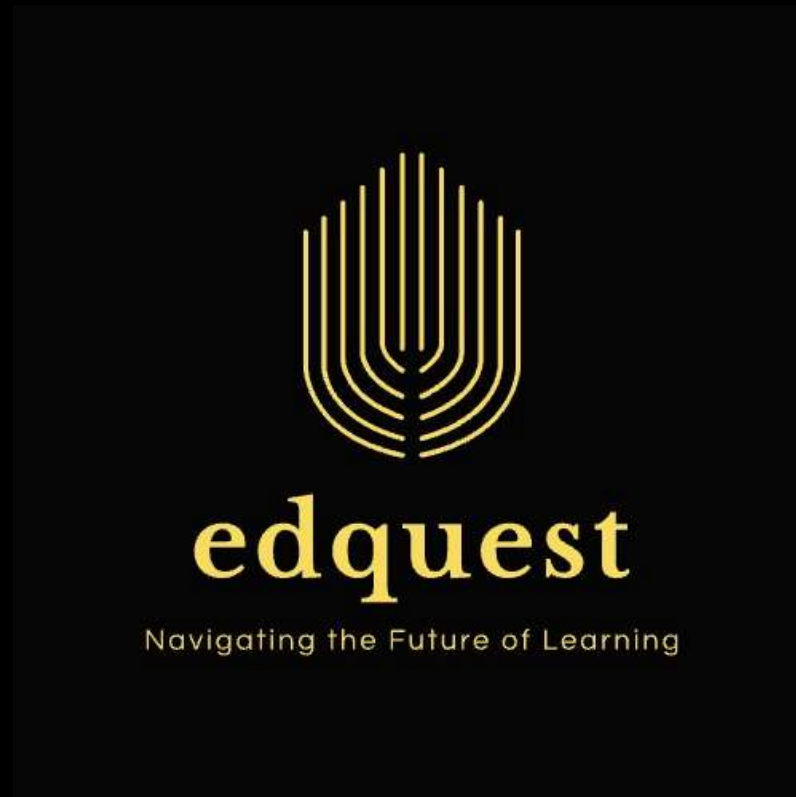


The Generative AI Revolution: A Month-Long AI Exploration



Week 1 Day 1: 3rd Feb 2024



Generative AI Cohort Feb 2024

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Navigating the Future of Learning

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Agenda for Feb 2024

Introduction to Generative AI

Generative AI in Software Applications

Impact of Generative AI

Prompt Engineering

Project: Laptop Salesman Assistant Supported by AI



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Our Team



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Navigating the Future of Learning



Introduction to Generative AI

- What is Generative AI ?
- Examples of Generative AI
- Limitations of Generative AI

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What is Machine Learning ?

Machine Learning (ML) is a **subset of Artificial Intelligence** that involves the **development of algorithms** enabling computers to **learn from data** and **improve their performance** on a specific task **without** being explicitly programmed.

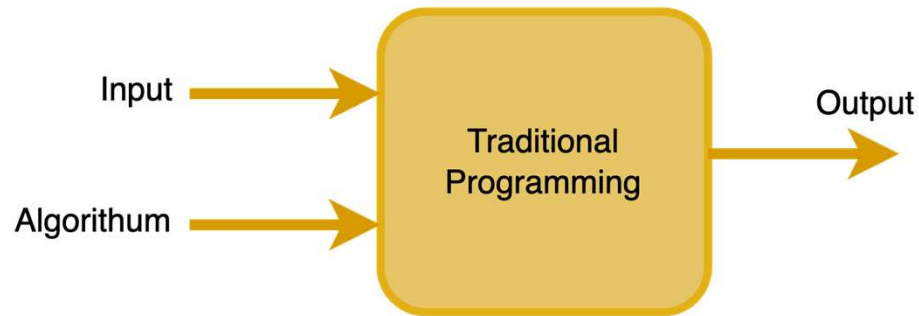
It focuses on the

- creation of models that can recognize patterns,
- make predictions,
- adapt to new information.



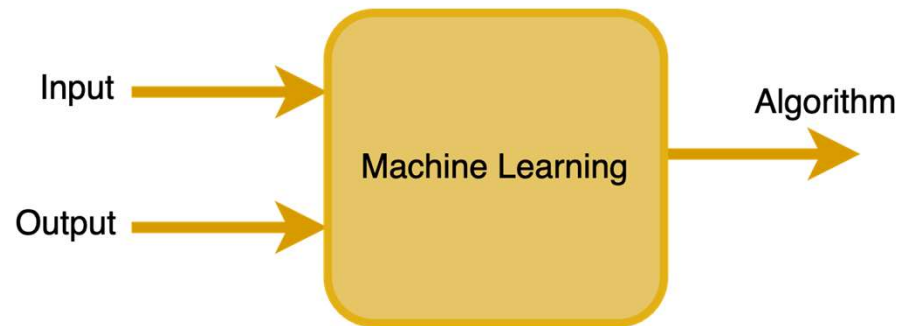


How Traditional Programming different from Machine Learning ?



e.g.

```
def sum(a, b):  
    return a+b
```



e.g.

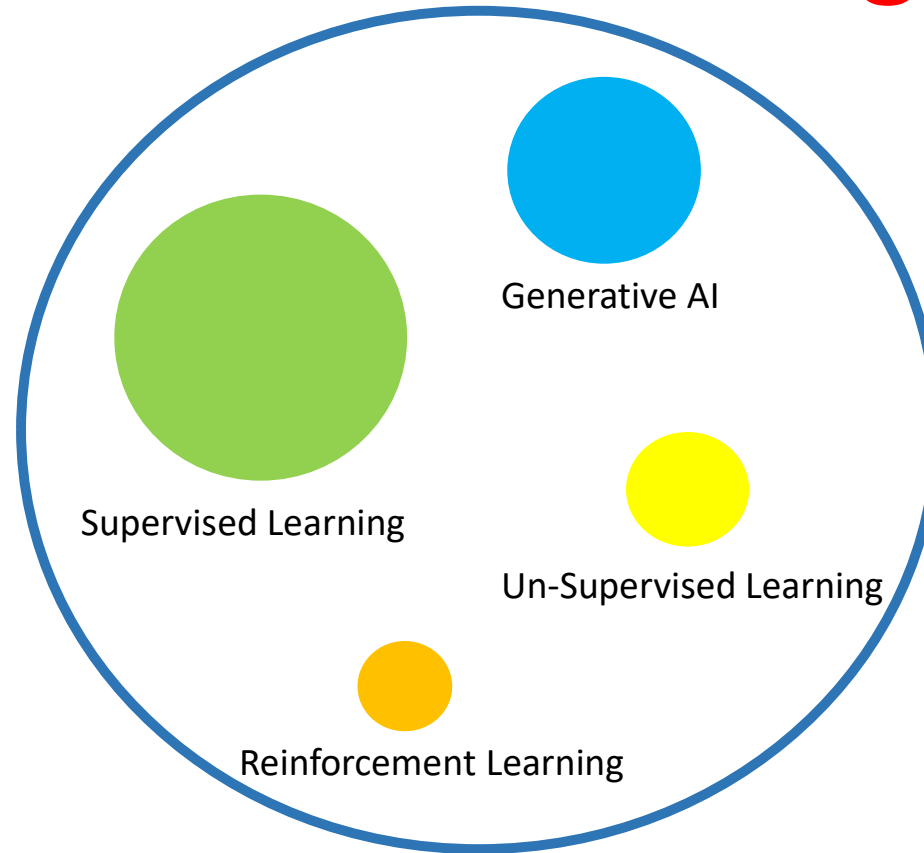
Input: [(1,2), (2, 3), (4, 5)]

Output: [3, 5, 9]

Algorithm: sum of two numbers



What is Artificial Intelligence ?





What is Generative AI ?

Artificial intelligence systems that can produce / **generate** high quality content, specifically **text**, **images**, and **audio**.



Examples of Generative AI Applications



ChatGPT



Google
Translate





Examples of Generative AI for Image

DALL.E (OpenAI)

MidJourney (accessed via discord)

Dream Studio (stability ai)

Firefly (Adobe)

Getty (Getty)



Examples of Generative AI for Audio

LOVO

11-LABS

SPEECHIFY

MURF

Many more ...

More Details: <https://www.youtube.com/watch?v=hxnTwyx8GS8>



Q & A



Navigating the Future of Learning



Examples of Generative AI Applications with **Text**

Writing, Reading and Chatting

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Gen AI Applications for Writing



Brainstorming

Sales (Developing Sales Strategy)

Writing a press release

Translation

Gen AI Applications for Reading



Summarizing an Article

Summarizing Call center conversation

Customer email analysis

Reputation Monitoring

Many more ...



Gen AI Applications for Chatting

Customer Service Chatbot

Specialized Chatbot

IT Service Chatbot



Q & A



Navigating the Future of Learning



Limitations of Gen AI ?

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Navigating the Future of Learning



Limitations of Gen AI: Knowledge Cutoff

Knowledge Cutoff: An LLM's knowledge of the world is frozen at the time of its training



You

Who is the prime minister of India ?



ChatGPT

As of my last knowledge update in January 2022, the Prime Minister of India is Narendra Modi. However, please note that political positions can change, and it's advisable to verify the current Prime Minister through up-to-date sources as my information might be outdated.



Limitations of Gen AI: Knowledge Cutoff



You

Who is the president of India ?



ChatGPT

As of my last knowledge update in January 2022, the President of India is Ram Nath Kovind. However, please be aware that political positions can change, and it's recommended to verify the current President through up-to-date sources as my information may be outdated.



Limitations of Gen AI: Knowledge Cutoff



Who is the president of India ?

View other drafts



The current president of India is Smt. Droupadi Murmu. She was sworn in on July 25, 2022, making her the 15th president of the country. You can find more information about her on the official website of the President of India: <https://presidentofindia.nic.in/>



Limitations of Gen AI: Token Limits

<u>gpt-3.5-turbo</u>	Currently points to gpt-3.5-turbo-0613.	<u>4,096 tokens</u>	Up to Sep 2021
gpt-3.5-turbo-16k	Currently points to gpt-3.5-turbo-16k-0613.	16,385 tokens	Up to Sep 2021
gpt-3.5-turbo-instruct	Similar capabilities as GPT-3 era models. Compatible with legacy Completions endpoint and not Chat Completions.	4,096 tokens	Up to Sep 2021
gpt-3.5-turbo-0613	Legacy Snapshot of gpt-3.5-turbo from June 13th 2023. Will be deprecated on June 13, 2024.	4,096 tokens	Up to Sep 2021
gpt-3.5-turbo-16k-0613	Legacy Snapshot of gpt-3.5-16k-turbo from June 13th 2023. Will be deprecated on June 13, 2024.	16,385 tokens	Up to Sep 2021
gpt-3.5-turbo-0301	Legacy Snapshot of gpt-3.5-turbo from March 1st 2023. Will be deprecated on June 13th 2024.	4,096 tokens	Up to Sep 2021

Source: <https://platform.openai.com/docs/models/gpt-3-5>



Limitations of Gen AI: Tabular Data

Gen AI does not work well with structured (Tabular) data.

Supervised Machine Learning is best for tabular datasets

Home prices

size (square feet)	price (1000\$)
523	100
645	150
708	200
1034	300
2290	350
2545	440

A B

π



Q & A



Navigating the Future of Learning



Summary

- What is Generative AI ?
- Examples of Generative AI
- Limitations of Generative AI

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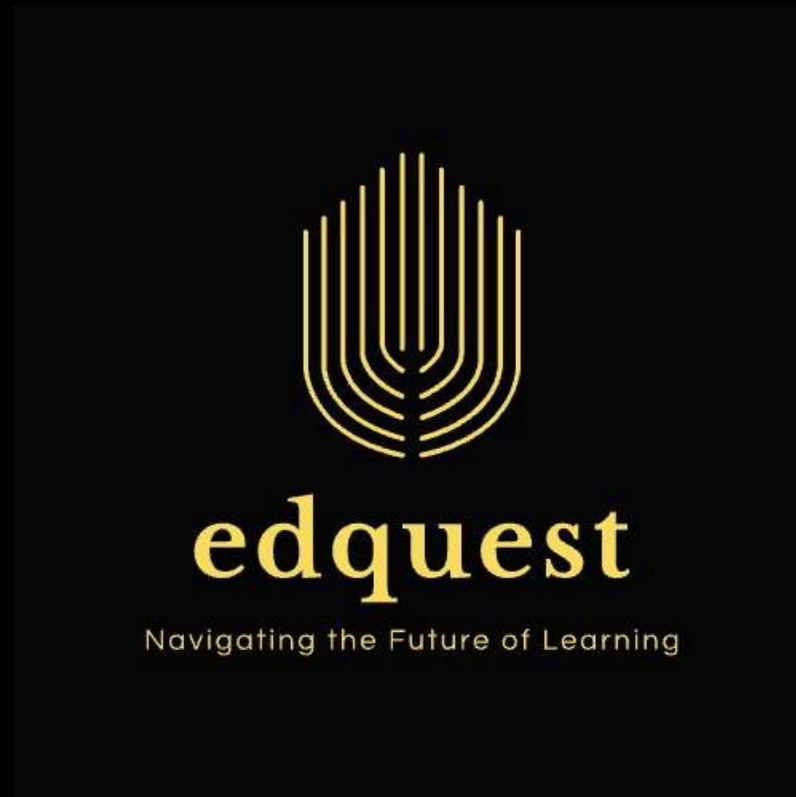
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Thank You!

Navigating the Future of Learning

The Generative AI Revolution: A Month-Long AI Exploration



Week 1 Day 1: 3rd Feb 2024

Leveraging Generative AI within software applications.



Agenda for today:

- Software applications & examples
- Basics of prompt
- The life cycle and application scenarios of Generative AI
- Methods for enhancing Generative AI applications



Gen AI Application Types

- Text Generation
- Image Generation
- Music Generation
- Video Generation
- Data Augmentation
- Design and creativity
- Game Development
- Drug discovery
- Language translation and Generation
- Content creation and marketing
- Many more...



Gen AI Examples:


Writing

Prompt: Is delivery service offered at your showroom?


Response: Certainly, you have the option to select fast delivery. With this option, we guarantee delivery on the same day.

RM You
write a patriotic poem in 3 lines

Which response do you prefer?
Your choice will help make ChatGPT better.

 Response 1

In the land of the free, our spirits
soar high,
Bravery echoes in every patriot's
cry.
United we stand, beneath the same
sky.

 Response 2

In fields of valor, freedom's flame
ignites,
United hearts, in liberty's bright
light.
A nation's pride, in stars and
stripes, takes flight.



Gen AI Examples

Reading

Prompt: Classify the sentiment of the following review as either positive or negative:

The delivery service was very good

Response <as shown in the screenshots>

You
Classify the sentiment of the following review as either positive or negative:
The delivery service was very good

ChatGPT
The sentiment of the review "The delivery service was very good" is positive.

Play around with our sentiment analyzer, below:

Test with your own text		Results	
The delivery service was very good		TAG	CONFIDENCE
<button>Classify Text</button>		Positive	88.5%



Gen AI Examples

Chatting

Bot: Welcome to the showroom!

User: I am looking for a laptop

Bot: Win. Mac. or Linux ?

User: Windows

Bot: i3, i5, i7

User: i7

ShopAssist

Hello! I'm an intelligent laptop gadget expert and I'm here to help you find the best laptop for your needs. Please let me know what you will be using the laptop for and any specific requirements you have.

I need laptop for backend development with high processing speed. High storage is not required because my data is on cloud

Great! As a backend developer, you likely require a laptop with high processing speed to handle complex tasks efficiently. Since you mentioned that high storage is not required as your data is on the cloud, we can focus on other important aspects. May I know if you prioritize portability or display quality for your work? Understanding your preferences will help me tailor my recommendations accordingly.

I do not require portability because I will not travel with laptop. Normal display quality will work for me

Thank you for providing that information. Since portability is not a priority for you, we can focus on other aspects of the laptop. As a backend developer, high processing speed is important for you, and you mentioned that normal display quality will work for your work. May I know your budget for the laptop? This will help me find options that fit within your price range while meeting the specified requirements.

Thank you for providing all the information. Kindly wait, while I fetch the products:

1. Acer Predator: Intel Core i7 2.8 GHz, 16GB RAM, SSD storage, 17.3" IPS display, NVIDIA GTX graphics, Windows 10, 3.2 kg, Dual Cooling Fans, 1-year warranty, 5 hours battery life. Price: Rs 80,000. 2. Lenovo ThinkPad: AMD Ryzen 7 3.0 GHz, 16GB RAM, SSD storage, 14" IPS display, NVIDIA GTX graphics, Linux OS, 1.6 kg, Backlit Keyboard, 3-year warranty, 6 hours battery life. Price: Rs 60,000. 3. MSI GL65: Intel Core i7 2.6 GHz, 16GB RAM, HDD+SSD storage, 15.6" IPS display, NVIDIA GTX graphics, Windows 10, 2.3 kg, RGB Keyboard, 2-year warranty, 4 hours battery life. Price: Rs 55,000.

80%

END CONVERSATION

Khanmigo
AI power

This conversation is recorded and viewable by your parent and teacher.

Can you just tell me the answer?

It's important that you learn how to do this yourself! What do you think you need to do to multiply 2 by 5/12?

They need the same denominator.

That's a good thought, but in this case, you don't need to find a common denominator because you're multiplying, not adding or subtracting. What else could you try?

Type message (do NOT share any personal data)

Clear chat



Q & A



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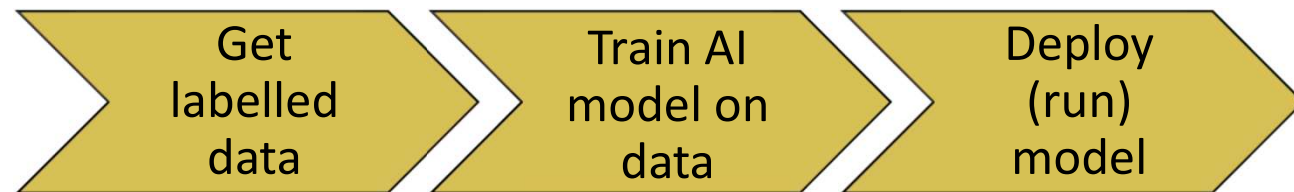


Supervise learning for showroom reputation monitoring

Feeding features & label to train the model:

Feature	Label
• Best assistance service I've ever experienced	• Positive
• Very Nice interaction/chatting system	• Positive
• Delivery person was not well dressed	• Negative

Steps for Supervised learning:



Input: "Best delivery service I've ever had"

Output: Positive



Prompt-based development

```
prompt =
```

```
    "Classify the following review as  
    having either a positive or negative  
    sentiment:
```

```
    The delivery service was really very  
    good"
```

```
response = llm_response(prompt)  
print(response)
```

→ Instruction text

→ Review text

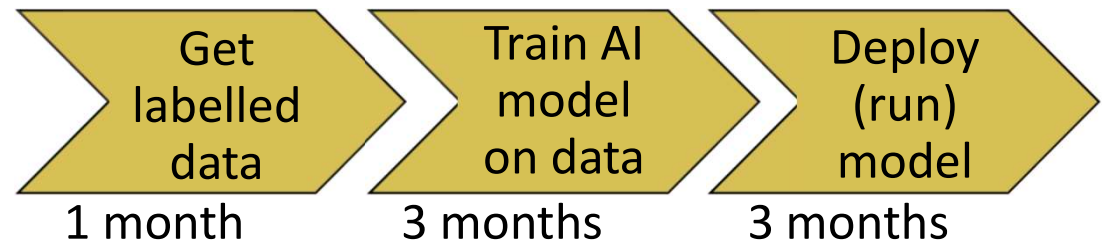
→ Code to call LLM

→ Code to print output

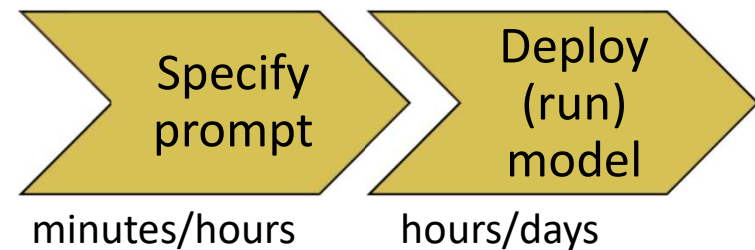


Workflow using Generative AI

Supervised learning



Prompt-based AI



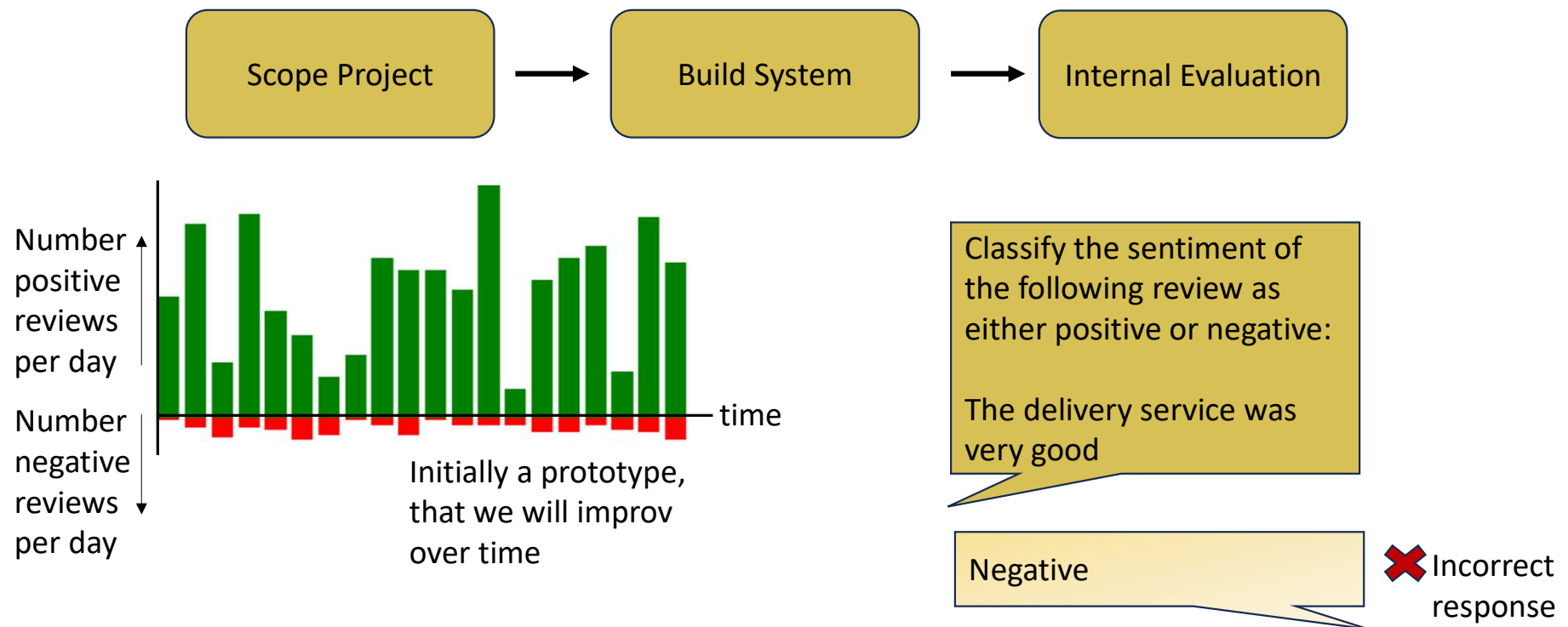


Q & A

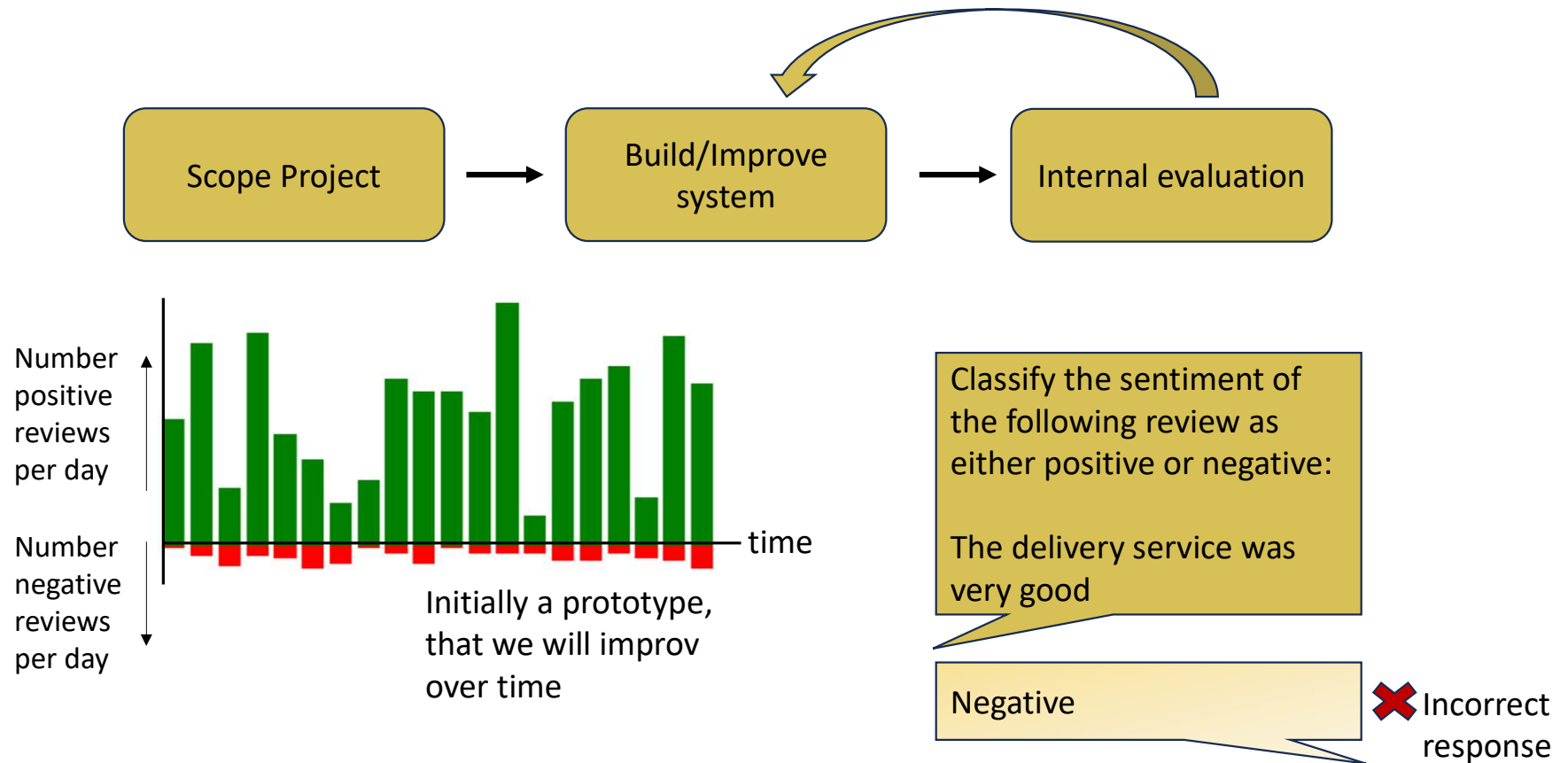


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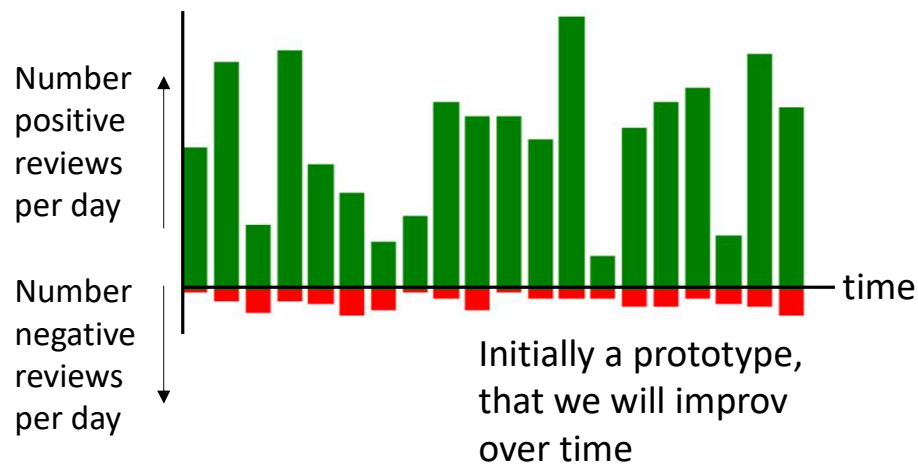
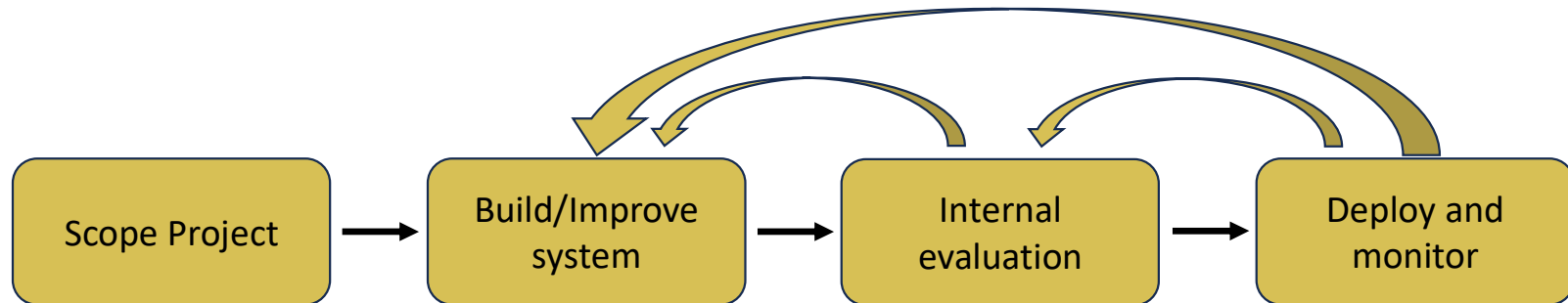
Lifecycle of a Generative AI project



Lifecycle of a Generative AI project



Lifecycle of a Generative AI project

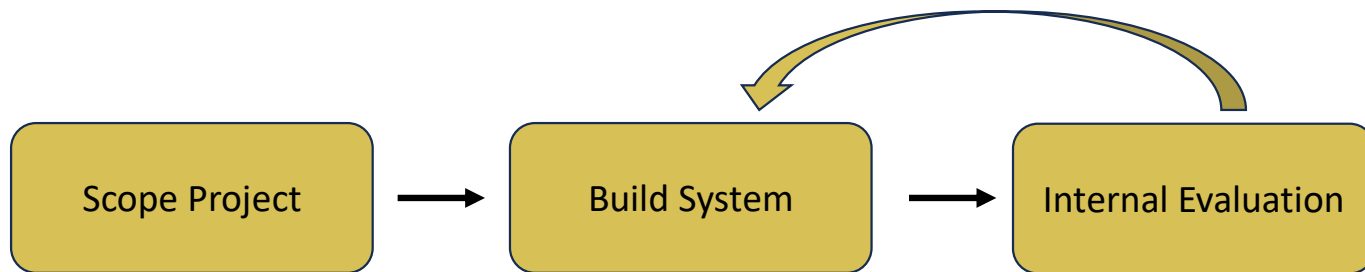


Classify the sentiment of the following review as either positive or negative:

The delivery service was very good

Positive

Lifecycle of a Generative AI project



Take Laptop order



Let team order ...

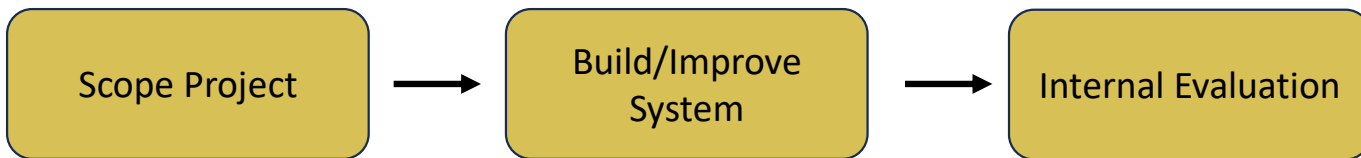
User: I require a i3 windows laptop

Bot: Apologies, we don't carry the i3 series. Would you be interested in the i5 or i7 series instead?



Incorrect Response As we currently have i3 laptops in stock

Lifecycle of a Generative AI project



Take Laptop order

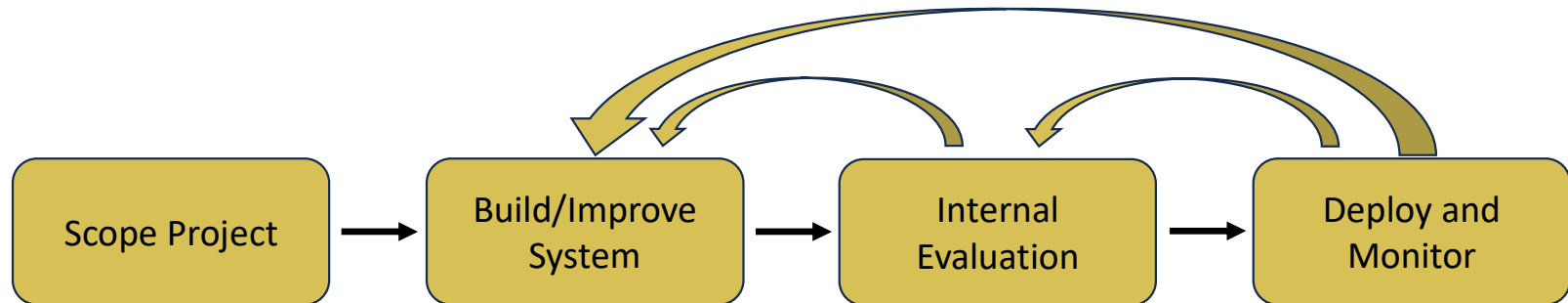


Let team order ...

User: Do you have windows ?

Bot: Yes – would you like to buy ?

Lifecycle of a Generative AI project



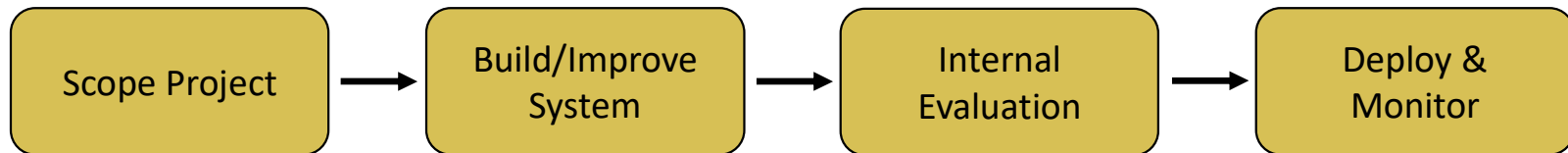
Take Laptop order



User: How much RAM does the Windows laptop have?

Bot: I'm sorry, I don't know

Lifecycle of a Generative AI project



Take Laptop order



User: How much RAM does the Windows laptop have?

Bot: About 4 to 32 GB

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Q & A



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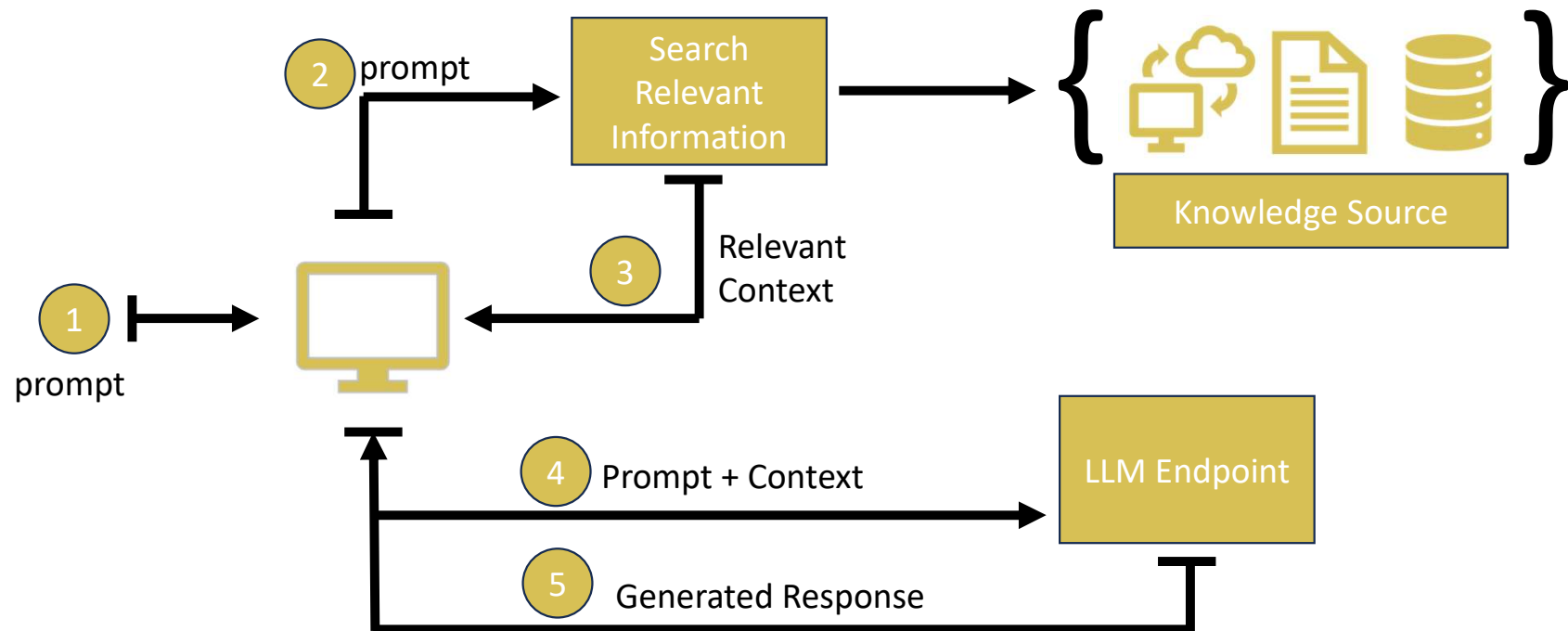


Tools to improve performance

Building Generative AI is a highly empirical (experimental) process – we repeatedly find and fix mistakes.

- Prompt Engineering
- Retrieval augmented generation (RAG)
 - Give LLM access to extend data source
- Fine-tune models
 - Adapt LLM to your task
- Pretrain models
 - Train LLM from scratch

Advanced Technologies Beyond Prompting:



- Retrieval Augmented Generation (RAG) Architecture

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Pre-training



Expected output: My favourite laptop is XYZ with i7

Input (A)	Output
My favourite laptop is	XYZ
My favourite laptop is XYZ	with
My favourite laptop is XYZ with	i7

Learns from 100Bs of words

Fine-tune:

To assist LLM in acquiring specialized knowledge.

RAM: 4GB, 8GB, 16GB, 32GB

CPU: Inte'l, AMD, Apple silicon qualcomm

GPU: Nvidia, AMD Radeon, Qualcomm Adreno, Apple Silicon Integrated GPU, Intel Integrated Graphics

e.g. What a performance laptop

Input	Output
What	a
What a	performance
What a performance	laptop

Learns from 1000s to 10,000s of words



π



Q & A



Navigating the Future of Learning



Summary

- Software applications & examples
- The life cycle of Generative AI
- Enhancing Generative AI



Q & A



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Thank You!



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