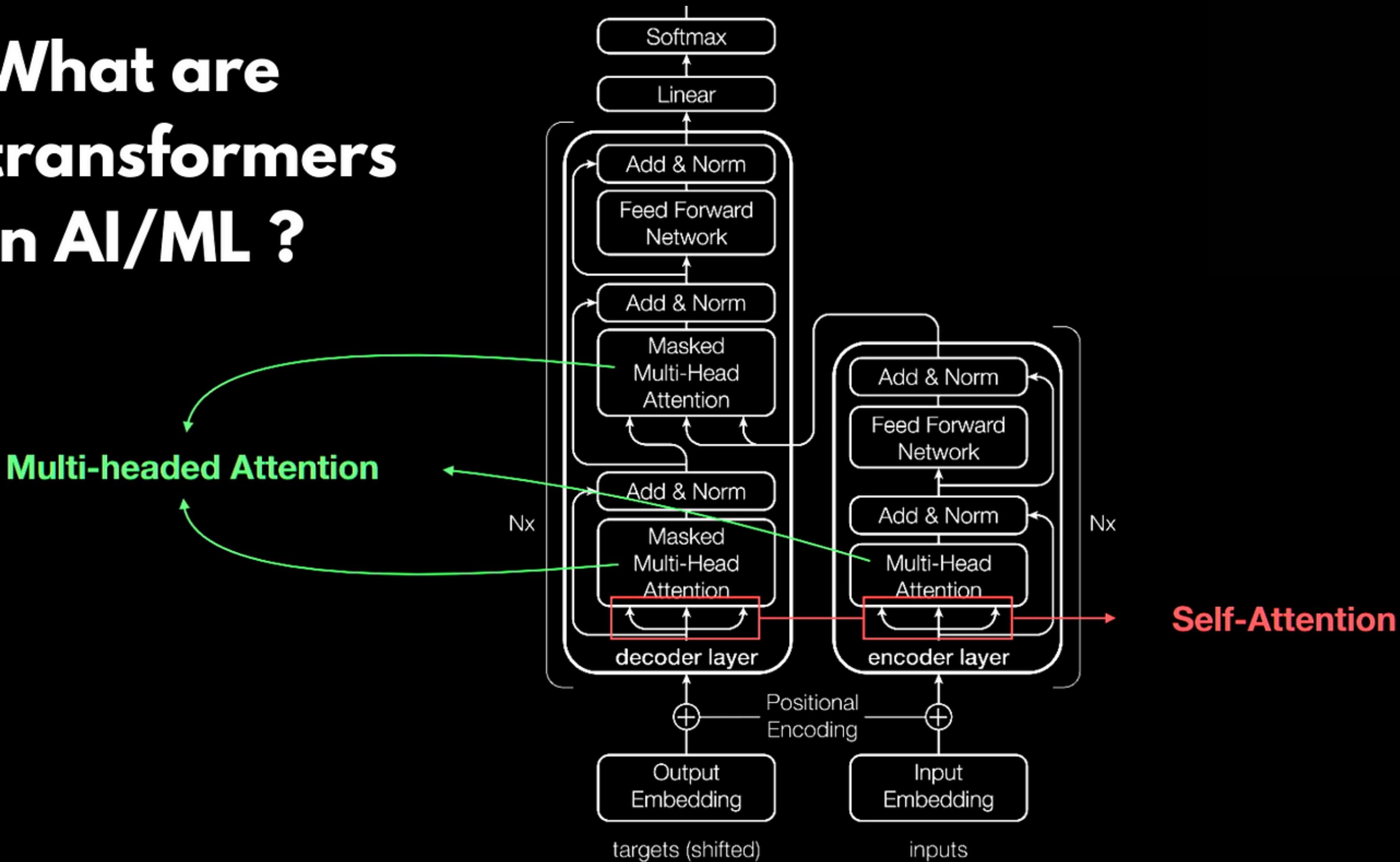
Example: How to detect spam Emails?



LLMs Lifecycle workflow in Azure



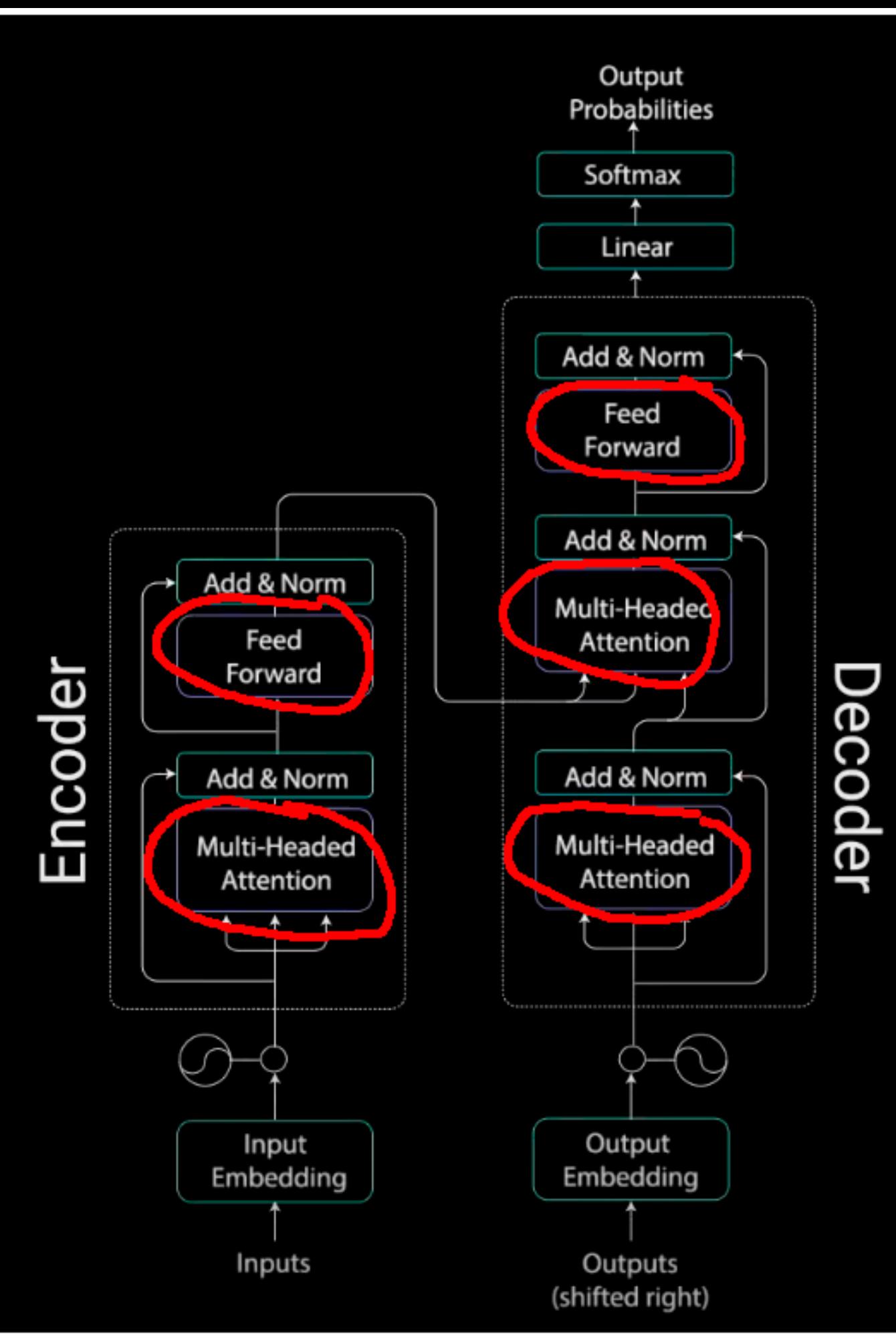
What are transformers in AI/ML ?

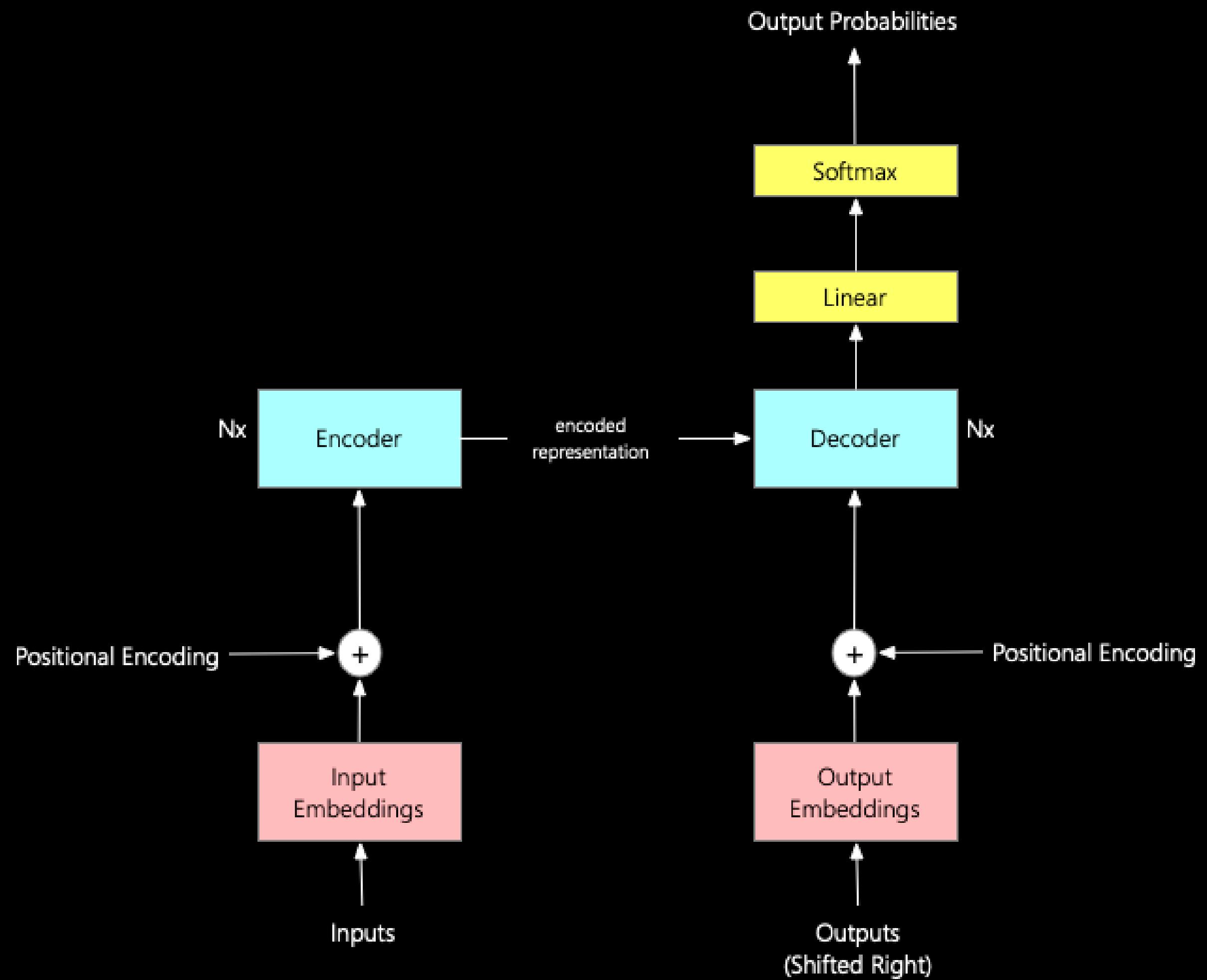




Title: Introduction of Transformer Architectures

A SIGNIFICANT TURNING POINT IN THE EVOLUTION OF LLMS WAS THE INTRODUCTION OF TRANSFORMER ARCHITECTURES. THIS INNOVATIVE FRAMEWORK, NOTABLY HIGHLIGHTED IN THE TRANSFORMER MODEL, REVOLUTIONIZED LANGUAGE PROCESSING BY ENABLING MORE EFFICIENT LEARNING OF CONTEXTUAL RELATIONSHIPS WITHIN TEXT. TRANSFORMERS, WITH THEIR ATTENTION MECHANISMS, FACILITATED PARALLEL COMPUTATION AND IMPROVED THE UNDERSTANDING OF LONG-RANGE DEPENDENCIES, LAYING THE GROUNDWORK FOR MORE COMPLEX AND EFFECTIVE LANGUAGE MODELS







Title: Key Advancements Leading to Modern LLMs

THE JOURNEY TOWARD MODERN LLMS HAS BEEN CHARACTERIZED BY PIVOTAL ADVANCEMENTS. THE REFINEMENT OF TRAINING TECHNIQUES, THE UTILIZATION OF LARGER AND MORE DIVERSE DATASETS, AND THE OPTIMIZATION OF MODEL ARCHITECTURES HAVE BEEN INSTRUMENTAL. BREAKTHROUGHS IN UNSUPERVISED PRE-TRAINING AND FINE-TUNING METHODOLOGIES HAVE SIGNIFICANTLY BOOSTED THE PERFORMANCE AND CAPABILITIES OF LLMS, ALLOWING FOR MORE ACCURATE LANGUAGE UNDERSTANDING, GENERATION, AND TASK-SPECIFIC ADAPTATIONS. THESE ADVANCEMENTS HAVE CULMINATED IN THE CREATION OF STATE-OF-THE-ART MODELS LIKE GPT-3, SHOWCASING UNPRECEDENTED LANGUAGE PROCESSING CAPABILITIES.

Transformer Architecture

A new powerful model architecture is released that is the basis for LLMs

GPT3

By scaling transformer models, special properties emerge such as few-shot learning. LLMs can be good at tasks without training.

ChatGPT

GPT-3.5 is trained with human feedback through reinforcement learning to achieve remarkable conversational abilities.

GPT4

Shows strong performance on human tests and sparks of AGI.

2017

2020

2022

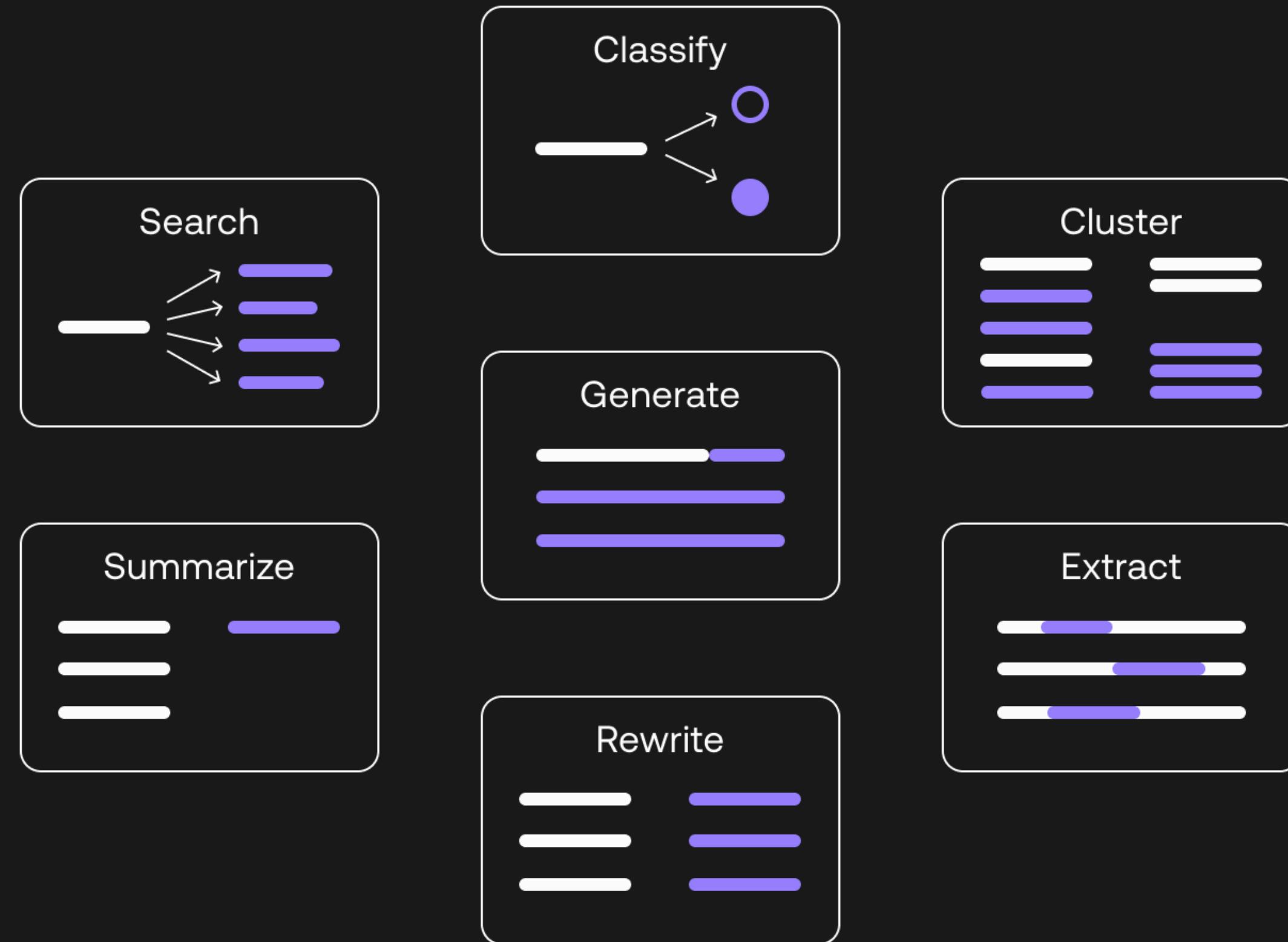
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Title: Explanation of the Functioning of LLMs

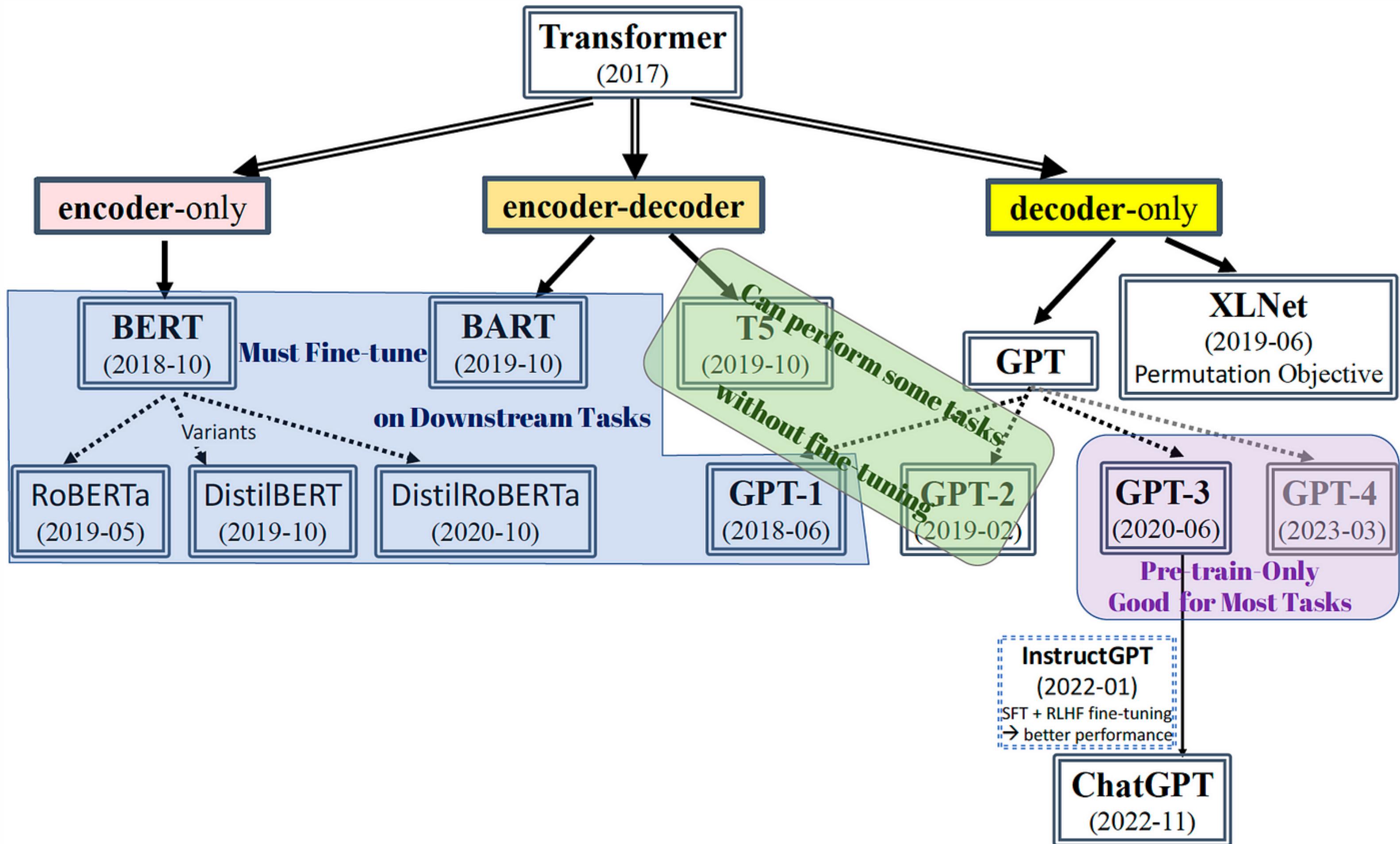
LARGE LANGUAGE MODELS (LLMs) OPERATE THROUGH COMPLEX NEURAL NETWORK ARCHITECTURES DESIGNED TO UNDERSTAND AND GENERATE HUMAN-LIKE TEXT. THESE MODELS LEVERAGE TRANSFORMER-BASED ARCHITECTURES, UTILIZING LAYERS OF NEURONS THAT PROCESS INPUT TEXT IN SEQUENTIAL STAGES. THROUGH A SERIES OF COMPUTATIONS AND TRANSFORMATIONS, LLMS INTERPRET THE CONTEXT, SEMANTICS, AND SYNTAX OF LANGUAGE, ENABLING THEM TO GENERATE COHERENT AND CONTEXTUALLY RELEVANT RESPONSES.

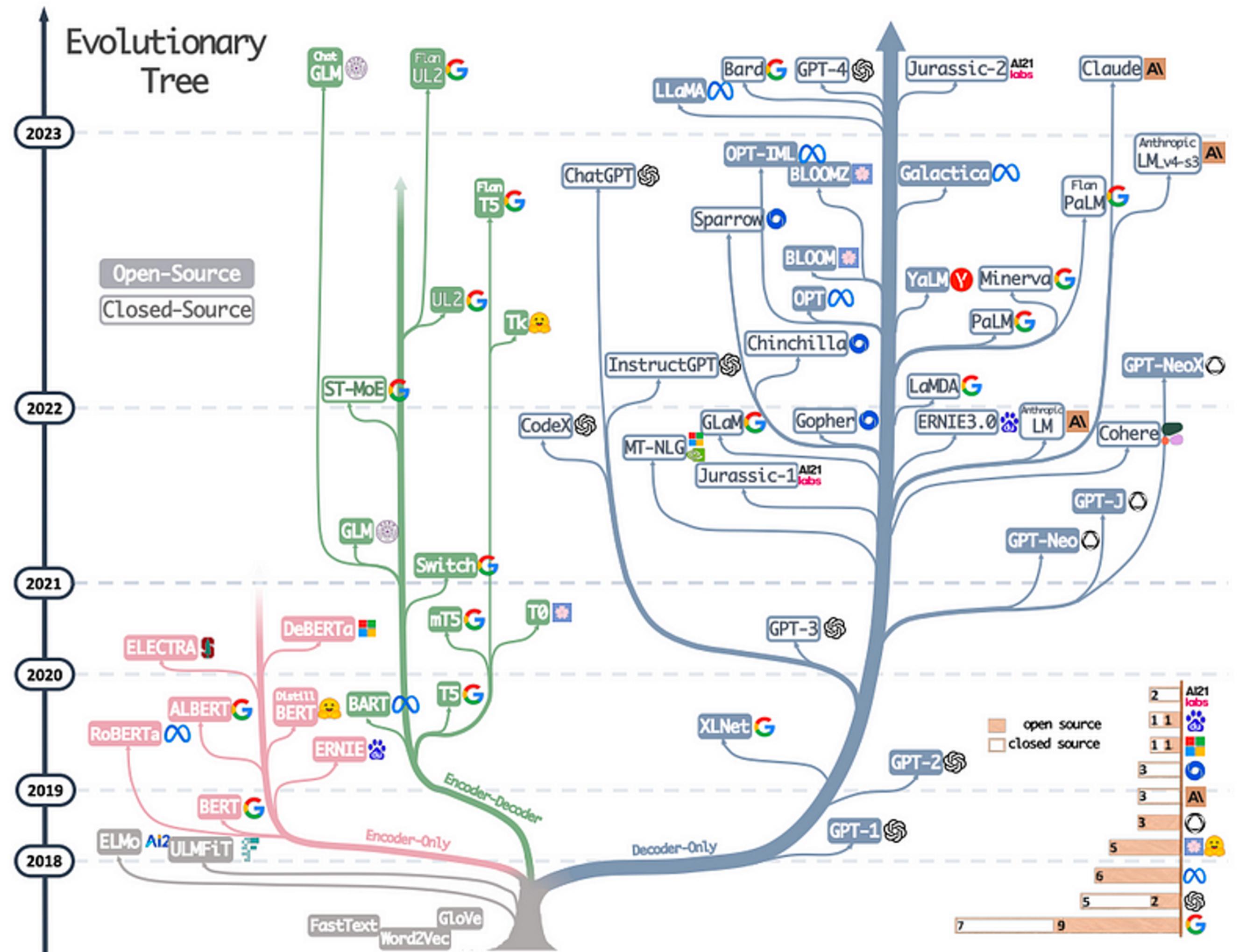




Title: Insight into Transformer Models and Their Mechanisms

AT THE CORE OF LLMS, TRANSFORMER MODELS EMPLOY ATTENTION MECHANISMS TO PROCESS INPUT DATA. THESE MECHANISMS ENABLE THE MODEL TO WEIGH AND PRIORITIZE DIFFERENT PARTS OF THE INPUT TEXT, FOCUSING ON CRUCIAL ELEMENTS WHILE CONSIDERING THE ENTIRE CONTEXT. BY ATTENDING TO RELEVANT SEGMENTS AND RELATIONSHIPS WITHIN THE TEXT, TRANSFORMERS CAN CAPTURE DEPENDENCIES, UNDERSTAND CONTEXT, AND GENERATE RESPONSES THAT ALIGN WITH THE INPUT CONTEXT, LEADING TO MORE COHERENT AND CONTEXTUALLY RELEVANT OUTPUTS.







Title: Role of Training Data in Model Comprehension

THE TRAINING DATA FORMS THE BEDROCK OF LLM COMPREHENSION. THESE MODELS ARE TRAINED ON VAST AND DIVERSE DATASETS COMPRISING TEXT FROM VARIOUS SOURCES, INCLUDING BOOKS, ARTICLES, WEBSITES, AND MORE. THE QUALITY, QUANTITY, AND DIVERSITY OF THIS TRAINING DATA SIGNIFICANTLY INFLUENCE THE MODEL'S LANGUAGE COMPREHENSION CAPABILITIES. THROUGH EXPOSURE TO DIVERSE LINGUISTIC PATTERNS AND CONTEXTS, LLMS LEARN TO RECOGNIZE AND REPLICATE LANGUAGE STRUCTURES, IMPROVING THEIR ABILITY TO UNDERSTAND AND GENERATE HUMAN-LIKE TEXT.

Applications of LLMs

Exploring the Impact of Advanced AI in Language Processing



1

These models are utilized in industries such as healthcare, finance, education, and entertainment, among others.



2

LLMs excel in various language-related tasks, including but not limited to text generation, translation, summarization, and sentiment analysis.



3

Impact on Customer Service, Content Creation, and Data Analysis



4

These capabilities have transformed how information is processed, shared, and understood across different languages and contexts.



5

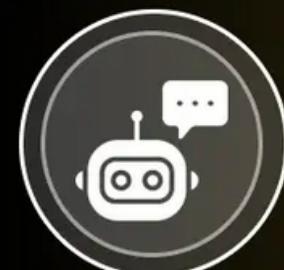
Large Language Models (LLMs) have found widespread applications across numerous fields due to their versatile language processing capabilities.



Text to Text



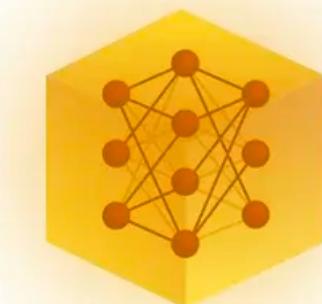
Image to Text



Chatbots



Data Cleaning



Popular LLM
Applications



Speech to Text



Code Generation



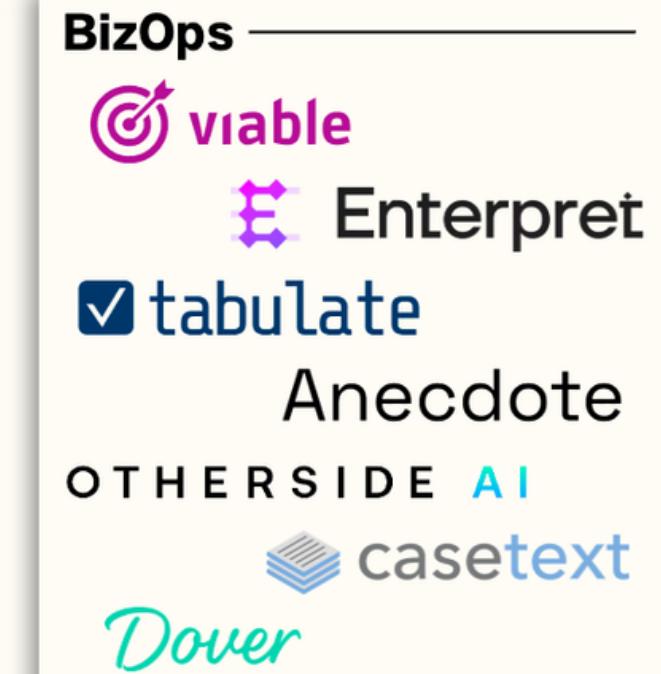
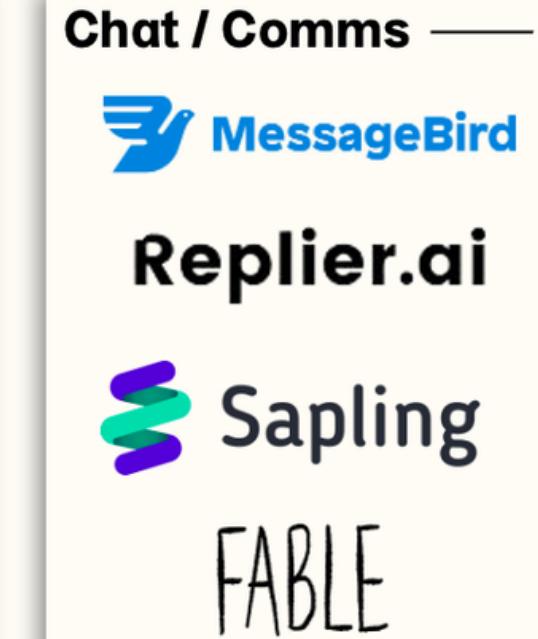
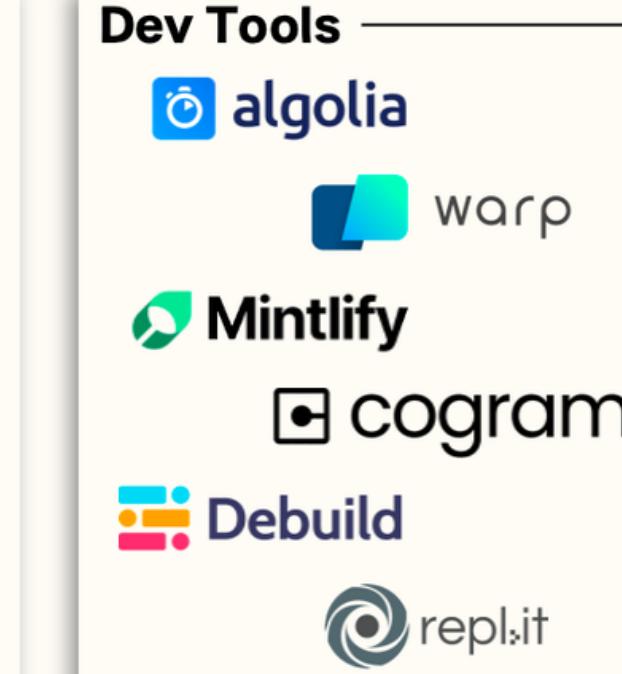
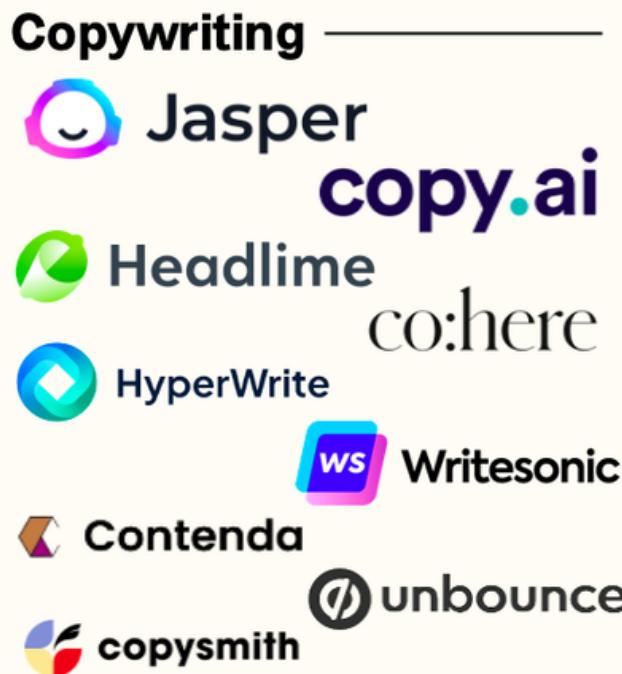
Sentiment Analysis



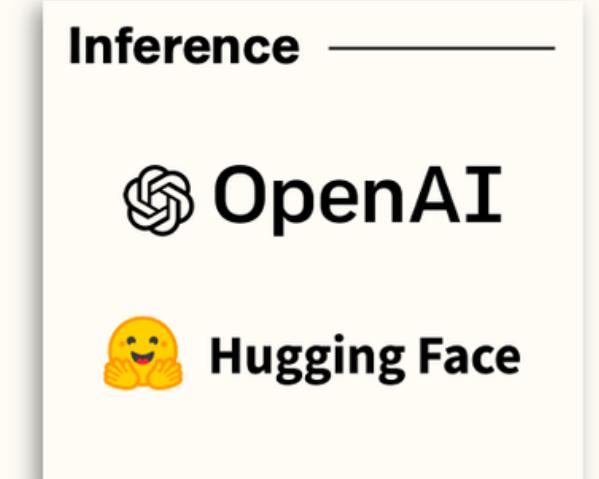
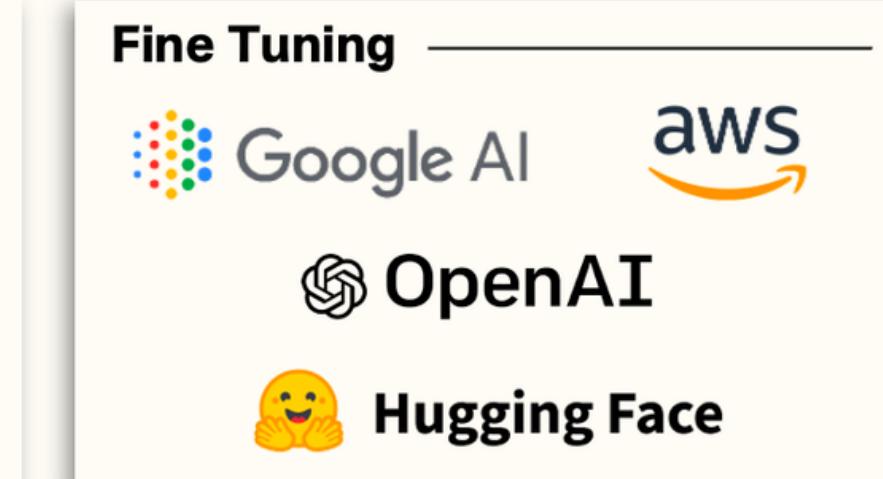
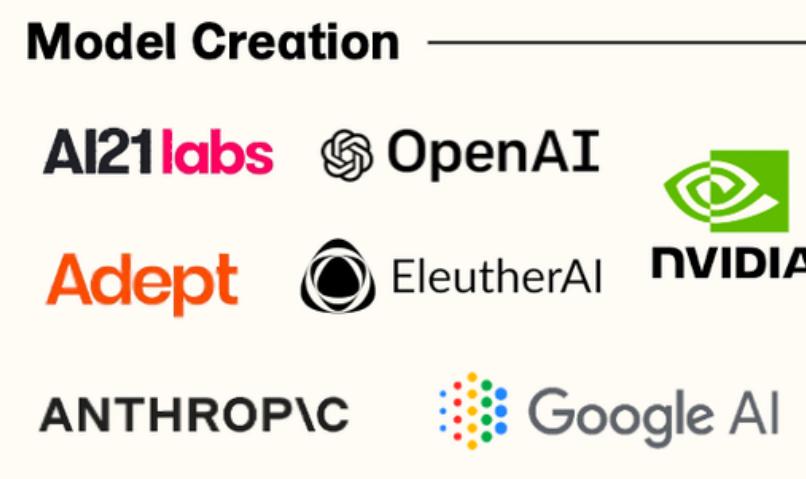
Anomaly Detection

BCV

Application Layer



Infrastructure Layer



“It’s not enough to just scrub the internet to train LLM. Quality data counts — we all are going back to his truth.”



THOMAS WOLF
Co-founder and chief
science officer

Source: Paul Byer's GAI Insights: Top 23 Quotes from Another Great AI Conference at MIT. LinkedIn. 2023. <https://www.linkedin.com/pulse/top-23-quotes-from-another-great-ai-conference-mit-paul-baier/>. Accessed July 2023.

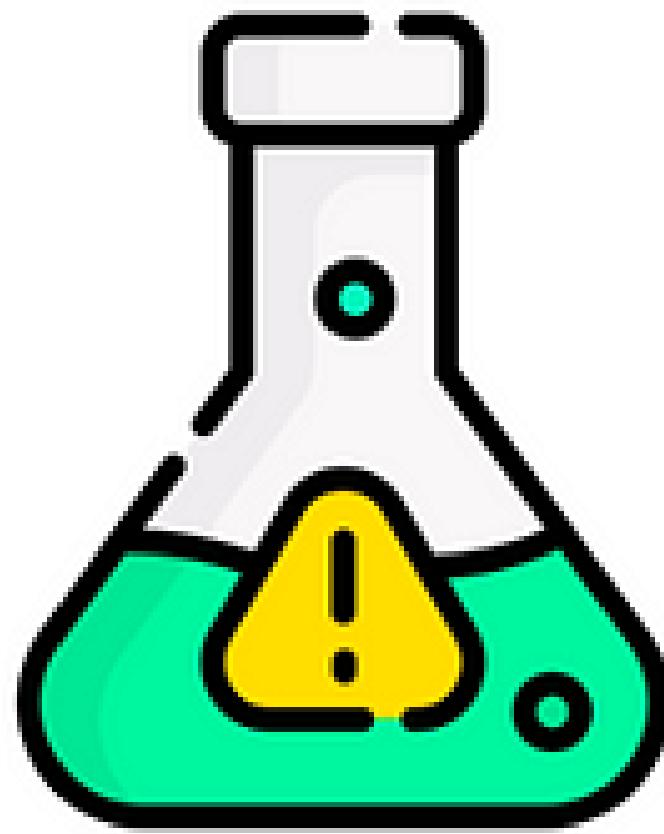


Hugging Face



Title: Ethical Challenges Associated with LLMs

THE INTEGRATION OF LARGE LANGUAGE MODELS (LLMs) INTO VARIOUS APPLICATIONS RAISES SIGNIFICANT ETHICAL CONCERNS. THESE MODELS, WHILE POWERFUL IN LANGUAGE PROCESSING, ARE SUSCEPTIBLE TO INHERENT BIASES PRESENT IN THE TRAINING DATA. BIASES, BOTH SOCIETAL AND LINGUISTIC, CAN PERPETUATE AND AMPLIFY EXISTING INEQUALITIES, LEADING TO BIASED OUTPUTS OR DISCRIMINATORY LANGUAGE PATTERNS IN GENERATED TEXT. ADDITIONALLY, CONCERNS ARISE REGARDING THE ETHICAL RESPONSIBILITY OF THOSE DEPLOYING THESE MODELS IN VARIOUS APPLICATIONS.



Toxicity

Harmful or discriminatory language or content



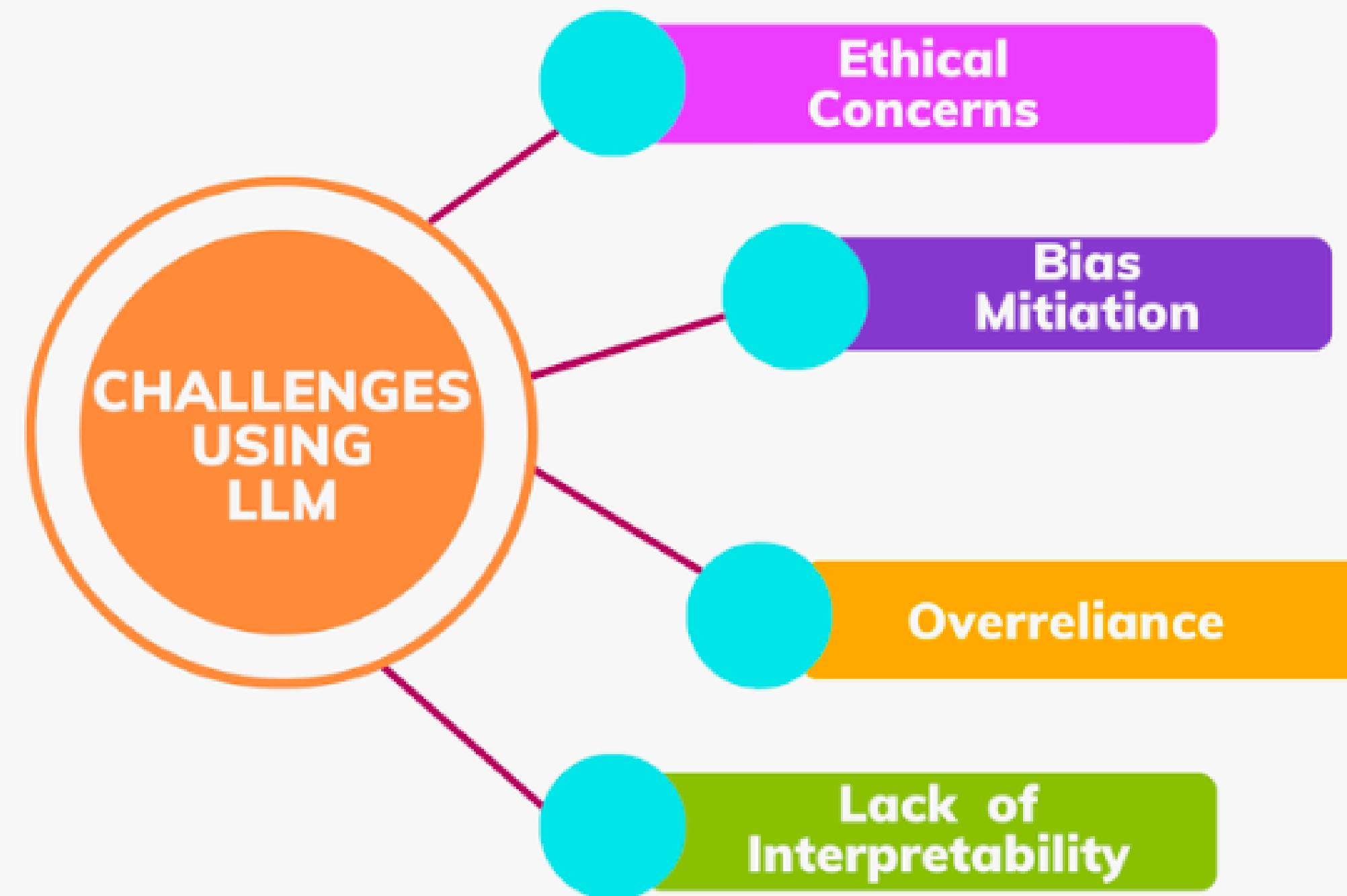
Hallucination

Factually incorrect content



Legal Aspects

Data Protection, Intellectual Property, and the EU AI Act



Data Privacy

Lack of Repeatability

Model Transparency

Model Versioning

Model Size

Prompt Engineering

Cost

Throttling

Accuracy

Customizability

Latency

Ethics

Terms of Service

Logging Personal Information

Prototype vs Production



Challenges and Limitations of LLMs

Computational Resources

Data Bias and Fairness

Ethical Use and Misinformation

Contextual Understanding
and Common Sense Reasoning

Explainability and Interpretability

Data Privacy and Security

Environmental Impact

Adaptability to
New Domains and Tasks

**For any further inquiries or collaborations, please
feel free to reach out:**



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A photograph of a man with curly hair and a beard, wearing a dark suit and tie, standing outdoors. He is smiling and has his arms outstretched to the sides. The background is a bright, slightly overexposed outdoor scene with yellow and orange tones.

THANK YOU FOR YOUR ATTENTION