



Engineering Institute of Technology.

Getting Job-Ready with AI – An Engineering Focus

12 October 2023

[Watch Webinar Recording Here](#)

About EIT

We are dedicated to ensuring that you receive a world-class education and gain skills that you can immediately implement in the workforce.



World-Class Australia Accredited Education

Our vocational programs and higher education degrees are registered and accredited by the Australian Government. We have programs that are also recognized under three international engineering accords.



Engineering Specialists

EIT is one of the only institutes in the world specializing in Engineering. We deliver professional certificates, diplomas, advanced diplomas, undergraduate and graduate certificates, bachelor's and master's degrees, and a Doctorate of Engineering.



Industry Experienced Lecturers

Our lecturers are highly experienced engineers and subject specialists with applied knowledge. The technologies employed by EIT, both online and on-campus, enable us to source our lecturers from a large, global pool of expertise.



Industry Oriented Programs

Our programs are designed by industry experts, ensuring you graduate with cutting-edge skills that are valued by employers. Our program content remains current with rapidly changing technology and industry developments.



Unique Delivery Model

We deliver our programs via a unique delivery methodology that makes use of live and interactive webinars, an international pool of expert lecturers, dedicated learning support officers, and state-of-the-art such as hands-on workshops, remote laboratories, and simulation software.

Discover Why Students Choose EIT



Quality of educational experience for
Undergraduate Engineering Programs in Australia
2019/2020 and 2020/2021



Quality of educational experience for
Postgraduate Engineering Programs in Australia
2019/2020 and 2020/2021



Student Support for Undergraduate and
Postgraduate Engineering Programs in Australia
2020/2021



Teaching Quality for Undergraduate and
Postgraduate Engineering Programs in Australia
2020/2021

Presenter – Kasey Martin

Special Projects Lead – EIT



Special Projects Lead – EIT

- 10+ years in the tech industry
- 4 years of experience in Geospatial Engineering
- 5 years of working with EIT – NLP, Computer vision, data analysis, cloud computing and cybersecurity
- A life-long learner and tinkerer of all things tech and engineering

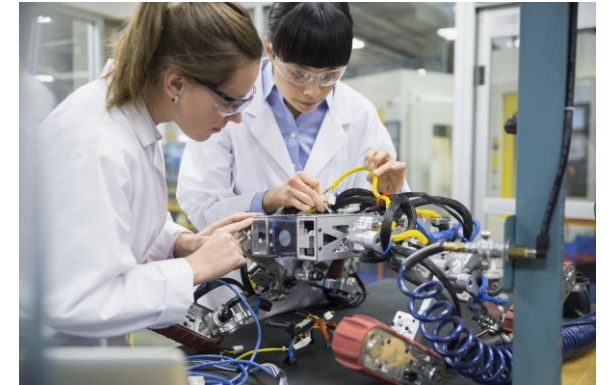
Getting Job Ready With AI

AGENDA

1	Introduction: AI and Engineering
2	Preparing for the Future
3	Skills for Engineers in the AI Age
4	Ethics and Responsibilities in AI
5	Careers in AI and Engineering
6	Key Takeaways

Introduction: AI and engineering

- Changing landscape of engineering
- AI applications in engineering



2. Preparing for the Future

- Future Outlook



- Challenges and Risks

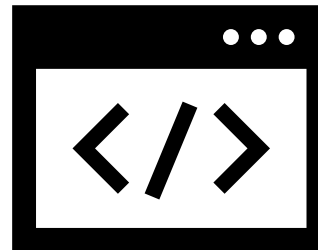


3. Skills for engineers in the AI Age

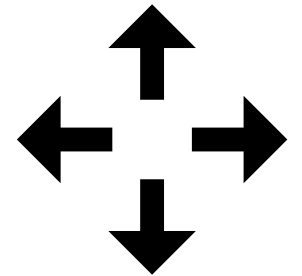
- Data literacy



- Programming Proficiency



- Adaptability



"As computing power gets cheaper, GPT's ability to express ideas will increasingly be like having a white-collar worker available to help you with various tasks."

- Bill Gates

Doverayay
No **PROVERYAY**

- *Russian Proverb*

Trust But **VERIFY**

- *Russian Proverb*

Ethics and Responsibilities in AI

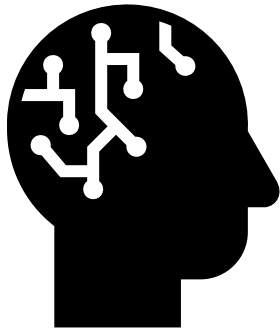
- Fairness and non-discrimination
- Accountability and Transparency
- Regulatory Compliance

Careers in AI and Engineering

- Data scientist
- AI engineer
- Robotics engineer
- AI product manager

Key Takeaways

- AI IS (PROBABLY)
HERE TO STAY



- USE AI
RESPONSIBLY



- KEEP YOURSELF
RELEVANT



Presenter – Nikka Boquio

AI Developer - EIT



- 5 years of experience in AI & ML – Deep Learning, NLP, Computer vision
- 3 years of experience as University Researcher – specializing on ML, cloud computing
- Contributor to AI literature – ML paper publications
- AI Developer at EIT – AI projects, data analysis & visualization
- Enthusiastic learner curious about the intricacies (and endless possibilities) of AI and machine learning

AGENDA

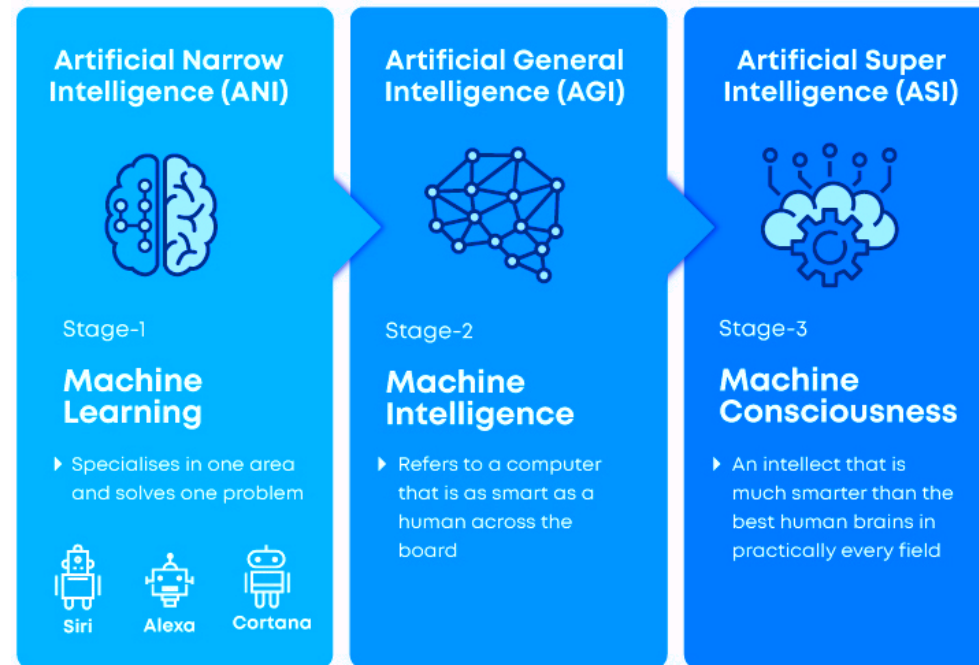
1	Understanding the Basics of AI
2	AI Engineering Toolkit
3	Practical AI Applications in Engineering Fields
4	The Future of AI in Engineering
5	Tips and Recommendations

Understanding the Basics of AI



Artificial Intelligence

The broad science of mimicking human abilities



<https://www.mygreatlearning.com/blog/what-is-artificial-intelligence/>

Understanding the Basics of AI

Understanding AI



Learning
from
experience



Reasoning and
problem-
solving



Perception



Natural
Language
Understanding



Knowledge
Representation

Understanding the Basics of AI

AI Statistics



92%

companies seeing **returns** on their AI investments



80%

CEOs intend to **incorporate** AI technologies within 2 years



81%

employees believe AI **enhances** their overall performance at **work**



64%

Business expect AI to **increase** productivity

<https://juliety.com/ai-statistics> - Updated Sept 2023

<https://www.forbes.com/advisor/business/ai-statistics/>

Understanding the Basics of AI

The AI Job Market

AI is expected to **destroy** more than **85 million jobs** by 2025

AI will **create** more than **97 million new jobs** by 2025.

percentage of jobs **requiring AI skills** had **increased** since 2014. (AI Index 2023 Annual Report by Stanford University)

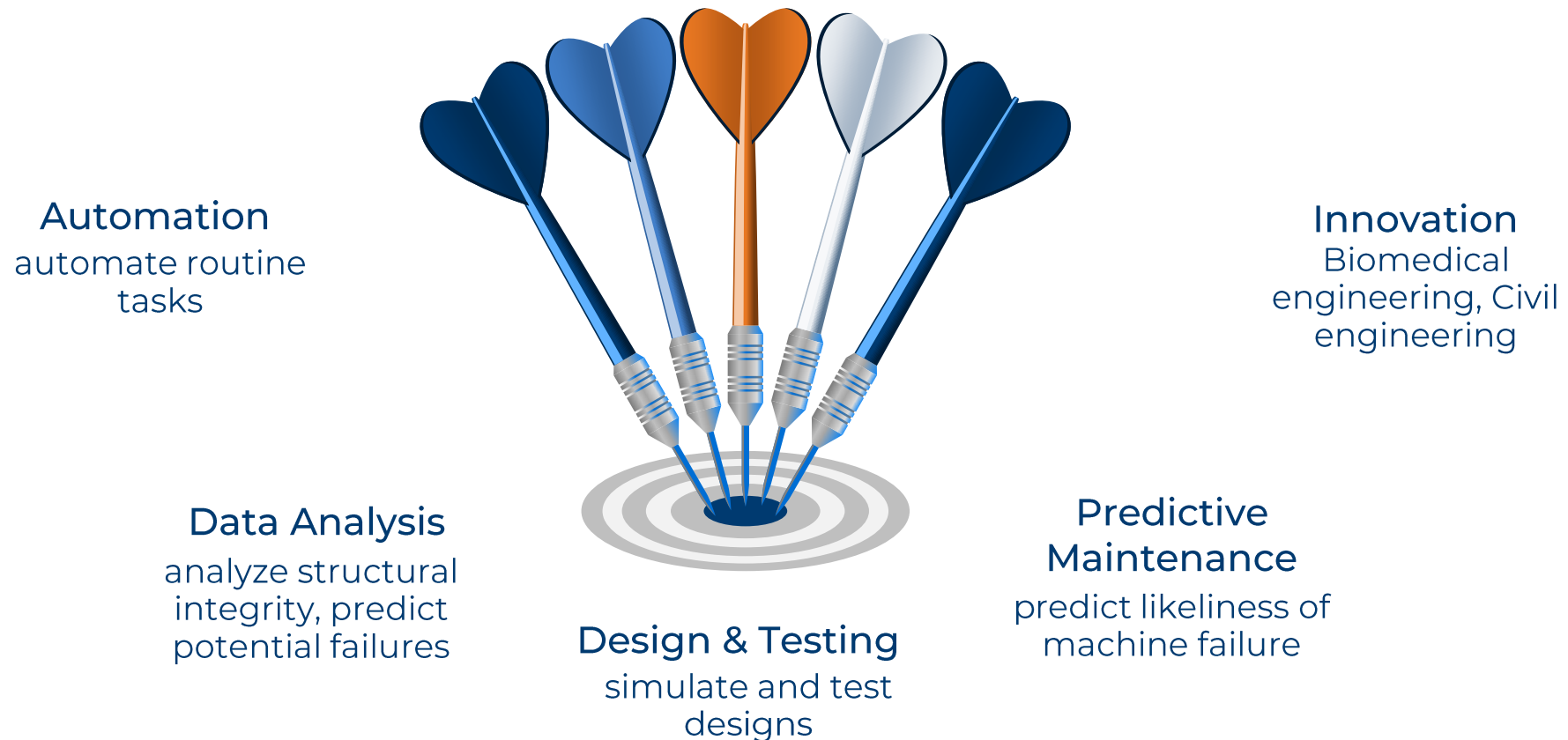
<https://findweb3.com/posts/ai-statistics>

<https://www.techopedia.com/artificial-intelligence-statistics>



Understanding the Basics of AI

AI's Impact on Engineering Job Market



**“AI won’t replace engineers, engineers
using AI will ”**

- Dr. Richard Ahlfeld, CEO and Founder of
Monolith

Subfields of AI

Artificial Intelligence (AI)

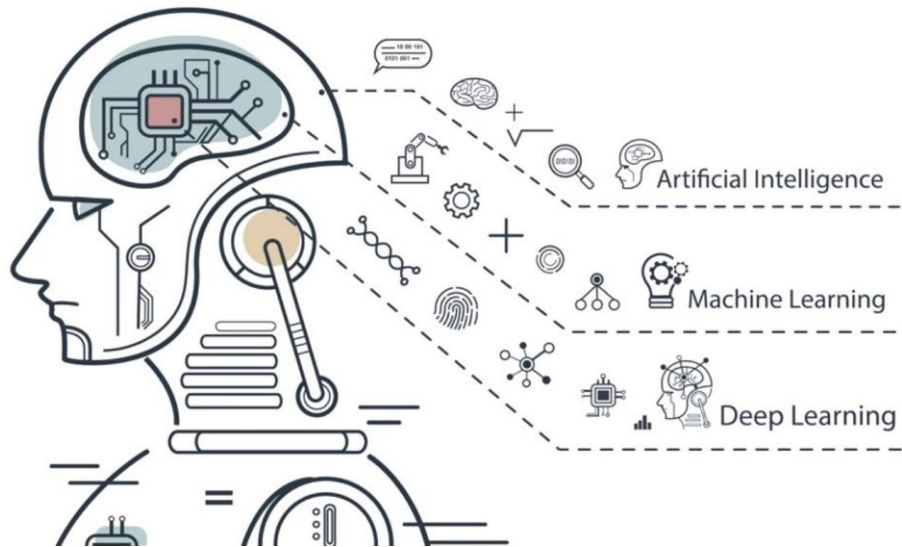
- Any problem-solving techniques that **mimic human abilities**

Machine Learning (ML)

- Techniques that allow **learning** from data without providing exact algorithm

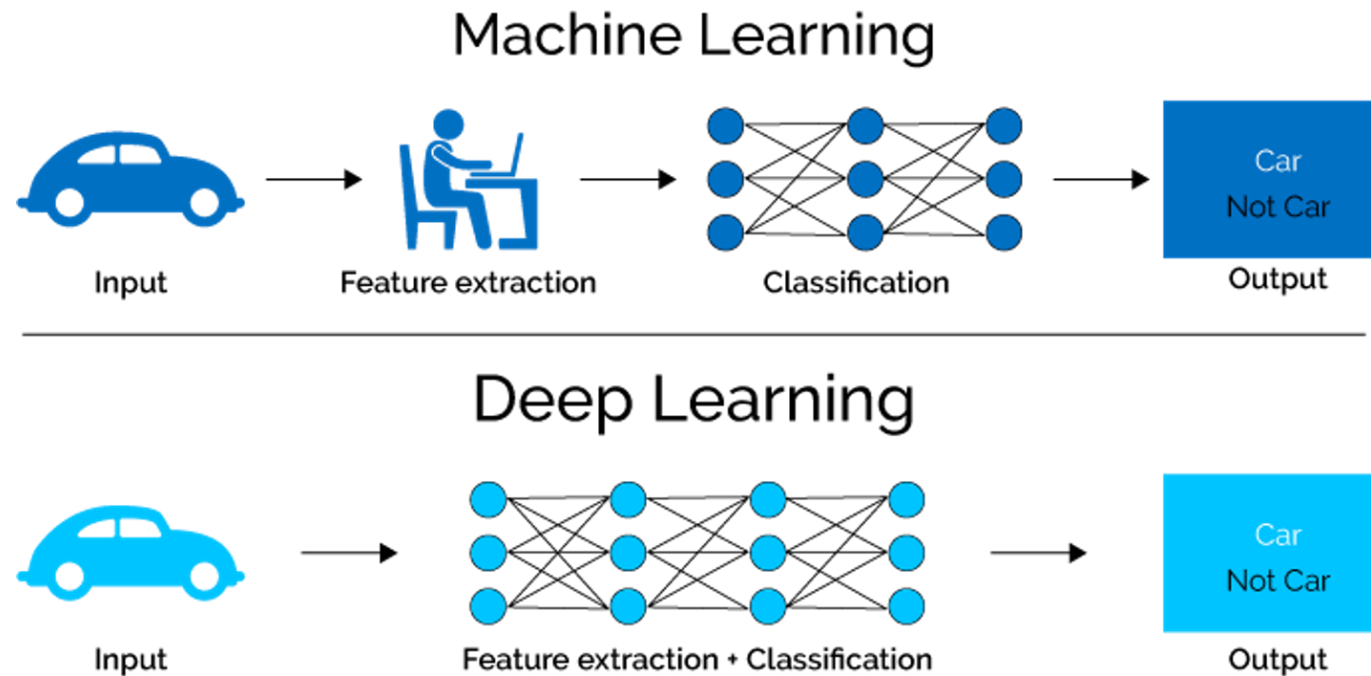
Deep Learning (DL)

- Uses **deep** artificial neural networks to learn data representations



Understanding the Basics of AI

Traditional ML vs DL



AI Engineering Toolkit

Techniques

Mathematics & Statistics

Programming

Data Structures & Algorithms

Data Preprocessing

Machine Learning/Deep Learning



Tools

Programming Languages

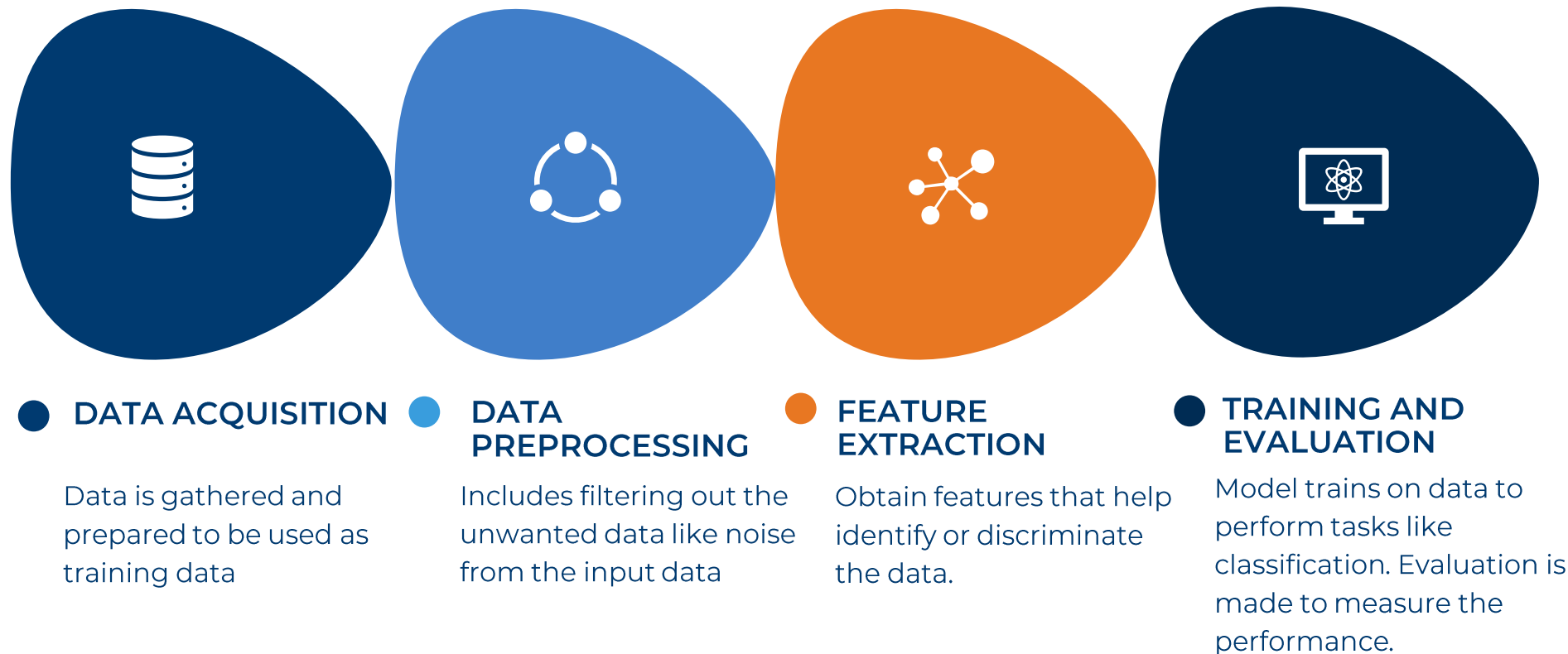
ML/DL Frameworks & Libraries

Big Data Technologies

Cloud Computing

Data Visualization Tools

Machine Learning Process



Machine Learning Methods

Supervised Learning

need human-annotated data or data with **labels**

Semi-supervised Learning

uses **both** labeled and unlabeled data for training

Unsupervised Learning

looks for patterns in **unlabeled** data

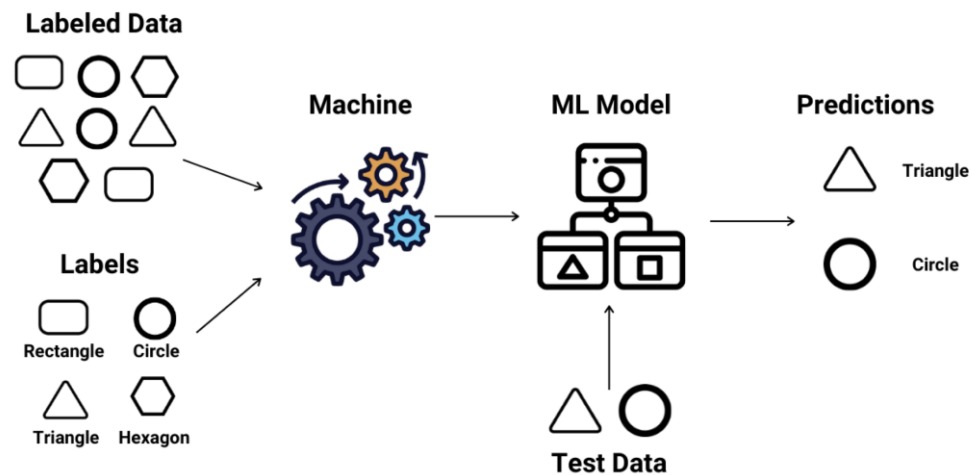
Reinforcement Learning

uses **trial** and **error** so machines take the best action by establishing a **reward** system

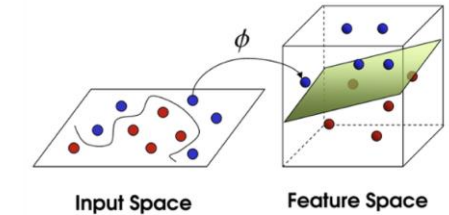
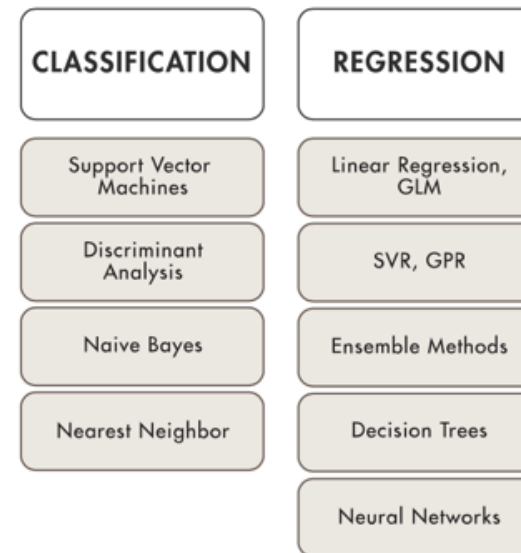


AI Engineering Toolkit

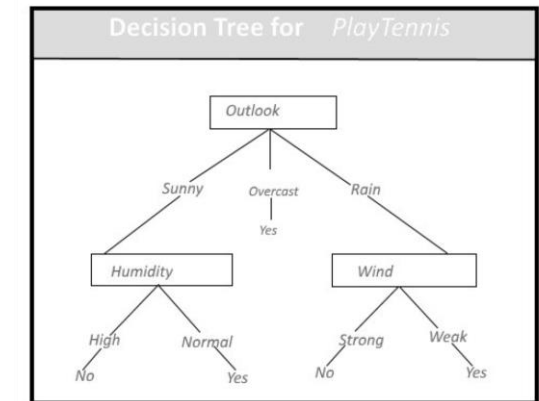
Supervised Learning



<https://medium.com/enjoy-algorithm/supervised-unsupervised-and-semi-supervised-learning-64ee79b17d10>



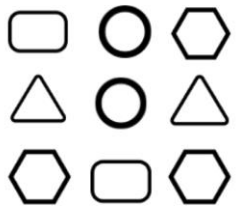
SVM



Decision tree

Unsupervised Learning

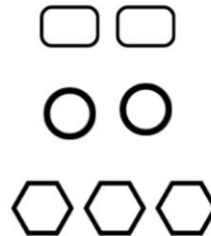
Unlabelled Data



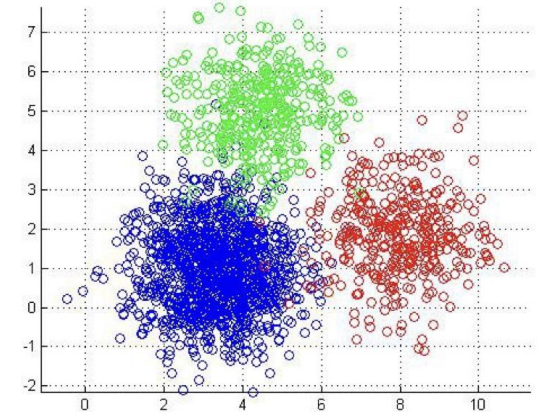
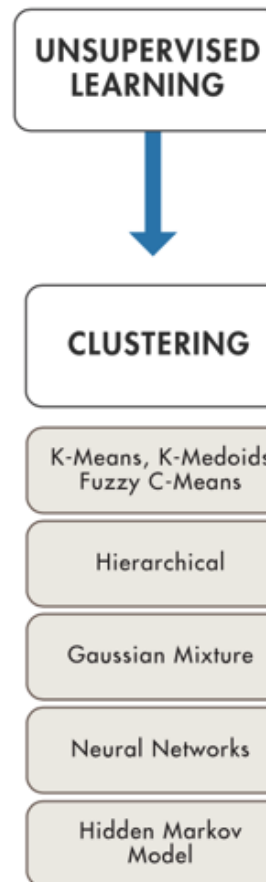
Machine



Results

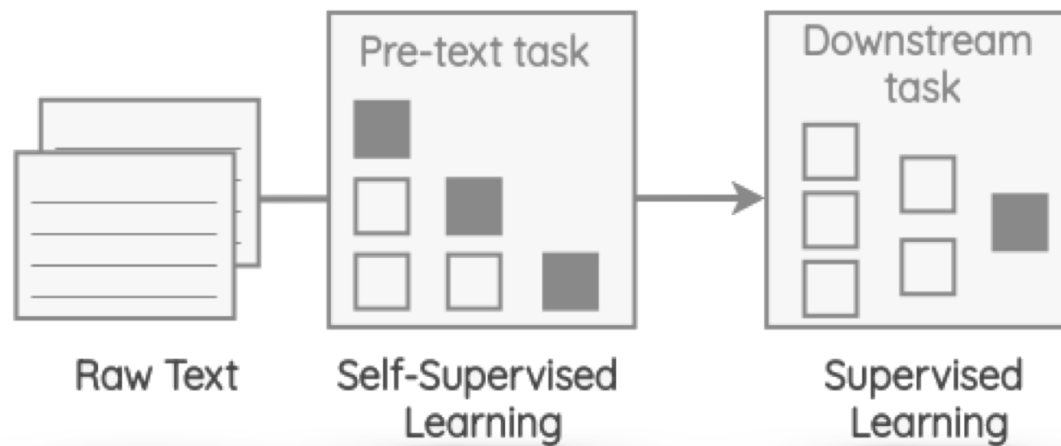


<https://medium.com/enjoy-algorithm/supervised-unsupervised-and-semi-supervised-learning-64ee79b17d10>



K-means clustering

Self-supervised Learning



<https://amitniss.com/2020/05/self-supervised-learning-nlp/>

Randomly masked: A quick [MASK] fox jumps over the [MASK] dog
↓
Predict: A quick brown fox jumps over the lazy dog

Masked Language Modeling

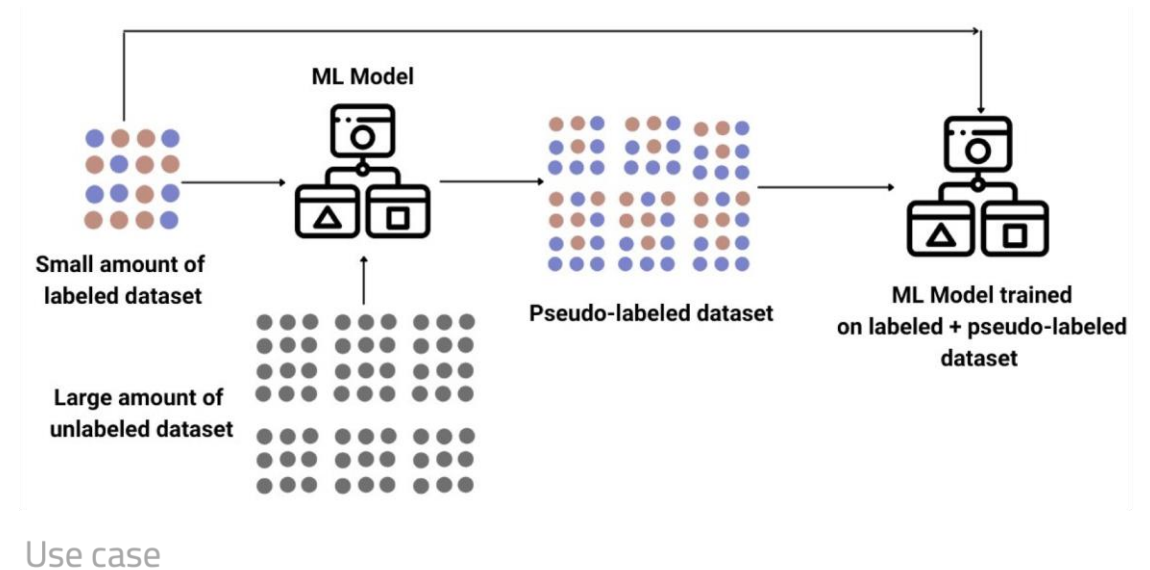
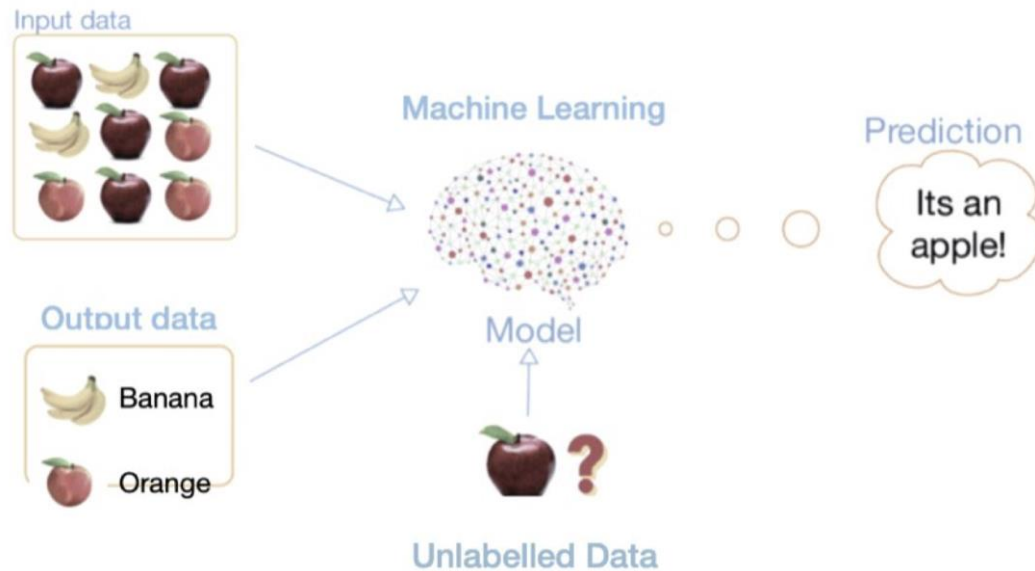
Consecutive sentences
I am going outside. I will be back in the evening.
I will bring back drinks and food and lets' Netflix and chill

Random Document
...
You know nothing John Snow.
...

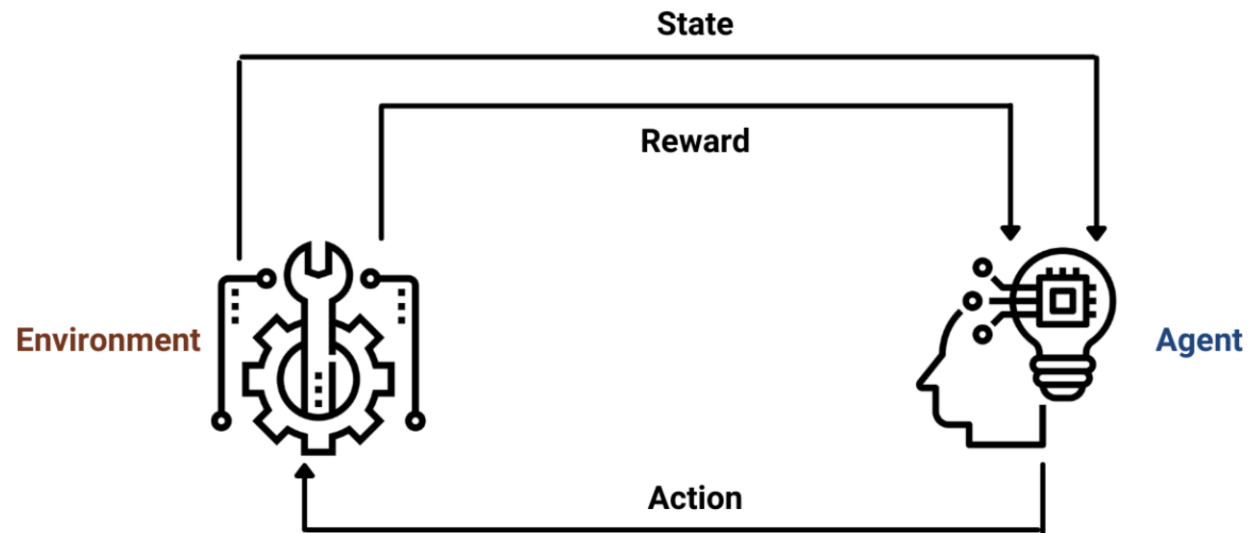
Sentence 1	Sentence 2	Next Sentence
I am going outside	I will be back in the evening	yes
I am going outside	You know nothing John Snow	no

Next Sentence Prediction

Semi-supervised Learning



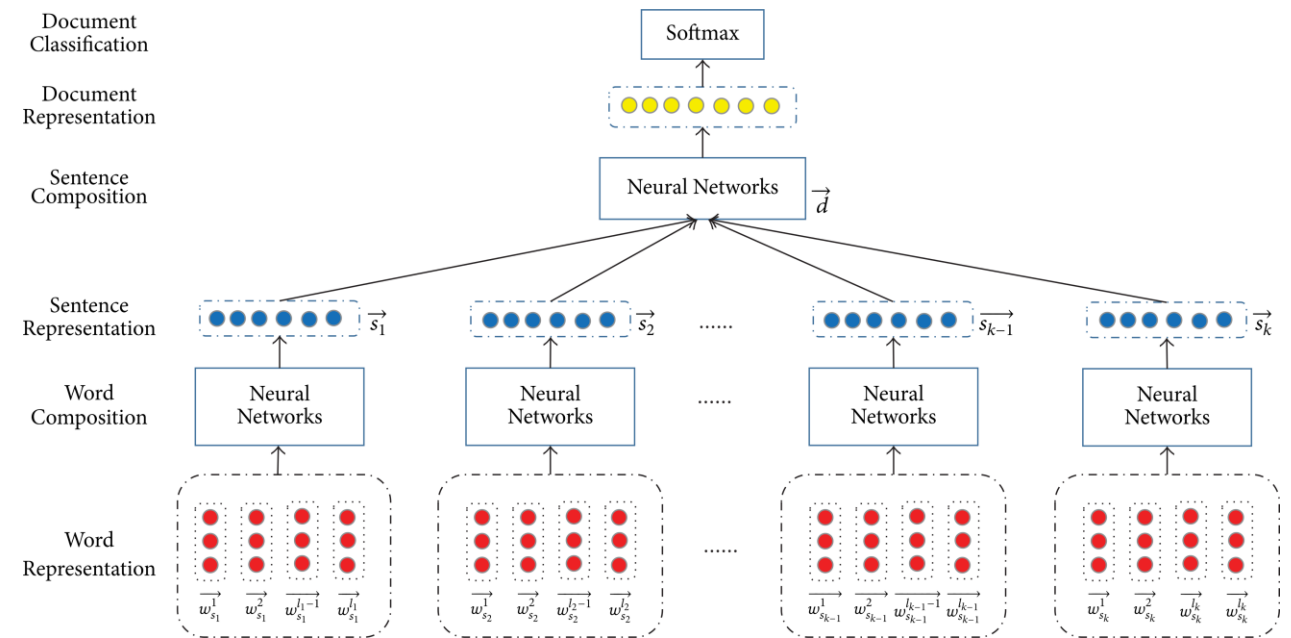
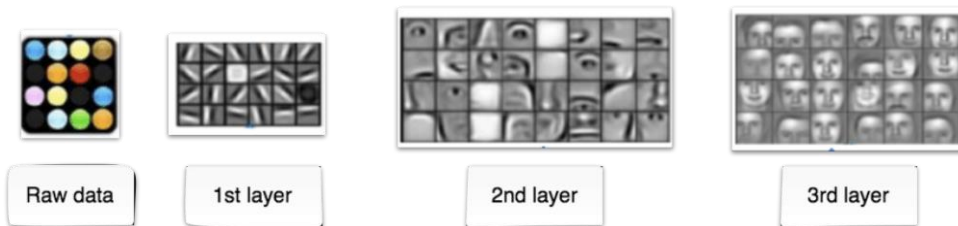
Reinforcement Learning



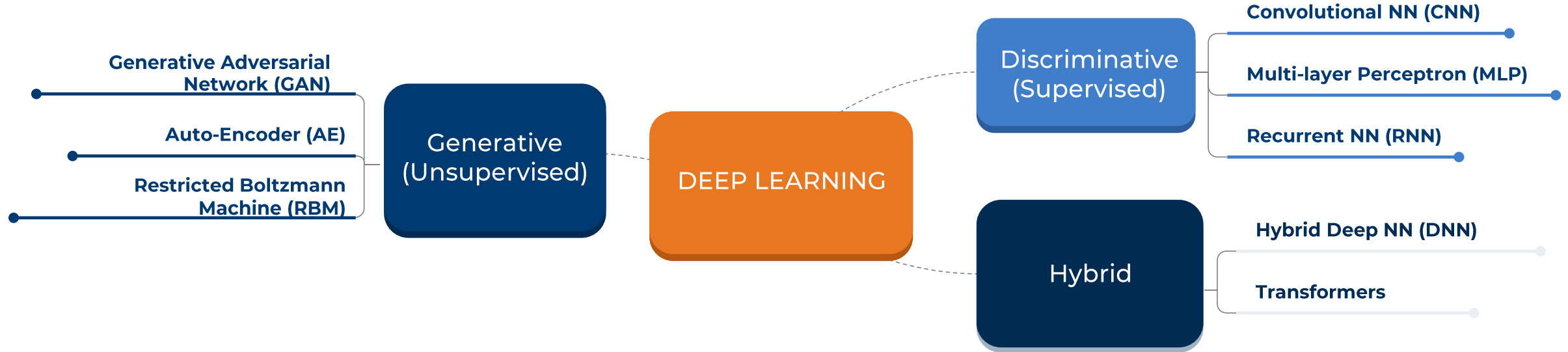
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Deep Learning Methods

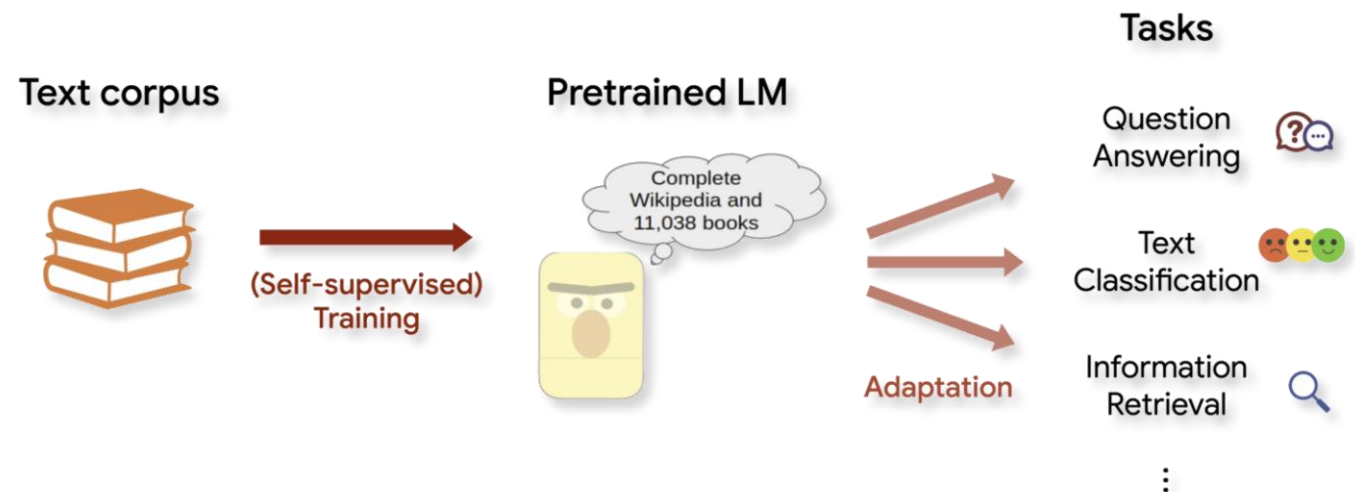


Deep Learning Methods

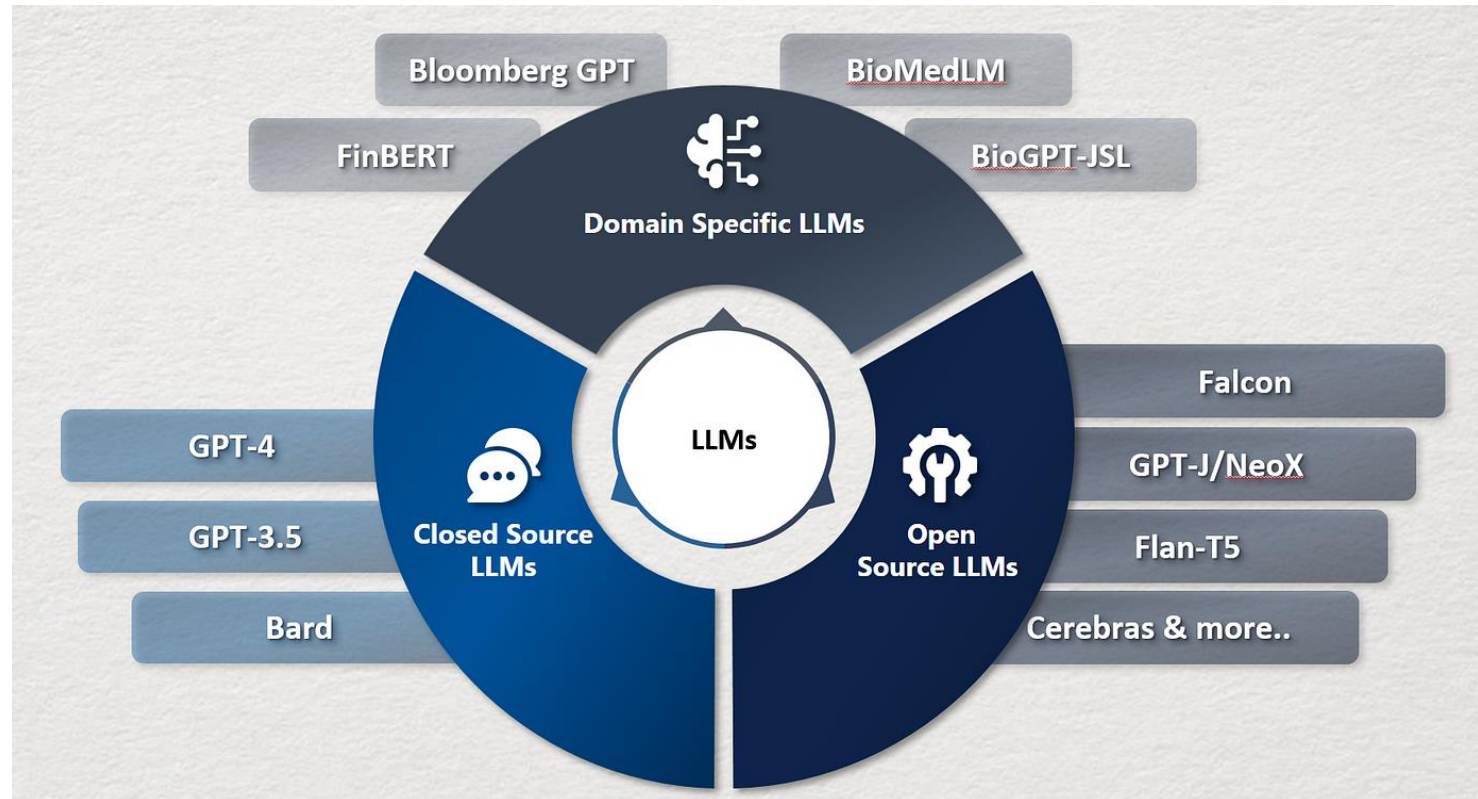


AI and Large-Language Models (LLM)

- Models that assign **probabilities** to sequences of words
- **probabilistic**, not deterministic
- tasked to understand and generate **human-like text**
- learn from **huge volumes** of data



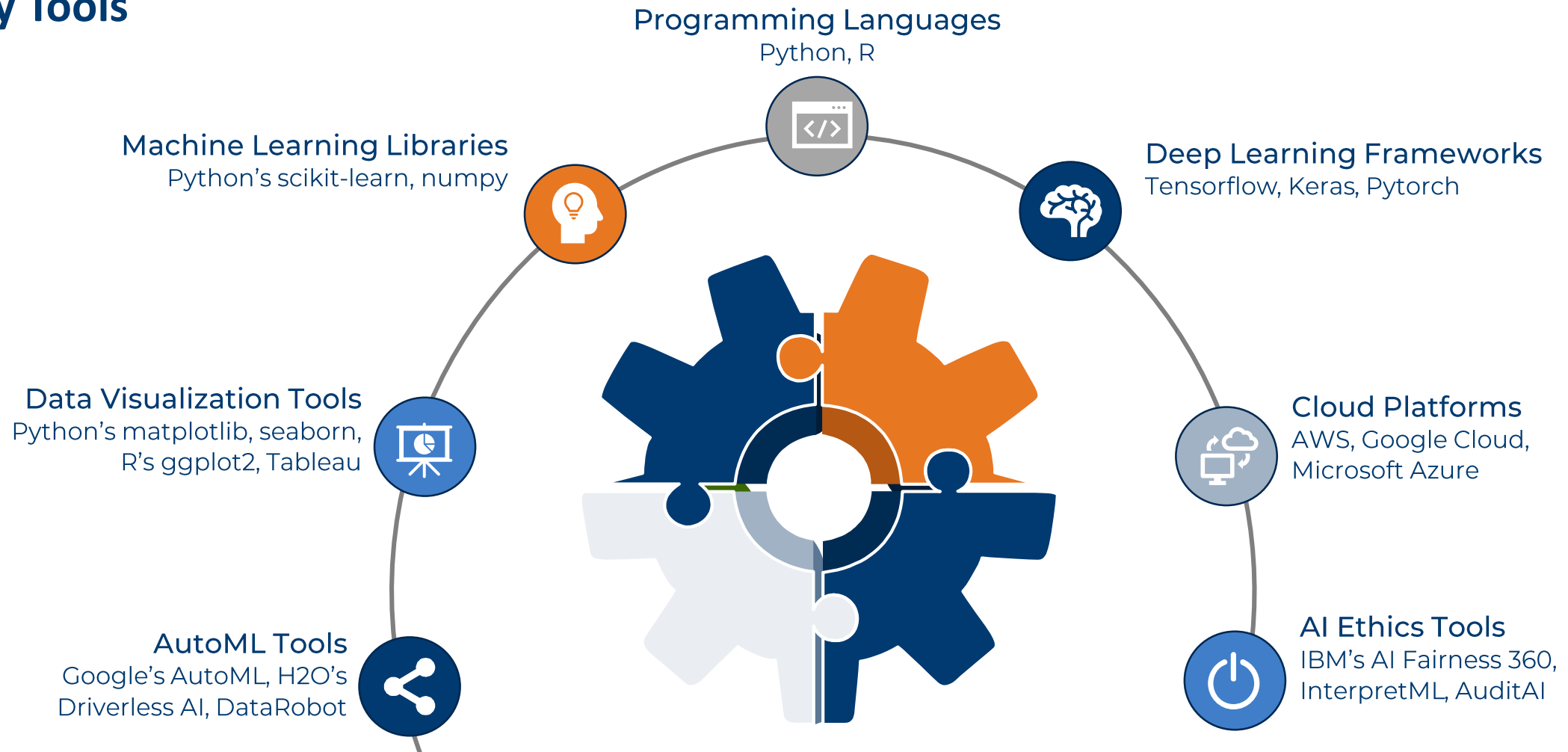
AI and Large-Language Models (LLM)



<https://towardsdatascience.com/how-enterprises-can-build-their-own-large-language-model-similar-to-openai-chatgpt-23ff6696c69c>

AI Engineering Toolkit

Key Tools



Practical AI Applications in Engineering

CIVIL ENGINEERING

- Predict infrastructure lifespan
- Optimize construction schedules
- Improve safety

MECHANICAL ENGINEERING

- Optimize design processes
- Automate manufacturing
- Predict equipment failures

ELECTRICAL ENGINEERING

- Optimize power distribution
- Improve energy efficiency
- Predict equipment failures

CHEMICAL ENGINEERING

- Optimize chemical reactions
- Improve process control
- Design new materials

ENVIRONMENTAL ENGINEERING

- Predict environmental changes
- Optimize waste management
- Design sustainable systems

BIOMEDICAL ENGINEERING

- Design personalized treatments
- Predict disease progression
- Detect diseases from medical images

LLM Applications in Engineering

CIVIL ENGINEERING

- Analyze project reports
- Provide insights into project progress & risk factors
- Draft technical docs & specs

MECHANICAL ENGINEERING

- Analyze machine logs
- Predict potential failures
- Suggest maintenance activities

ELECTRICAL ENGINEERING

- Assist in documenting processes
- Interpret test results
- Provide troubleshooting assistance

CHEMICAL ENGINEERING

- Interpret chemical process data
- Experiment documentation
- Generate safety reports

ENVIRONMENTAL ENGINEERING

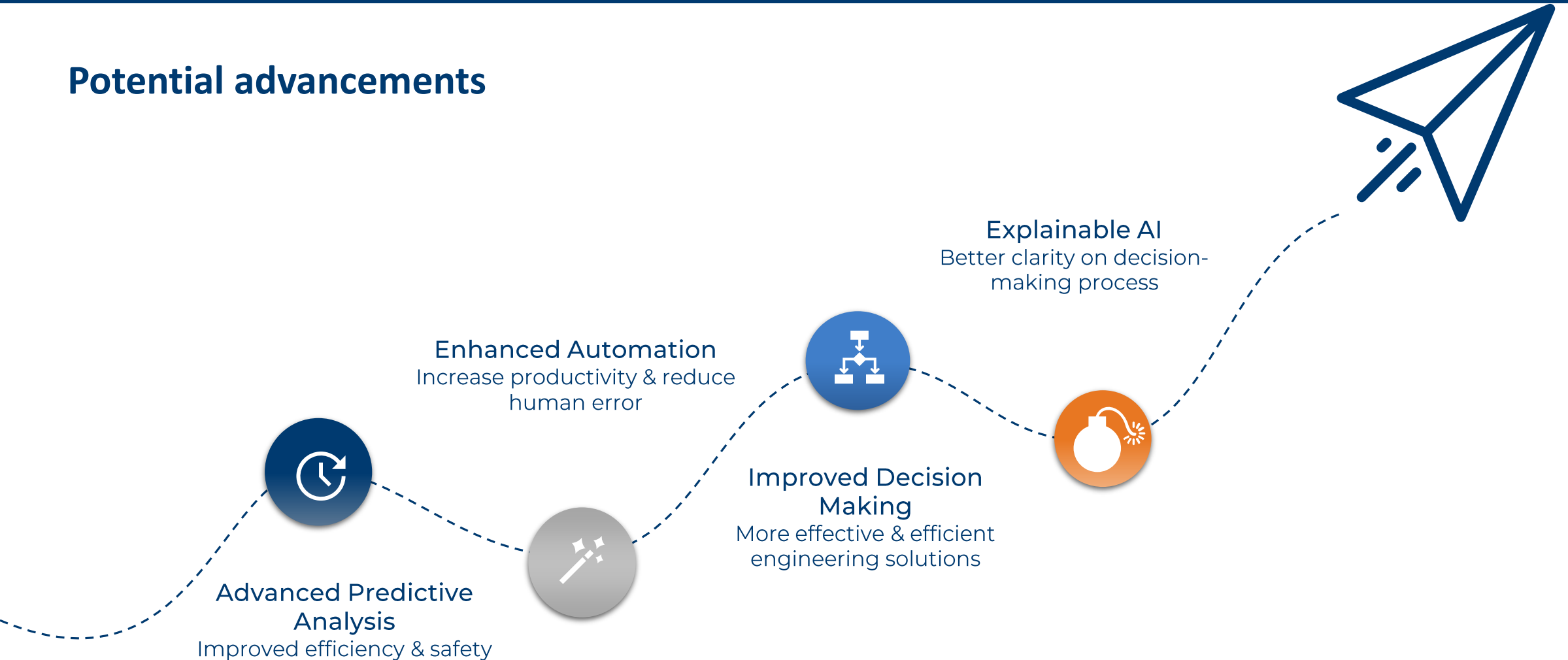
- Analyze environmental data reports
- Generate summaries
- Assist in drafting environmental impact assessment reports

BIOMEDICAL ENGINEERING

- Analyze medical literature
- Assist in medical diagnosis
- Assist in medical report generation

The Future of AI in Engineering

Potential advancements



Tips and Recommendations

Understand and Learn 

Hands-on Experience 

Understand Data 

Familiarization of AI Tools 



 Understand the Ethics

 Specialize

 Utilize AI in your Role

 Stay up to date

“Artificial intelligence will be part of the home just like the light bulb. And the quicker we learn and adapt, the more we can shape our future.”

- Mark Cuban

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<https://qrco.de/beRHUK>

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Q&A



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