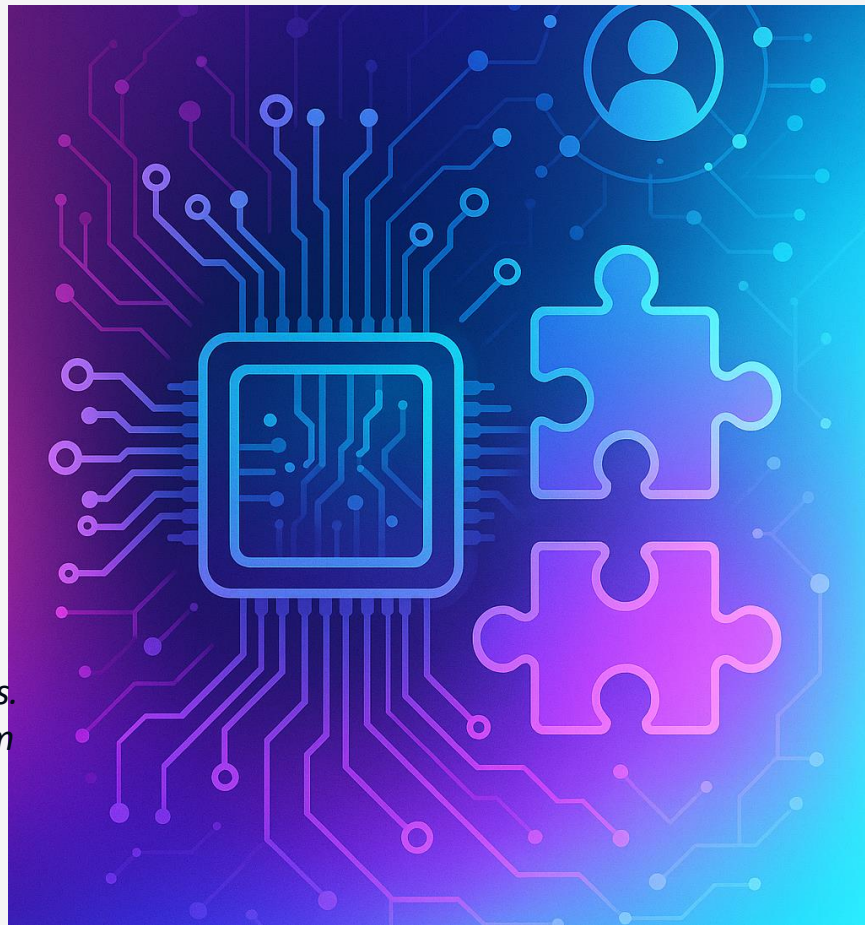


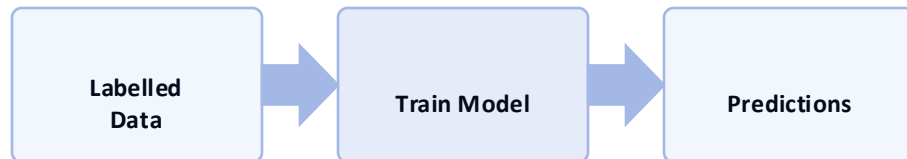
# AI Fundamentals for Product Development

*Master AI fundamentals for building user-facing products.  
Learn core machine learning concepts and integrate them  
into apps.*

July 30, 2025



# Supervised Learning



- Supervised learning trains models on labelled examples to map inputs to known outputs.
- During training, predictions are compared to the correct labels and the model adjusts to minimise errors.
- Two key problem types: classification for discrete categories (e.g., spam detection) and regression for continuous values (e.g., price forecasting).

# Natural Language Processing

*NLP empowers machines to understand, interpret and generate human language.*



## Sentiment Analysis

Determine whether text expresses positive, negative or neutral emotion.



## Entity Recognition

Identify and categorise key entities such as people, organisations and places.



## Text Generation

Generate human-like text for tasks like summarisation and conversation.

# Recommendation Systems

*Personalise experiences using user behaviour and item data.*



## **Collaborative Filtering**

Suggest items based on patterns of user interactions and similar preferences.



## **Content-based**

Recommend items using attributes and features of items themselves.



## **Hybrid**

Combine collaborative and content-based signals for robust recommendations.

# Tools of the Trade

*Industry-standard tools for building AI-powered applications:*



## Python

General-purpose language favoured for ML projects due to simplicity and readability.

Rich ecosystem of libraries (NumPy, Pandas, TensorFlow, PyTorch).



## scikit-learn

Widely used open-source library built on NumPy, SciPy and Matplotlib.

Provides consistent APIs for classification, regression, clustering and pipelines.



## Hugging Face Transformers

Open-source framework with a model hub of state-of-the-art pre-trained models.

Pipelines simplify using these models for NLP, vision and other domains.

# User Needs Analysis

*Align AI features with real user goals.*



- Understand pain points and motivations to build features that resonate.
- Stay ahead of changing user behaviour with continuous research.
- Use data to prioritise features and remove friction, increasing satisfaction.

# Product-Market Fit

*When your product solves a real problem for a viable market and enough customers to sustain growth.*

## Why it matters

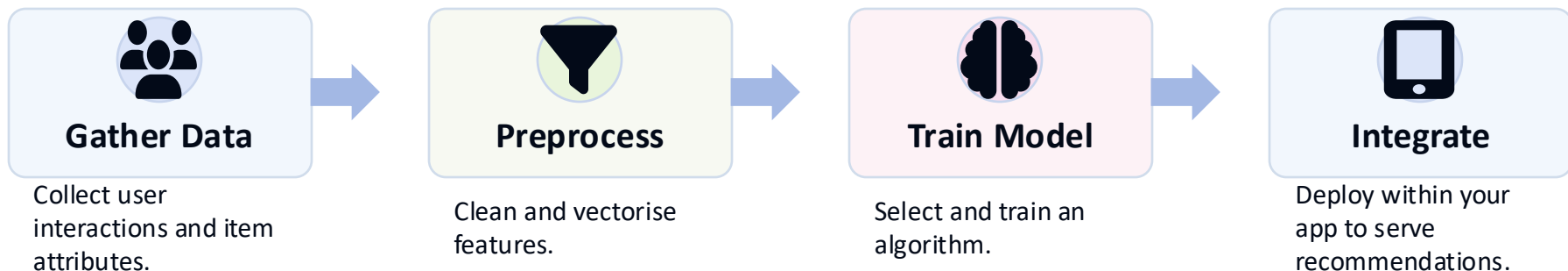
- It's vital for long-term product success – without real demand, even the best engineering fails.
- Applies equally to startups and established companies launching new products.
- Helps avoid building solutions for problems that don't exist.

## Steps to find PMF

1. Identify a growth opportunity through market research.
2. Understand customer needs and develop personas.
3. Define your value proposition and how it uniquely solves the problem.
4. Build an MVP to validate your hypotheses.
5. Iterate and adapt based on feedback until fit is achieved.

# Let's Build!

*Apply what you've learned: build a simple recommendation system.*



- Gather user and item data.
- Preprocess data: normalise, encode and vectorise features.
- Train and evaluate your model using collaborative or content-based approaches.
- Integrate the recommender into your product to deliver personalised experiences.