

Welcome! We will begin shortly



The Art and Science of Data

Navigating the Data Science Lifecycle

Learning Outcomes

- Develop an idea of the data science and machine learning lifecycle
- Understand how the solution lifecycle is implemented to solve business problems
- Gain insights on the underlying architecture that powers a solution for a business problem
- Comprehend how different job roles come together to deliver these impactful solutions

Guidelines



Listen only mode



Ask questions at the interest of
the larger audience



Questions in the
Q&A Box

Thank you

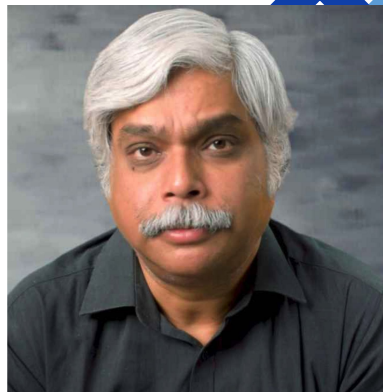
Kindly utilize the chat box for **subject-relevant questions only** to maximize your learnings from the session.

Your **questions** are being managed by the academic team, and they will be **answered**.

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Meet Your Speaker



Dr. Abhinanda Sarkar
Academic Director at Great Learning

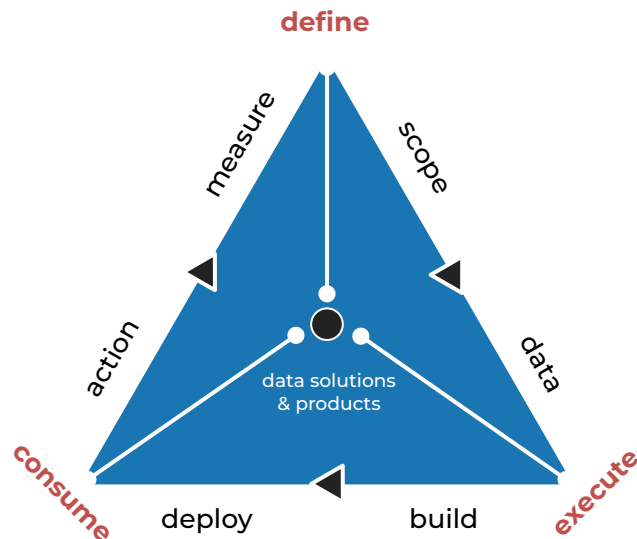
- Alumnus - Indian Statistical Institute, Stanford University
- Faculty - MIT, Indian Institute of Management, Indian Institute of Science
- Experienced in applying probabilistic models, statistical analysis and machine learning to diverse areas
- Certified Master Black Belt in Lean Six Sigma and Design for Six Sigma in GE

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How data driven-solutions are typically built?



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Business Context - Ecommerce



Product Selection Struggle

Difficult navigation of web page

Inadequate support



Poor Shopping experience

Poor customer satisfaction

High cart abandonment rate

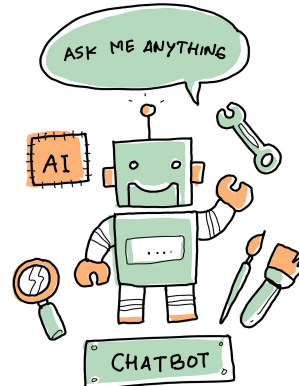
Track orders



24*7 support



Product Analytics



Search for products



Assist with FAQs



Nudge to complete sales



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Strategy for building the ChatBot

“If you were owning this business, what teams would have to come together to build this solution?”

You would need someone to -

- create the UI of the chatbot and integrate it into your website
- create a language based model to answer your customers' questions
- create/gather and manage the data that is needed to train your model
- deploy that model, monitor it and manage it's performance
- manage and drive the development & consumption of this product

UI/UX developer

Data Scientist

Data Engineer

ML Engineer

Product Manager

COLLABORATION

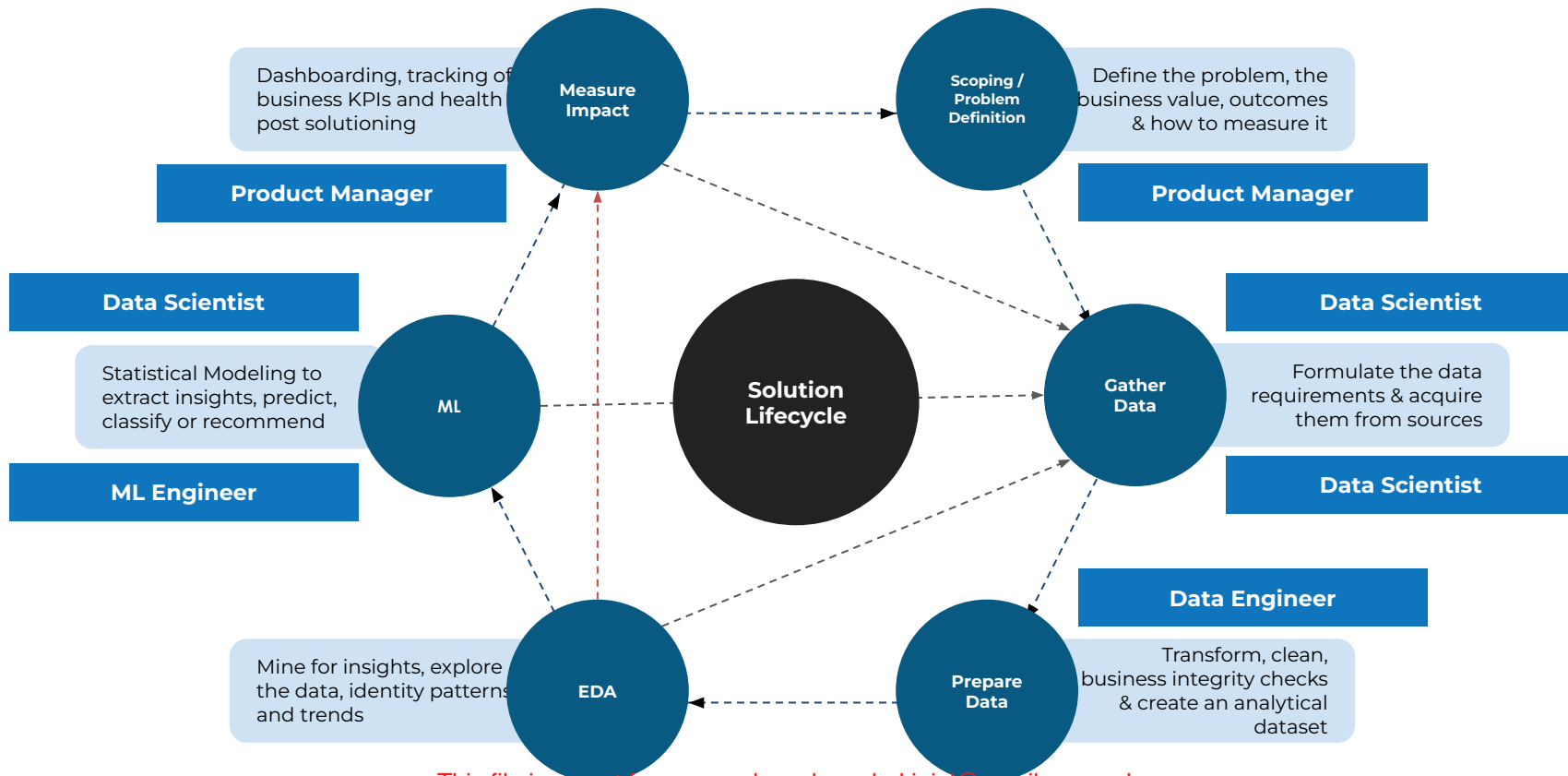
ChatBot is built!

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A typical solution lifecycle

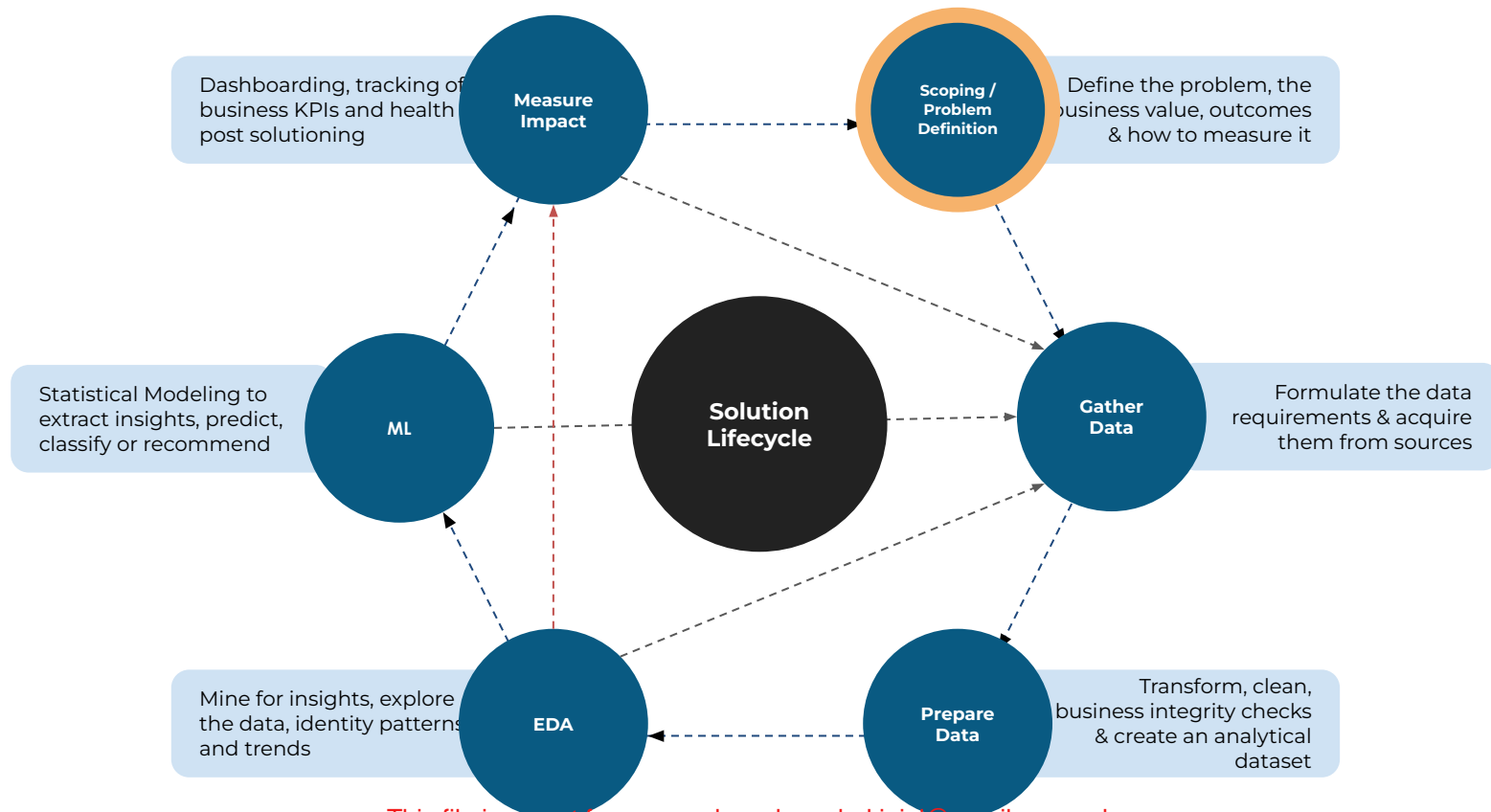


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A typical solution lifecycle



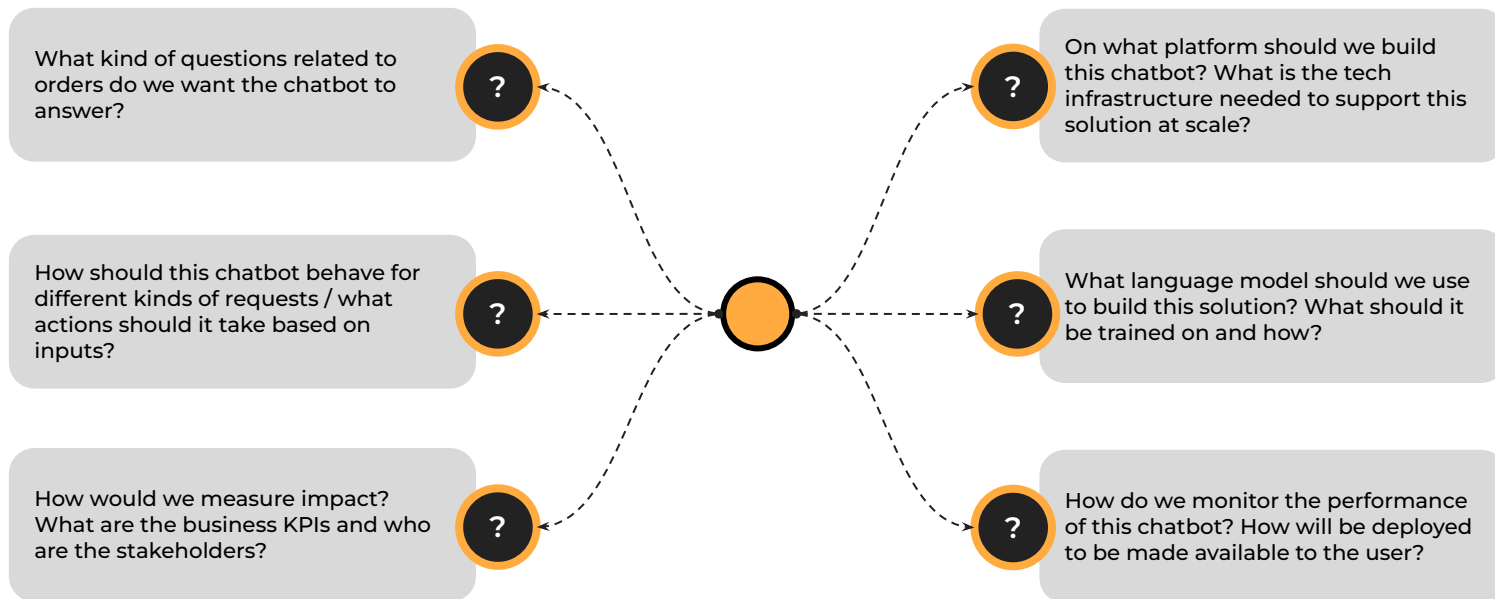
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Scoping / Problem Definition

“What should this ChatBot be able to do / how would it work?”

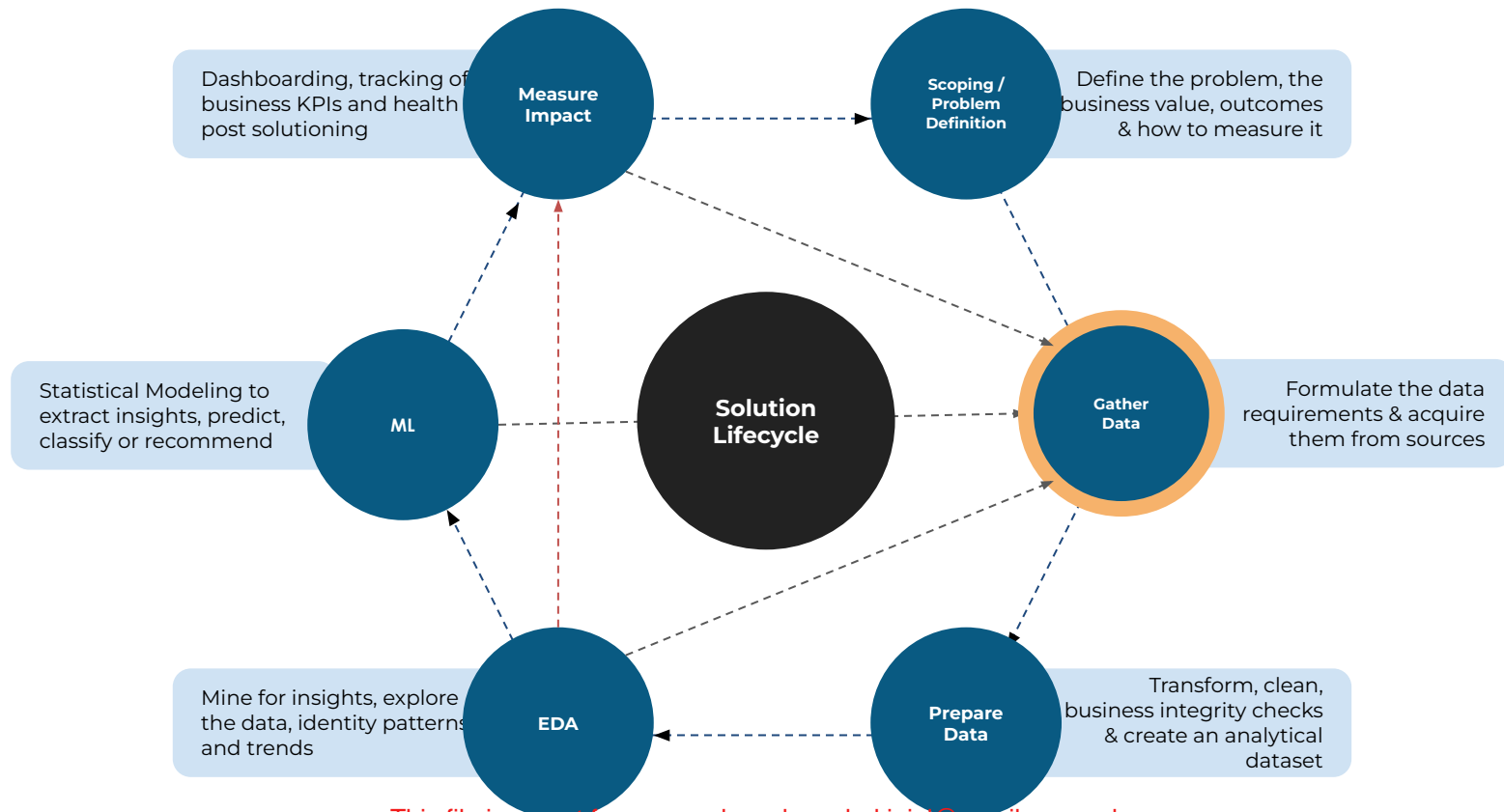


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A typical solution lifecycle



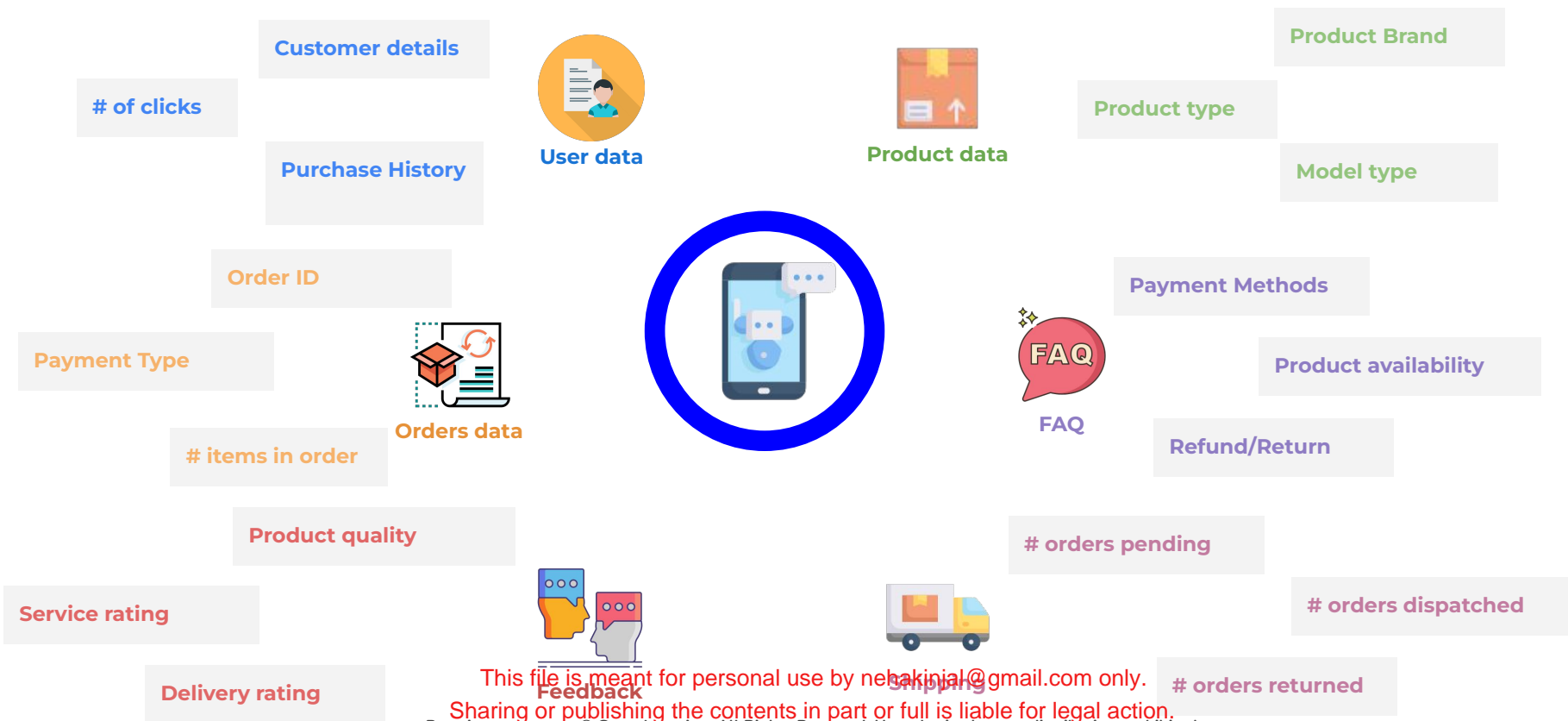
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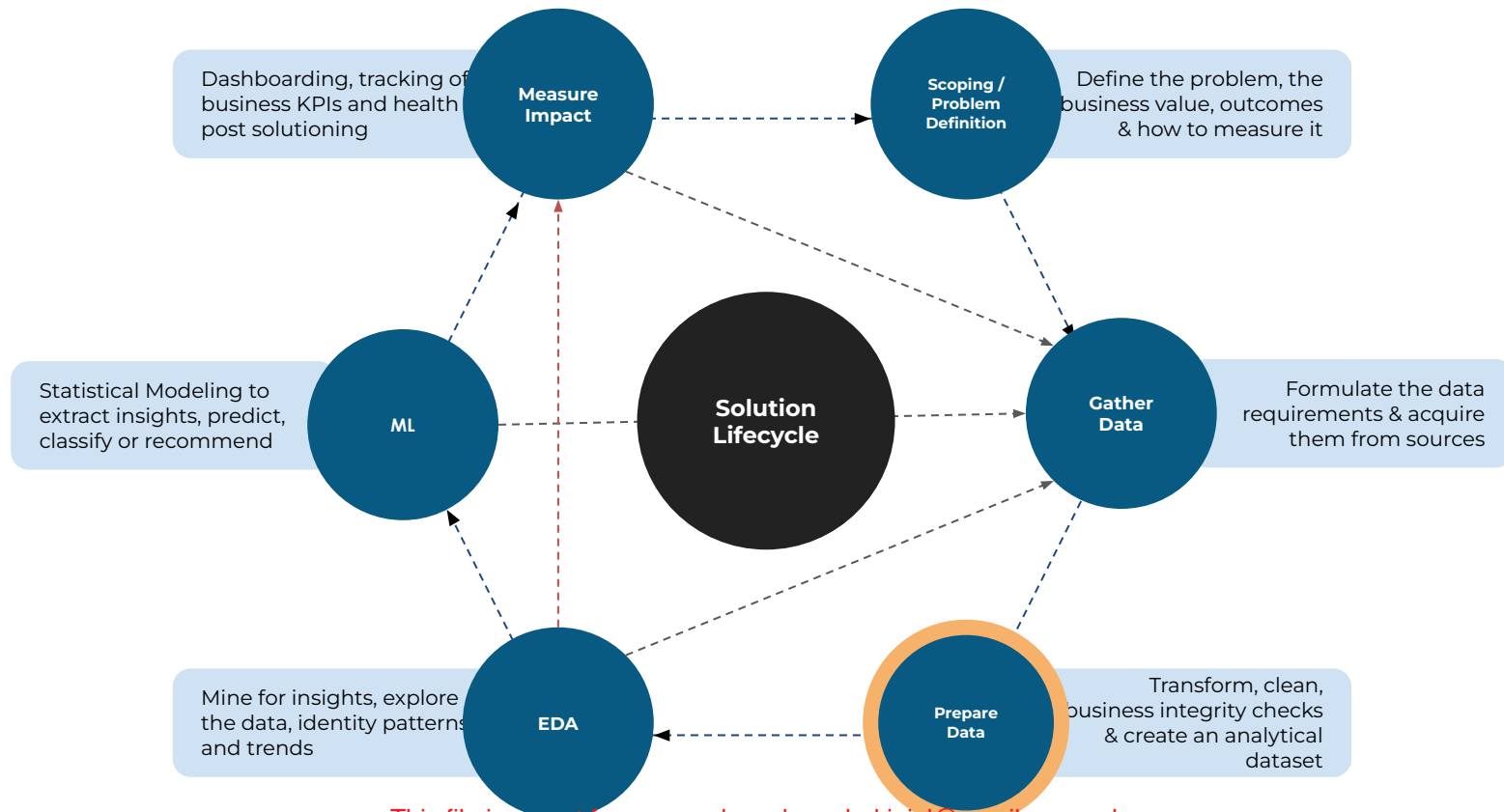
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Gather Data

“What data do I need to build this chatbot?”



A typical solution lifecycle



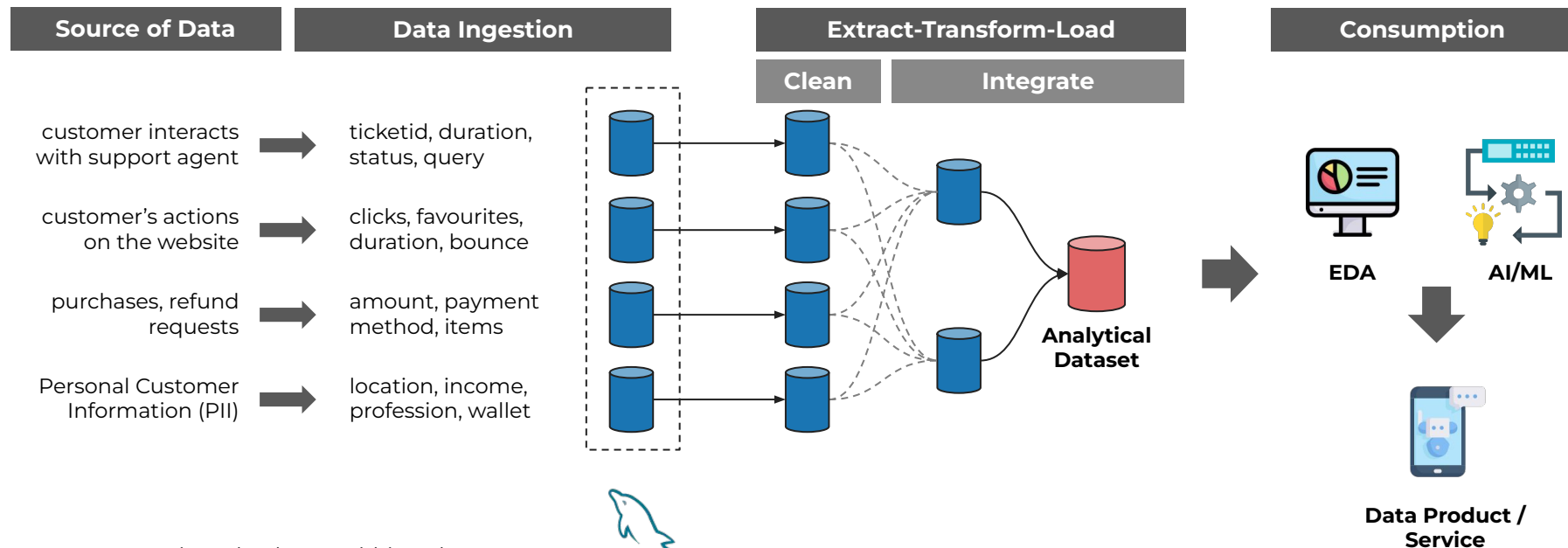
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Prepare Data

“How do I create the data I need for my data solution / product?”



various databases within a data warehouse like -

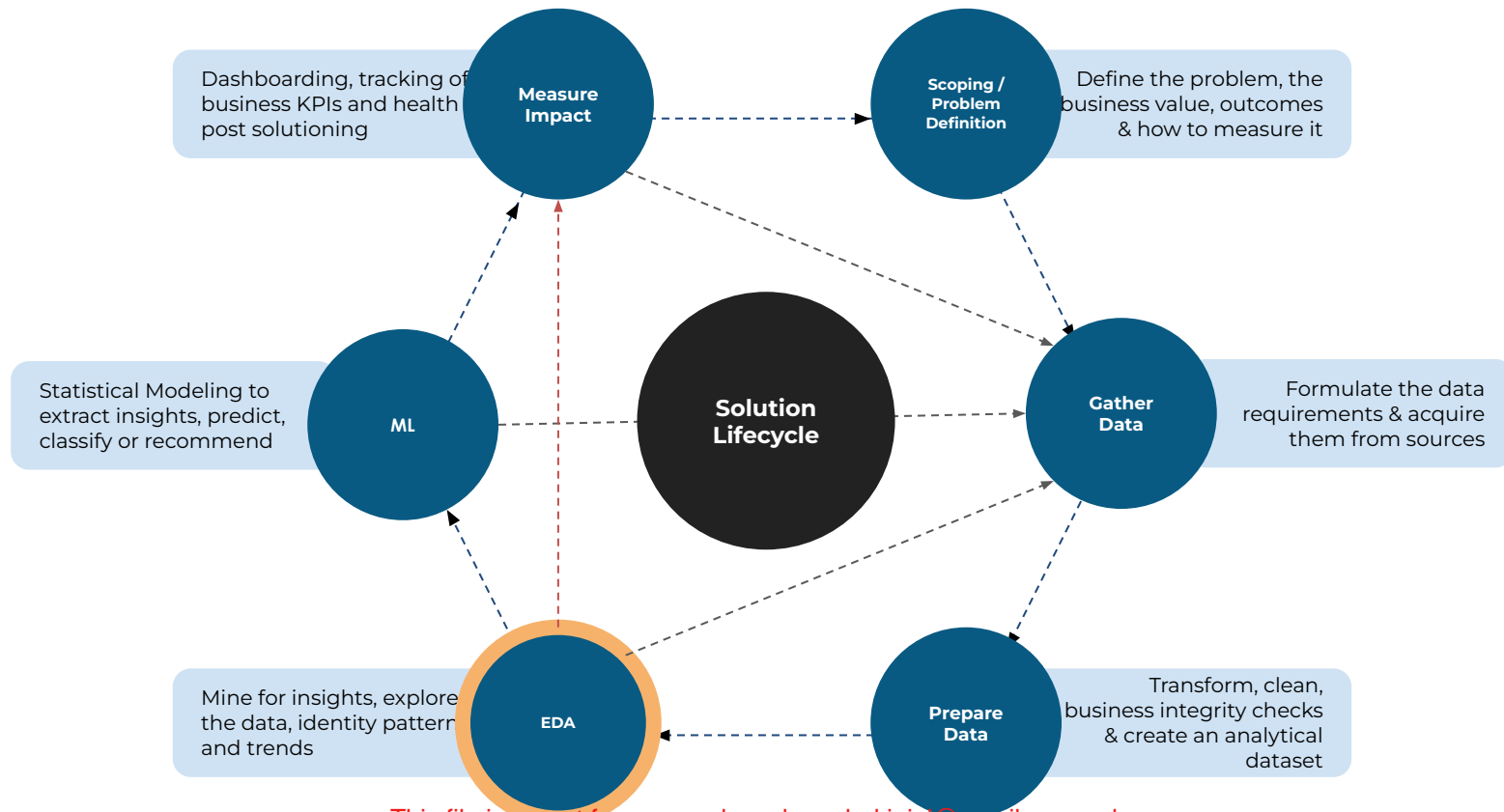


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A typical solution lifecycle



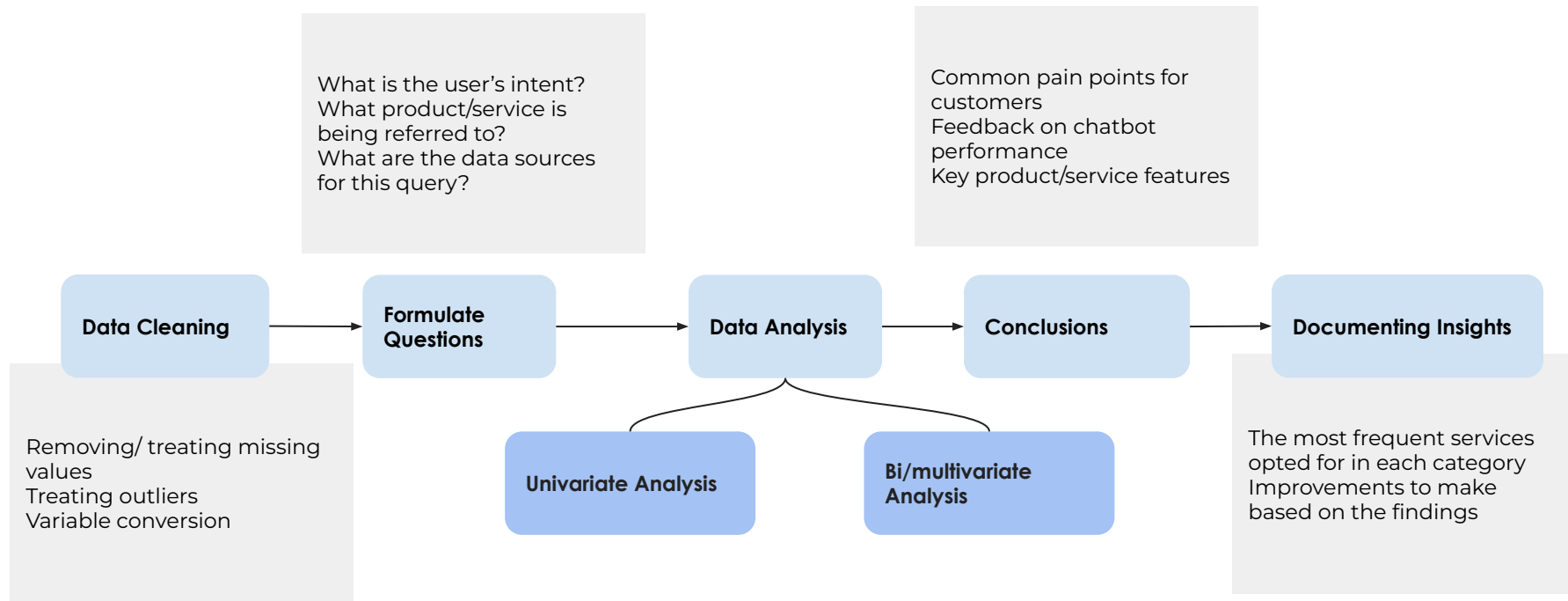
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Exploratory Data Analysis

“How should I approach exploring my data?”

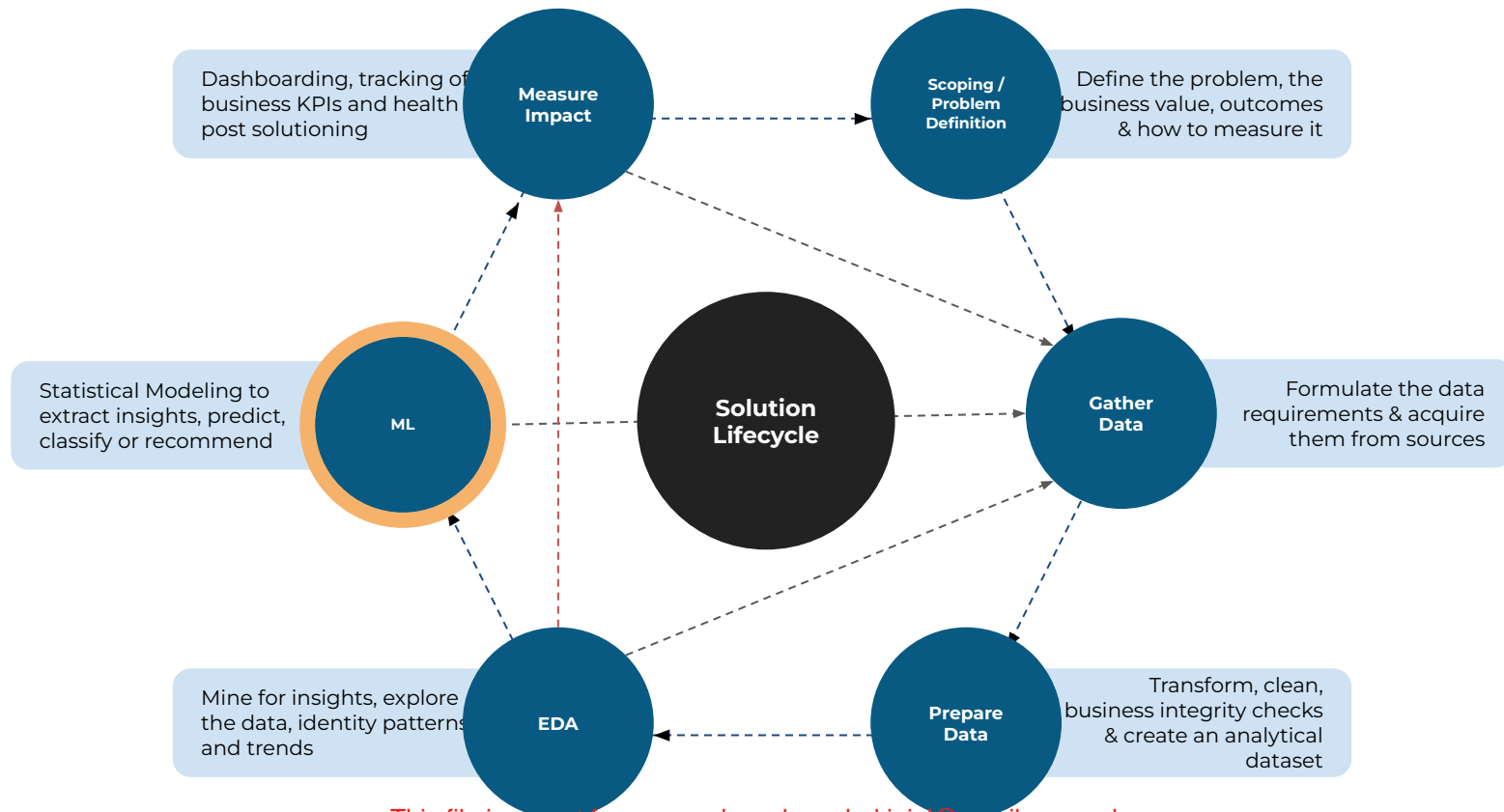


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A typical solution lifecycle

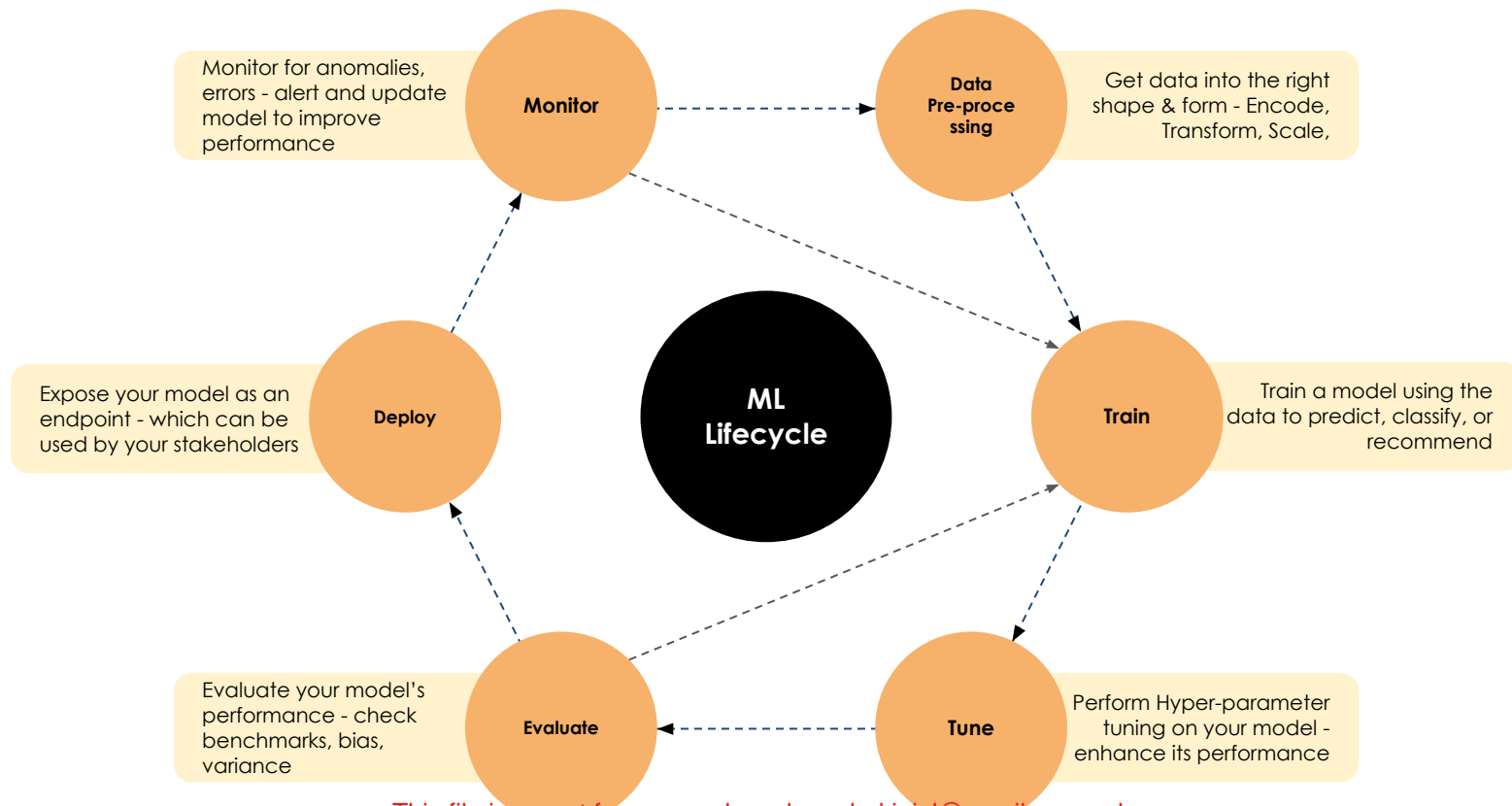


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The Machine Learning Lifecycle

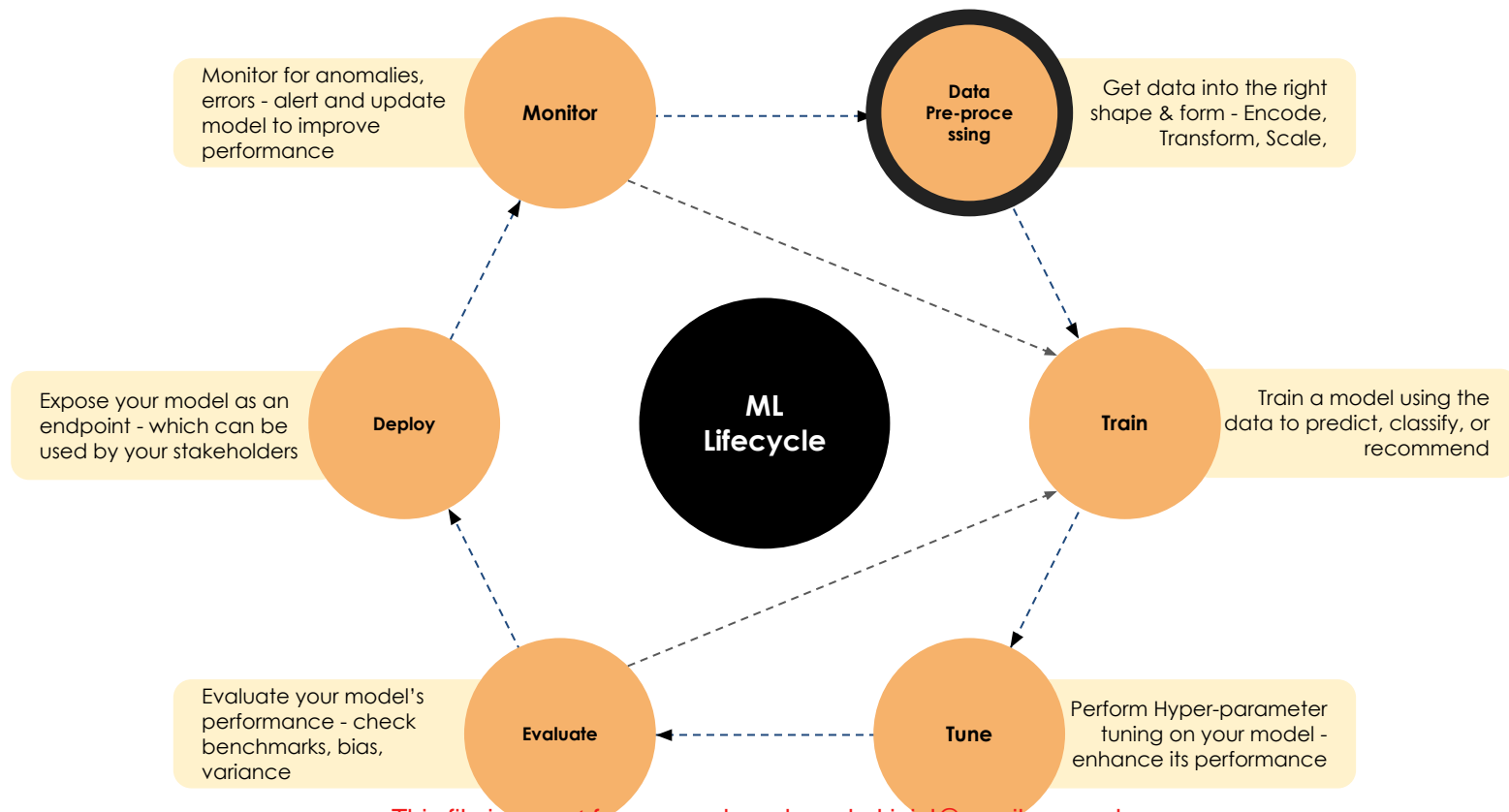


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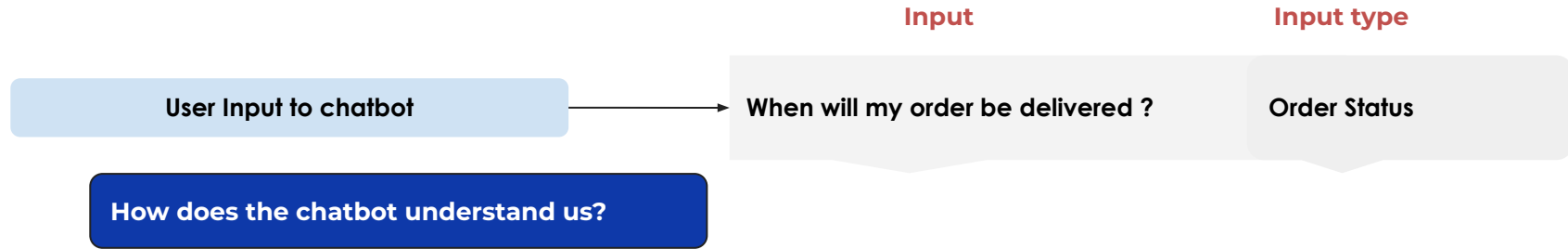


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Data Pre-processing



I want to buy a new HP Laptop

Make a purchase

Intent Recognition

I want to buy a new HP Laptop

Product - new Laptop

Entity Recognition

I want to buy a new HP Laptop

Brand - HP

Named Entity Recognition

I want to buy a new HP Laptop

Sentiment - Positive

Sentiment Analysis

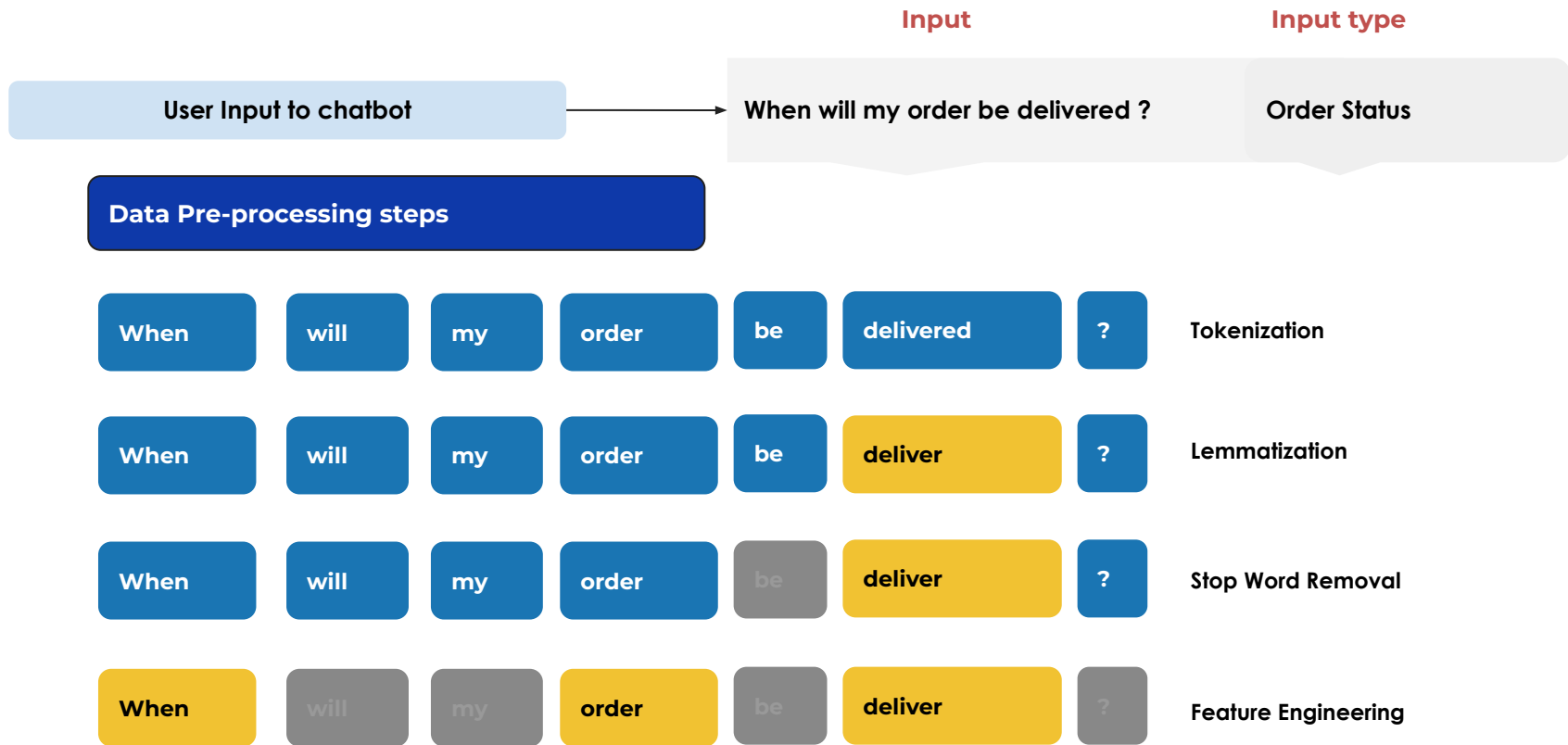
This is how a machine understands - this is a customer, who seems to have an overall positive sentiment, and wants to purchase a new HP laptop

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Data Pre-processing

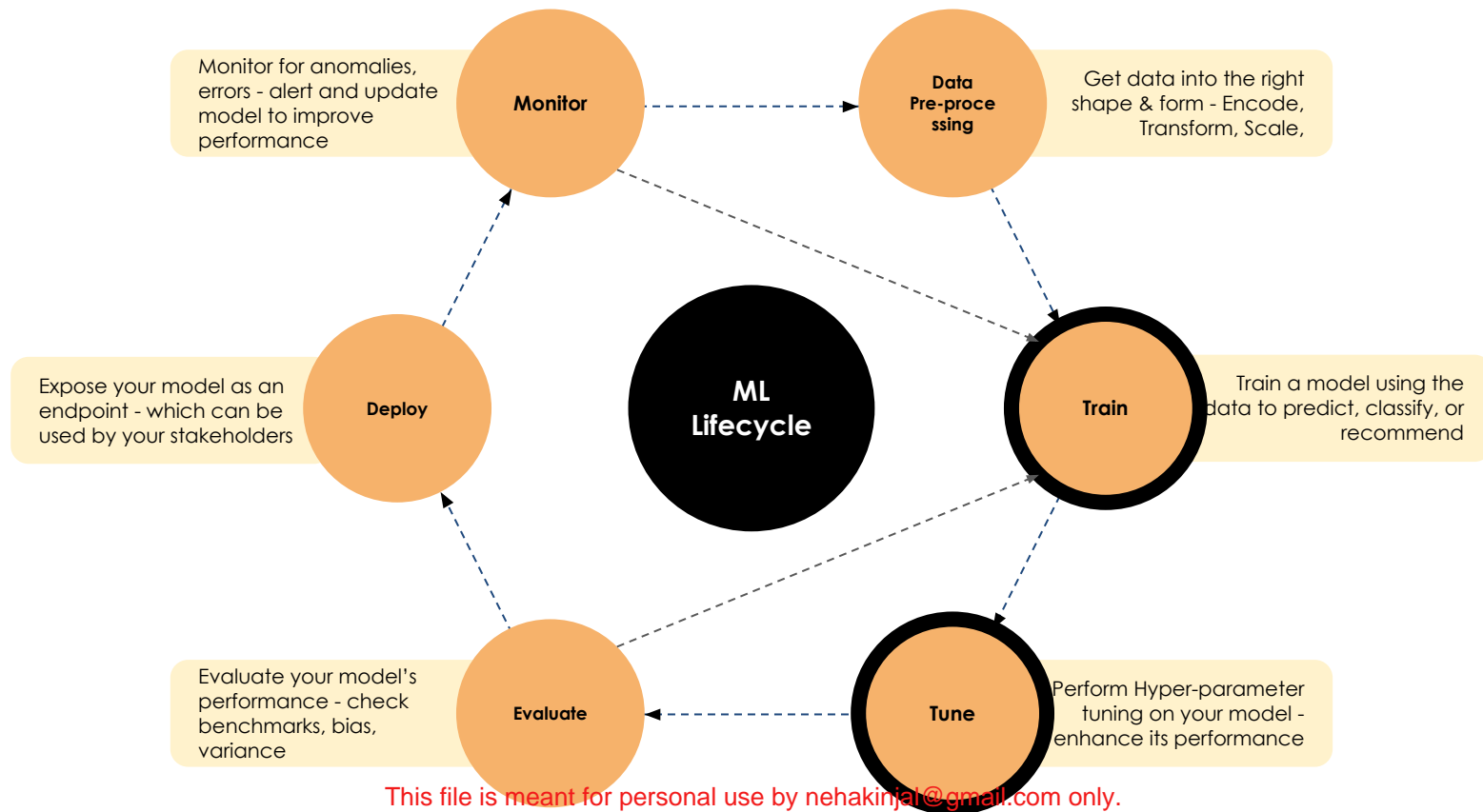


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Training & Tuning

Model Training

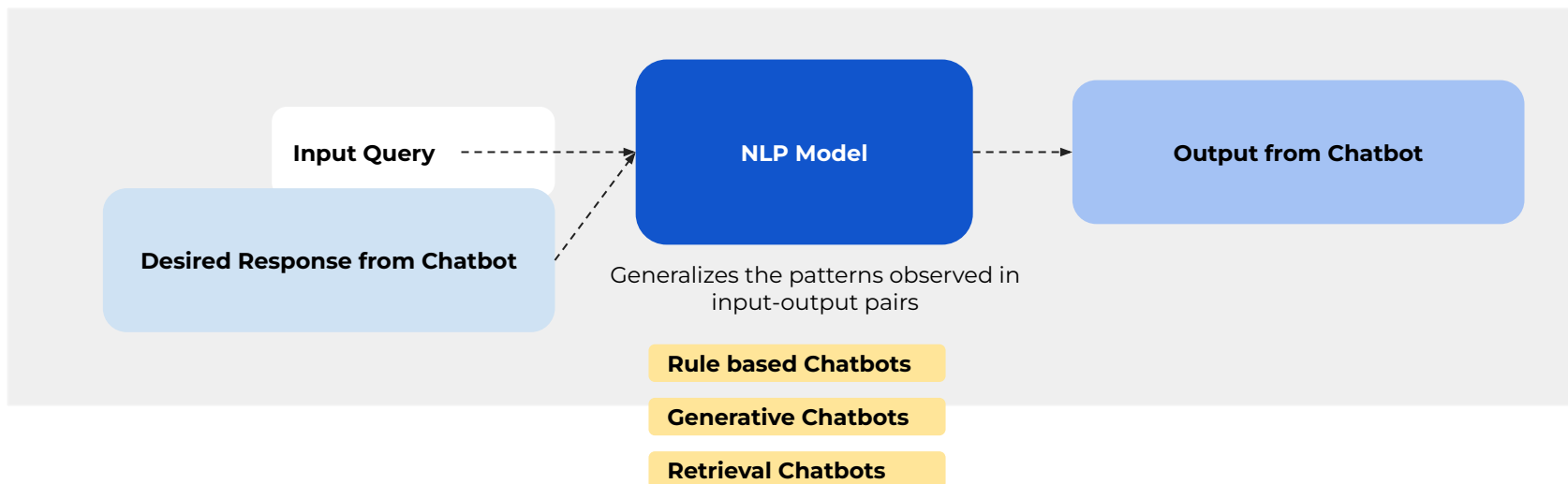
Labeled Dataset



Input Query



Desired Response from Chatbot



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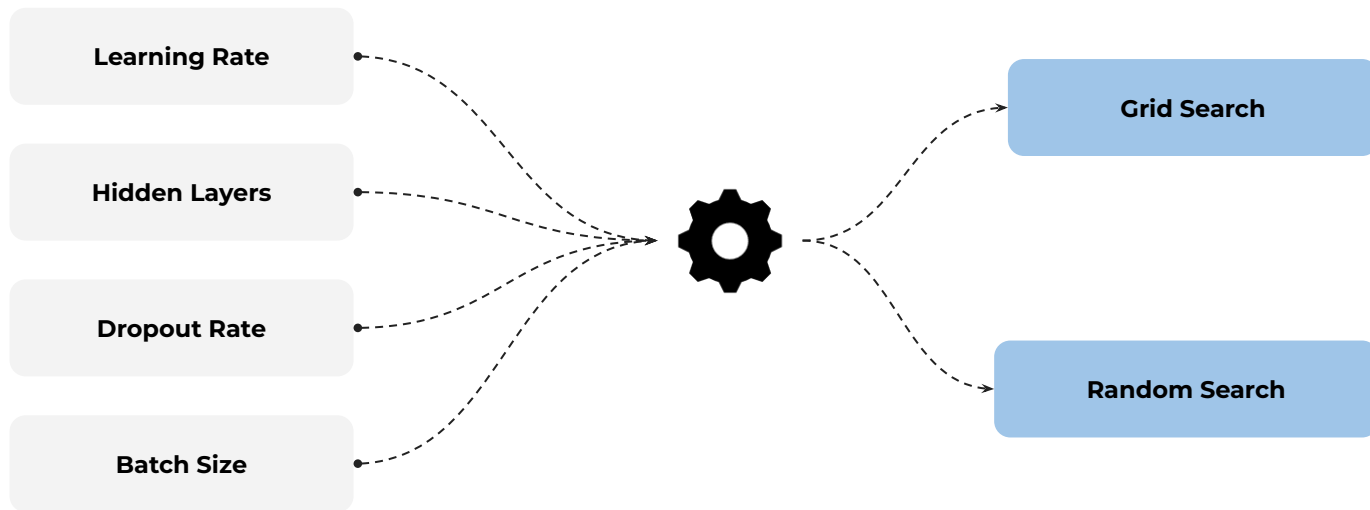
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Training & Tuning

Model Tuning

“Hyperparameters control the behavior of the model during training”



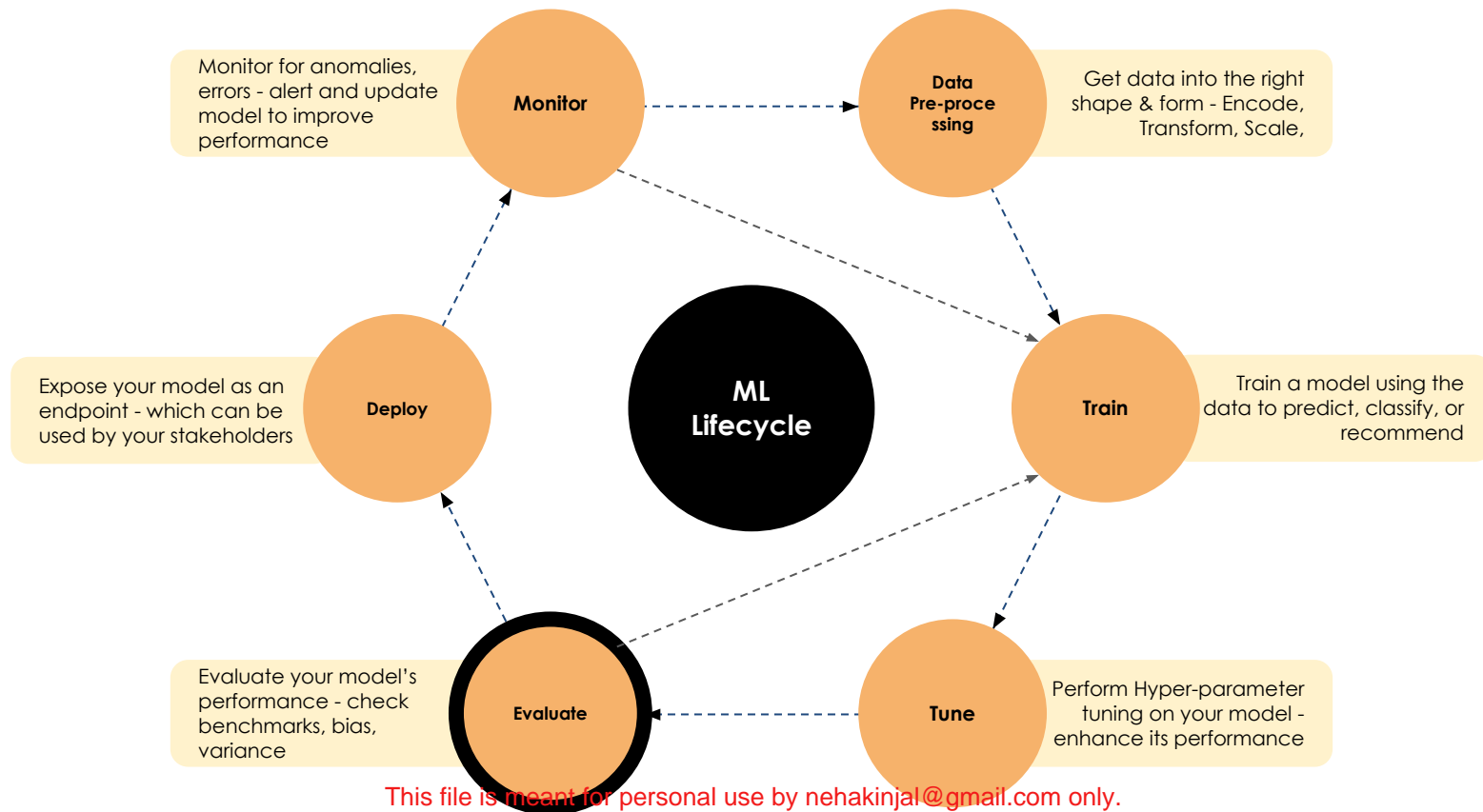
Hyperparameter tuning involves testing different combinations of hyperparameters and selecting the combination that offers the best performance

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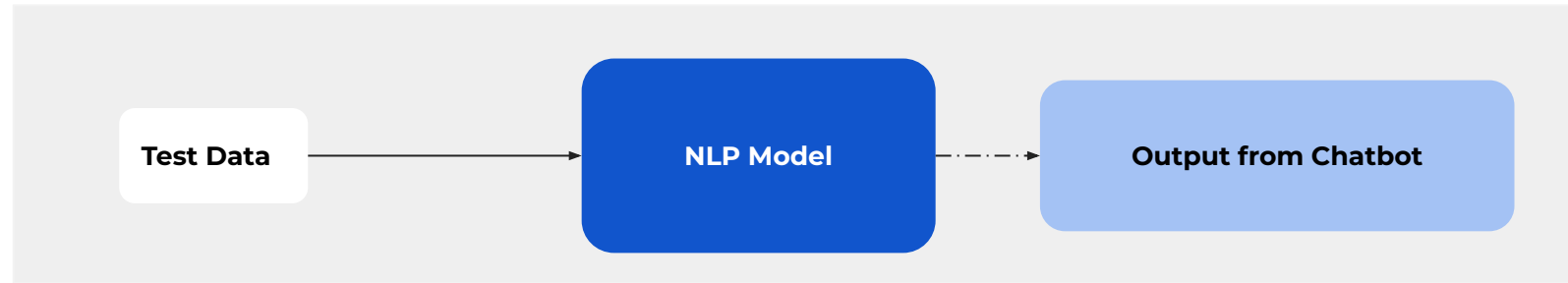
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Performance Evaluation

Model Testing

Using **Validation / Test Dataset** that is different from training data



The output from Chatbot is evaluated using different Evaluation metrics like **Accuracy, Recall, Precision**

Evaluation

Generalize

well on new examples

Best fit

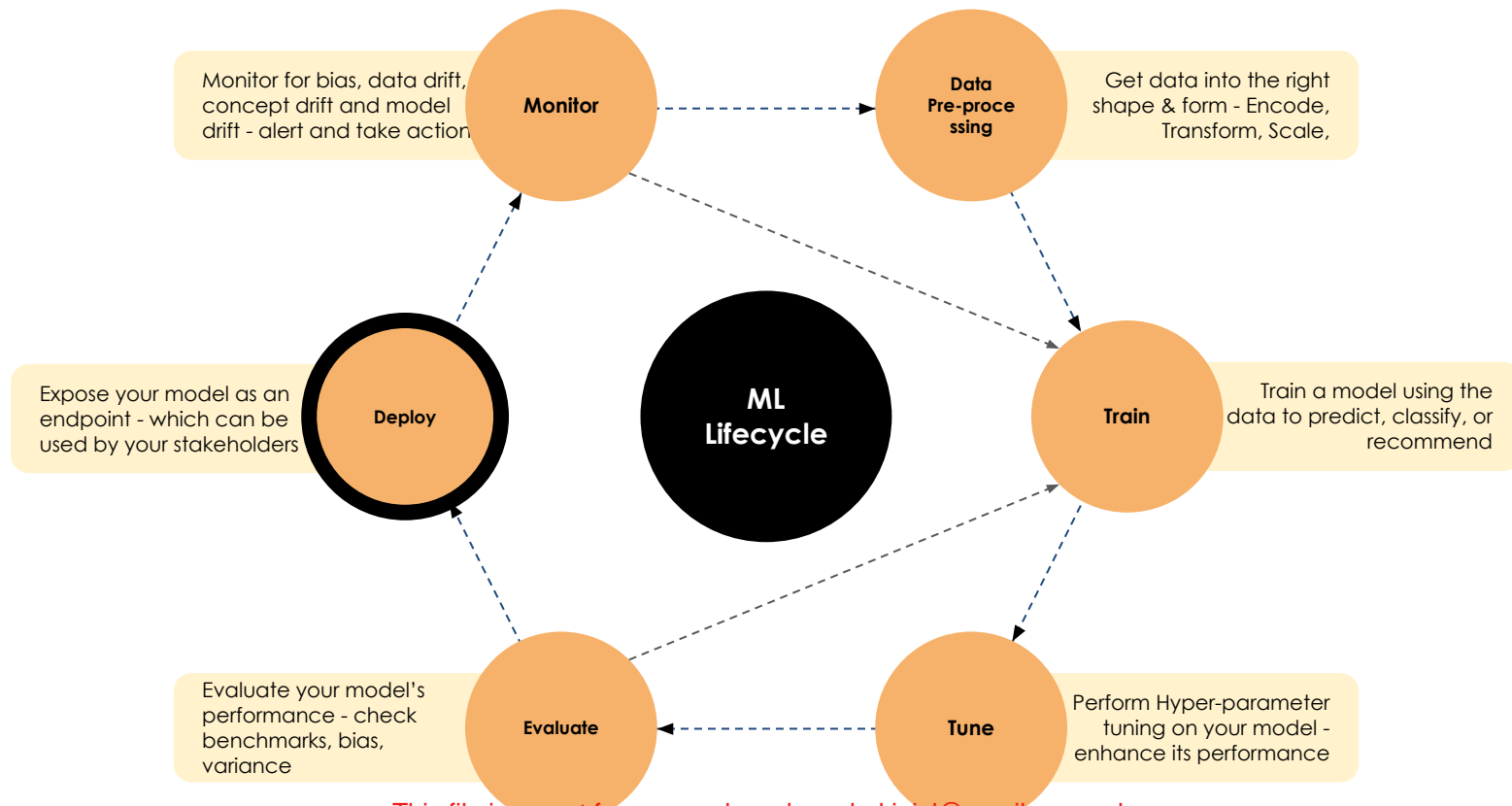
To prevent overfitting/underfitting

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The Machine Learning Lifecycle



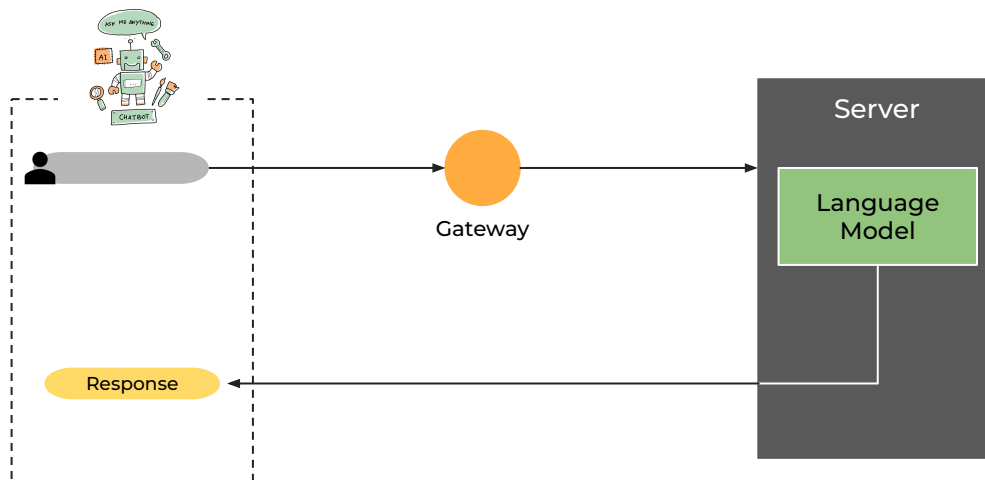
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Model Deployment

“How am I able to get the real time response for my queries?”

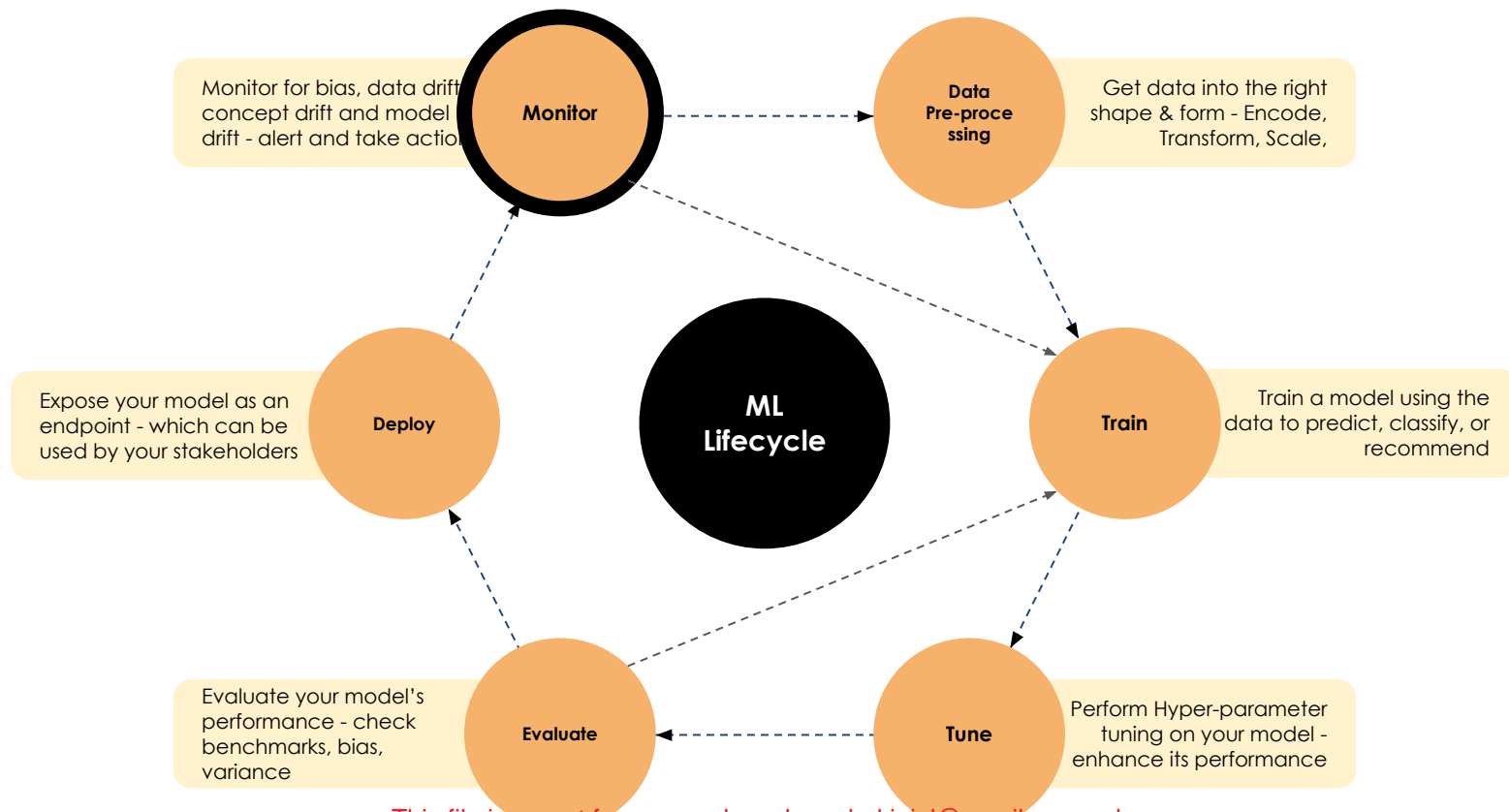


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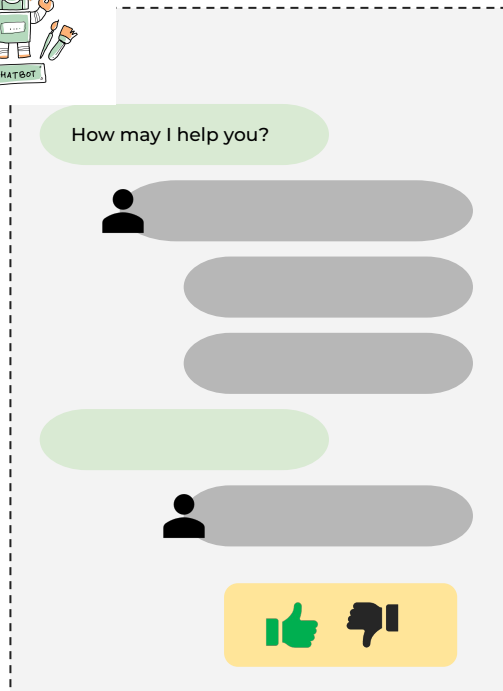
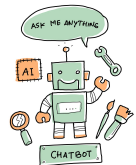


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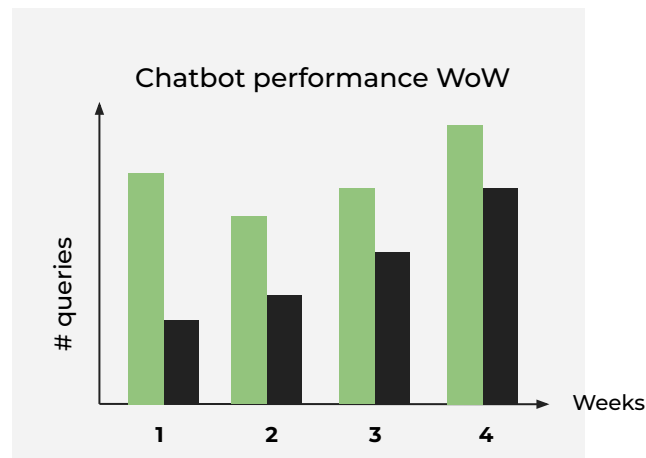
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Model Monitoring



Date	C-ID	Category	Query	Response	Satisfied

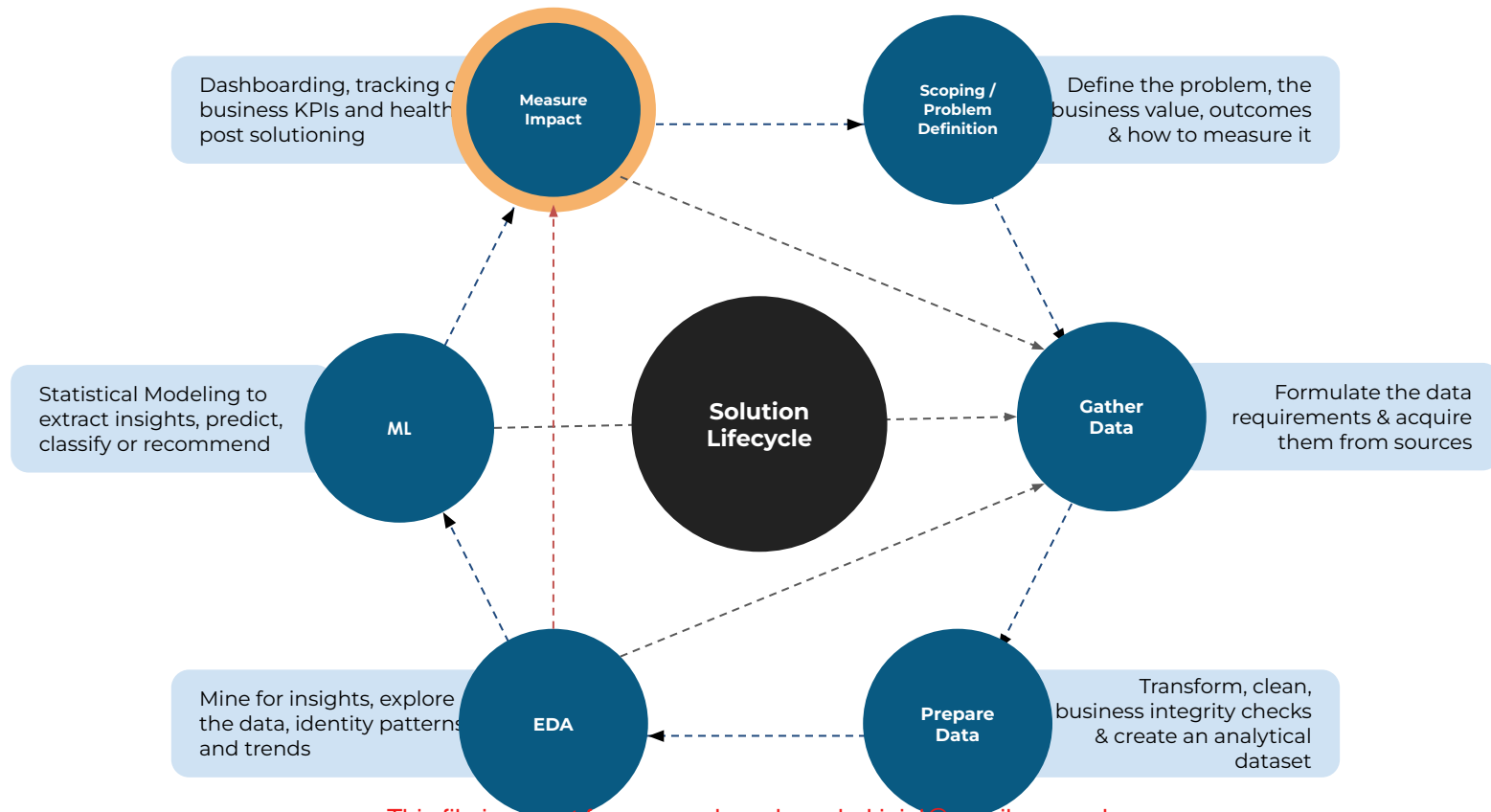


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A typical solution lifecycle



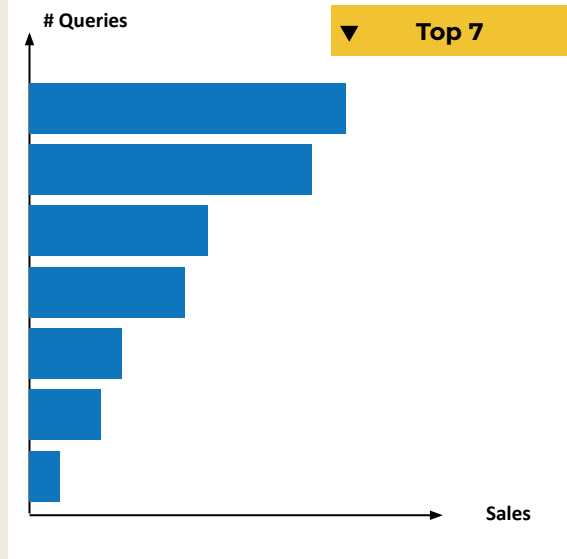
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Measuring Impact

Dashboard Title: Weekly Query Response Metrics



% Satisfaction

% Escalations

WoW

WoW

80.25% +4.7%

5.13% +1.7%

Satisfied

▼ Support

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Summary

To recapitulate, we learned:

1. The problems that customers face commonly in ecommerce domain like inadequate customer support, difficult navigation, product selection issues and how a chatbot can help solve them
2. How a UI-UX developer, a Data Scientist, a Data Engineer, an ML Engineer and a Product Manager collaborate to build a chatbot
3. How the data science and machine learning lifecycle work in gathering data, building and monitoring the chatbot
4. How the data engineering pipeline, the machine learning pipeline and the operations pipeline assist in development and maintenance of the solution
5. How an input given to the chatbot is meaningfully interpreted by the chatbot to generate a suitable response
6. The outcomes that arise with a successful chatbot implementation and how does it impact the business

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