MODULE 2 Recommendation Engines

2.1 What are Recommendation Engines?

Recommendation Engines use Artificial Intelligence and Machine Learning to predict user preferences and suggest relevant products or content in real time.

How Recommendation Systems Work

1	Collect user interaction data (clicks, purchases, ratings, watch history)
2	Analyse patterns and individual preferences using ML algorithms
3	Generate personalised suggestions ranked by relevance
4	Deliver recommendations in real time across the platform

Real-World Examples

Platform	What Is Recommended
Netflix	Movies and TV shows based on viewing history
Amazon	Products based on browsing and purchase behaviour
Spotify	Songs and playlists based on listening habits
YouTube	Videos based on watch history and engagement

2.2 Collaborative Filtering

Collaborative filtering recommends items based on similarities between users — if two people have similar tastes, they are likely to enjoy the same new items.

! **Working Principle:** *People with similar interests often like similar things.*

Step	Action
1	Identify users with similar interaction histories
2	Analyse their preferences and highly rated items
3	Recommend items enjoyed by similar users but not yet seen by the target user

Advantages

- Discovers new and unexpected content
- Learns continuously from user behaviour
- Improves accuracy with more interaction data

Used By

- Netflix
- Spotify
- YouTube
- Amazon

2.3 Content-Based Filtering

Content-based filtering recommends items similar to those a user has previously liked, using the attributes and features of the content itself rather than other users' behaviour.

Features Analysed

- Genre
- Keywords
- Categories
- Tags
- Themes
- Attributes

> Example: If a user likes science fiction movies, the system recommends other science fiction content with similar themes, directors, or cast members.

! **Advantage:** *Works well even when user interaction data is limited (no cold-start problem for items).*

2.4 Collaborative vs. Content-Based Filtering

Feature	Collaborative Filtering	Content-Based Filtering
Focus	User behaviour patterns	Item features & attributes
Data Used	Ratings and actions of similar users	Properties of previously liked items
Key Strength	Discovers new & unexpected items	Highly personalised suggestions
Main Limitation	Cold start problem for new users	Can lead to repetitive recommendations
Best For	Social platforms, streaming services	News, articles, niche catalogues

2.5 Business Importance of Recommendation Systems

Recommendation systems drive measurable commercial value by keeping users engaged and increasing the likelihood of purchase.

- Improved customer engagement
- Increased conversion rates
- Better customer loyalty
- Higher revenue growth
- Reduced content discovery friction
- Personalised user journeys

! **Key Principle:** *Better recommendations create happier users and stronger businesses.*