# Facebook before AI:

**Server-Client Model:**

Facebook operated on a client-server model

**Databases:**

Relational databases like MySQL were used to store user data

**User Interface:**

HTML/CSS/JavaScript: The front-end was built using standard web technologies such as HTML, CSS, and JavaScript,

**PHP**: Facebook was originally built using PHP

**Data management:**  
SQL queries were used to manage the data

**Caching:**  
memchache were used for best performance.

**User authentication security:**

**Session management:**Session were used for the user authentication and cookies were used for best performance

**Security measures :**Basic secutrity measures were taken into account like ssl/tls

**Social Graph**

**Friendships and Connections:** Facebook’s core functionality revolved around the social graph, representing users and their connections. Friend relationships were stored and queried to display relevant content.

**News Feed:** The News Feed algorithm, although less sophisticated than today, used basic ranking and filtering techniques to show users the most relevant posts from their friends.

Facebook after AI:  
**1.Content Personalization**

* **Machine Learning Models**: AI-driven machine learning models, such as collaborative filtering and deep learning algorithms, are used to personalize the News Feed, showing users the most relevant posts based on their interactions, preferences, and behavior.
* **Recommendation Systems**: Advanced recommendation systems suggest friends, pages, groups, and content that users might find interesting

**2. Content Moderation and Safety**

* **Computer Vision**: AI models for image and video recognition are deployed to automatically detect and flag inappropriate content, such as violence, nudity, and hate speech.
* **Natural Language Processing (NLP)**: NLP algorithms are used to analyze text for harmful language, spam, and other violations of community standards.
* **Automated Reporting**: AI assists in prioritizing user reports of inappropriate content, ensuring that the most urgent issues are addressed promptly.

**3. User Engagement and Interaction**

* **Chatbots and Virtual Assistants**: AI-powered chatbots facilitate customer service and provide instant responses to user inquiries on Facebook Messenger.
* **Voice and Text Assistants**: NLP and speech recognition technologies enhance the functionality of Facebook’s voice and text-based virtual assistants.

**4. Content Creation and Curation**

* **Automated Content Generation**: AI tools assist in generating captions, tagging images, and creating automated highlights from videos.
* **Content Summarization**: NLP algorithms summarize long articles and posts, making it easier for users to consume information quickly

# Netflix before AI:

**1. Basic Infrastructure**

* **Server-Client Model**: Netflix used a client-server architecture where user requests from web browsers or applications were handled by servers.
* **Databases**: Relational databases like Oracle and MySQL were used to store user data, movie metadata, and transactional information.

**2. Content Delivery**

* **CDN (Content Delivery Network)**: Netflix partnered with CDNs to distribute video content to users efficiently. This ensured that videos could be streamed smoothly by delivering content from servers geographically close to the user.
* **Buffering**: Basic buffering techniques were used to pre-load parts of the video to reduce playback interruptions

**3. User Interface**

* **Web and App Development**: The user interface was developed using standard web technologies such as HTML, CSS, and JavaScript for web browsers, and platform-specific languages (Java for Android, Objective-C for iOS) for mobile applications.

**4. Content Recommendation**

* **Collaborative Filtering**: Early recommendation systems used collaborative filtering methods to suggest content to users based on their viewing history and the preferences of similar users.
* **Basic Personalization**: Users were provided with basic personalized recommendations, but these were not as sophisticated as the AI-driven recommendations seen today.

**5. User Authentication and Security**

* **Session Management**: User authentication was handled through standard session management techniques, using cookies and tokens to maintain user sessions.
* **Encryption**: Basic encryption methods were used to secure user data and communications.

**6. Advertising and Marketing**

* **Basic Targeting**: Marketing campaigns were based on user demographics and viewing history, but lacked the sophisticated targeting and personalization seen with AI.

# Netflix after AI:

**1. Enhanced Content Recommendation**

* **Deep Learning Algorithms**: Netflix uses deep learning models, such as neural networks, to analyze user behavior and preferences more accurately. These models consider various factors like viewing history, user interactions, and content metadata to make personalized recommendations.
* **Collaborative Filtering and Matrix Factorization**: Advanced collaborative filtering techniques, including matrix factorization, help predict user preferences by analyzing patterns in large datasets.
* **Hybrid Recommendation Systems**: Netflix employs a hybrid approach, combining collaborative filtering, content-based filtering, and deep learning to provide more accurate and diverse recommendations.

**2. Improved Content Delivery**

* **Dynamic Adaptive Streaming over HTTP (DASH)**: AI algorithms optimize streaming quality based on real-time network conditions, ensuring smooth playback with minimal buffering.
* **Content Delivery Network (CDN) Optimization**: Machine learning models predict peak usage times and adjust CDN resources dynamically, improving content delivery efficiency.

**3. User Interface Personalization**

* **Personalized UI**: AI customizes the user interface based on individual preferences, showing different artwork, trailers, and thumbnails to different users to maximize engagement.
* **A/B Testing**: Machine learning algorithms continuously run A/B tests on different UI elements to determine the most effective designs for user engagement and retention.

**4. Content Creation and Curation**

* **Data-Driven Content Production**: AI analyzes viewing trends and user preferences to inform content creation decisions, helping Netflix produce shows and movies that are more likely to succeed.
* **Automated Metadata Generation**: Natural Language Processing (NLP) and computer vision techniques automatically generate and tag metadata for new content, improving searchability and recommendations.

**5. Advanced Analytics and Insights**

* **Predictive Analytics**: Machine learning models predict user behavior, such as churn likelihood and content popularity, enabling Netflix to take proactive measures to retain users and promote content.

The integration of advanced AI technologies significantly transformed Netflix, enhancing its recommendation systems, content delivery, user experience, and overall operational efficiency. Here are some of the key changes and AI technologies that Netflix implemented:

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* **Sentiment Analysis**: NLP algorithms analyze user reviews and social media mentions to gauge public sentiment about content, helping Netflix understand audience reactions.

**6. Enhanced Security and Fraud Detection**

* **Anomaly Detection**: AI models monitor user activity to detect and prevent fraudulent behavior, account sharing, and other security threats.
* **Behavioral Biometrics**: Machine learning analyzes user behavior patterns to identify potential security risks and verify user identities.

# Youtube before AI:

**1. Basic Infrastructure**

* **Server-Client Model**: YouTube used a client-server architecture where user requests from web browsers or applications were handled by servers.
* **Databases**: Relational databases like MySQL were used to store user data, video metadata, comments, and other information.

**2. Content Delivery**

* **CDN (Content Delivery Network)**: YouTube partnered with CDNs to distribute video content to users efficiently, ensuring smooth playback by delivering content from servers geographically close to the user.
* **Buffering**: Basic buffering techniques were used to pre-load parts of the video to reduce playback interruptions.

**3. User Interface**

* **Web and App Development**: The user interface was developed using standard web technologies such as HTML, CSS, and JavaScript for web browsers, and platform-specific languages (Java for Android, Objective-C for iOS) for mobile applications.

**4. Content Recommendation**

* **Basic Algorithms**: Early recommendation systems relied on simpler algorithms, such as collaborative filtering, which suggested videos based on users' viewing history and the behavior of similar users.
* **Manual Curation**: Human editors and basic algorithmic techniques were used to feature popular videos and curate content for categories and homepages.

**5. User Authentication and Security**

* **Session Management**: User authentication was handled through standard session management techniques, using cookies and tokens to maintain user sessions.
* **Basic Security**: Standard security measures, such as HTTPS for secure communication and CAPTCHA to prevent automated abuse, were implemented.

**6. Analytics and Reporting**

* **Log Analysis**: User interaction logs were analyzed to understand viewing patterns, peak usage times, and popular content.
* **Basic Metrics**: Metrics such as view counts, user ratings, and subscription data were used to gauge content popularity and user engagement.

**7. Content Management**

* **Video Uploads**: Users could upload videos, which were then processed and stored on YouTube’s servers.
* **Metadata and Tags**: Users provided metadata and tags for their videos to help with searchability and organization.

**8. Search and Discovery**

* **Keyword Matching**: Search functionality was based on keyword matching, where users’ queries were matched against video titles, descriptions, and tags.
* **Basic Ranking**: Search results

# Youtube after AI:

**1. Enhanced Content Recommendation**

* **Deep Learning Algorithms: YouTube uses deep learning models, such as neural networks, to analyze user behavior and preferences more accurately. These models consider factors like watch history, search queries, user interactions (likes, shares, comments), and content metadata to make personalized recommendations.**
* **Collaborative Filtering and Matrix Factorization: Advanced collaborative filtering techniques help predict user preferences by analyzing patterns in large datasets.**
* **Contextual Bandits: Used to dynamically update and optimize the recommendations based on real-time user interactions.**

**2. Content Moderation and Safety**

* **Computer Vision: AI models for image and video recognition are deployed to automatically detect and flag inappropriate content, such as violence, nudity, and hate speech.**
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* **Automated Metadata Generation: NLP and computer vision techniques automatically generate and tag metadata for new videos, improving searchability and recommendations.**
* **Content Summarization: AI tools create automated highlights and summaries of videos, making it easier for users to discover relevant content.**

**5. Advertising and Monetization**

* **Ad Targeting and Optimization: Machine learning algorithms analyze user data to deliver highly targeted and personalized advertisements, improving ad performance and user engagement.**
* **Predictive Analytics: AI predicts user behavior and trends, enabling advertisers to optimize their campaigns and budget allocation.**

**6. Enhanced Security and Fraud Detection**

* **Anomaly Detection: AI systems monitor user activity to detect and prevent fraudulent behavior, such as click fraud, bot activity, and unauthorized content use.**
* **Content Verification: AI helps in verifying the authenticity of content and protecting intellectual property rights.**