

## **NM2 Applications of AI in daily life (on a personal level) Foundational**

### **How the Biggest Social Media Sites Use AI**

Over half of the world's population uses at least one social media website. Whether through Facebook, Twitter, Youtube, etc., social media provides an opportunity to **connect** with others more efficiently than ever.

Social media platforms need technology that keeps up with massive amounts of users. That's where artificial intelligence comes in. With AI, social media platforms can keep up with monitoring their platform and curating content that users are most likely to enjoy and stay on the platform.

- **Youtube**

YouTube employs Artificial Intelligence (AI) for various purposes to ensure a safer and more inclusive platform. One of its top priorities is to protect users from objectionable content and violent extremism. In 2020, about 8 million videos were removed, with over 70% flagged by AI classifiers.

To address global audiences and break language barriers, YouTube utilizes AI-powered translation and video description tools. These tools provide subtitles in multiple languages, making videos accessible to users worldwide, including those with hearing impairments.

AI plays a crucial role in combating intellectual property theft on YouTube. Given the massive amount of content uploaded every minute, automation is essential. The platform uses AI to scan uploaded content against a vast database of copyrighted files, automatically detecting and flagging any material that infringes on intellectual property rights. Content creators then have the option to decide whether to monetize, flag, or take down the flagged material.

- **Meta**

Meta utilizes AI through its virtual assistant, Meta AI, which has evolved to provide enhanced assistance. The AI offers detailed responses on mobile, accurate summaries of search results, and improved help across various requests. Users can engage with Meta AI through messaging platforms or by using voice commands with Meta smart glasses.

Beyond chats, Meta AI plays a crucial role in optimizing user experiences on Facebook and Instagram. It powers AI-generated suggestions for post comments and community chat topics, serves search results, and enhances product copy in Shops. Furthermore, Meta AI introduces a standalone experience called "imagine with Meta AI," catering to creative hobbyists. Overall, Meta leverages AI to enhance user interactions and improve various aspects of its platform.

- **Linked In**

LinkedIn has integrated AI across various functionalities to enhance user experiences and streamline recruitment processes:

**AI-Generated Recruiter Messages:** LinkedIn Recruiter now features AI-generated messages that create personalized InMail messages for potential candidates based on their LinkedIn

profiles. This accelerates interactions between recruiters and candidates, leading to more tailored outreach and a reduction in generic, non-personalized messages that may be perceived as spam.

**AI-Enhanced Job Descriptions:** LinkedIn employs AI to assist in crafting job descriptions. Recruiters can input basic information, and the AI generates a customizable job description. This tool provides a solid foundation for recruiters and hiring managers, allowing them more time to focus on articulating specific role requirements. This, in turn, aids job candidates in finding more relevant positions.

**AI-Powered Profile Building:** To improve user experiences, LinkedIn utilizes an AI tool that offers personalized writing suggestions. This feature identifies key skills and experiences, recommending ways to present them in users' About and Headline sections while respecting each user's unique writing style. This streamlines the profile-building process, providing a more user-friendly experience.

### **AI-powered recommendation system**

An AI-powered recommendation system is a machine learning algorithm designed to predict user preferences and provide ranked suggestions for products or content. Widely used by companies like Google, Amazon, and Netflix, these systems enhance user engagement by offering personalized recommendations. For instance, Spotify suggests songs similar to a user's previous preferences, while Amazon recommends products based on user data.

Despite being effective, recommendation systems are often perceived as "black boxes" due to their complex, less interpretable models. Users may not fully understand the basis of a recommendation, but they generally find the suggestions relevant and helpful. Recommender systems can be built using various approaches, such as collaborative filtering, content-based methods, and link prediction. Notably, even simple implementations can yield strong results, as seen in platforms like Reddit, Hacker News, and Google, which have used straightforward recommendation engines to promote content effectively.

the different types of recommendation systems:

#### **1. Collaborative Filtering Systems:**

Memory-based: Relies on user-item ratings to predict preferences by analyzing user neighborhoods.

User-based: Recommends products based on the preferences of similar users.

Item-based: Recommends products based on the similarity between items calculated using user ratings.

Model-based: Utilizes predictive models, such as decision trees or latent factor models, to parameterize features and solve optimization problems. Examples include YouTube's content recommendations and CourseEra's course suggestions.

#### **2. Content-Based Systems:**

Recommends items based on user preferences and profiles by matching them to previously liked items.

Focuses on item attributes, such as price or publication year, to establish similarity.

Effective when there's limited rating data, leveraging both ratings and item attributes for recommendations.

Examples include Amazon's product feed and Spotify's music recommendations.

### **3. Hybrid Recommendation Systems:**

Parallel Design: Combines multiple recommendation systems simultaneously to generate recommendations.

Sequential Design: Uses a single recommendation engine, with its output passed on to the next recommender in the sequence.

Increases robustness and personalization in user recommendations by combining different models.

Netflix is a notable example of a company using a hybrid recommendation system, combining collaborative and content-based filtering.

### **4. Knowledge-Based Systems:**

Generates recommendations based on user needs and domain expertise, incorporating predefined rules.

Rules set the context for each recommendation, considering criteria for when a specific product or service would benefit the user.

Offers easily explainable recommendations, making it suitable for complex domains with infrequently purchased items.

Doesn't suffer from the same cold-start problems as other methods.

These recommendation systems play a crucial role in enhancing user experiences across diverse platforms, from personalized content suggestions in entertainment to relevant product recommendations in e-commerce. They cater to different needs, leveraging various techniques to provide effective and personalized suggestions to users.

## **AI in Gaming**

In the contemporary landscape of gaming, the role of artificial intelligence (AI) has experienced a transformative shift. The focus is no longer on questioning whether AI should be permitted to cheat in games, but rather on exploring how AI can elevate the gaming experience to unprecedented levels. Advanced AI technologies have revolutionized the gaming industry, altering the way games are developed, played, and perceived.

Once merely a tool to provide competitive elements, AI has evolved into an integral component of the gaming ecosystem. It now serves as the invisible force shaping immersive virtual worlds, the puppeteer controlling non-player characters (NPCs) with remarkable realism, and the architect designing intricate game mechanics. The influence of AI in gaming extends beyond the game itself, impacting player behavior analysis, game testing, and the burgeoning field of esports.

The impact of AI advancements in gaming is profound, reshaping the industry in ways previously considered science fiction. Games have become more dynamic, interactive, and personalized, offering players an experience tailored to their preferences and play styles. The lines between the virtual and real worlds are blurring, with AI-powered virtual reality (VR) games providing an unprecedented level of immersion.

In the realm of video games, AI has fundamentally transformed the role of NPCs. Traditionally relegated to the background as props or quest givers, NPCs are now experiencing a paradigm shift in how they are perceived and utilized in gaming environments. The use of AI to enhance NPC behavior goes beyond creating realistic characters; it entails fundamentally changing how players interact with virtual worlds. Unlike static and predictable traditional NPCs, AI-enhanced NPCs are dynamic and adaptable, capable of learning and evolving in response to player actions. This shift from static to dynamic NPCs represents a significant advancement in interactive entertainment, opening up new possibilities for emergent gameplay and narrative experiences.

Furthermore, the impact of AI in enhancing NPC behavior extends beyond the gaming realm, influencing various aspects of interactive entertainment.

### **AI in home appliances**

In the present era, artificial intelligence (AI) is significantly influencing the development of smart home systems, providing homeowners with remote control and automation capabilities. The evolution of AI in gaming has paved the way for similar advancements in smart technology, emphasizing enhanced convenience, security, and energy efficiency. Rather than promoting laziness, AI is redefining what it means for technology to be 'smart,' moving beyond simple control through mobile devices to systems that learn and adapt autonomously.

The integration of AI into smart home systems has ushered in a new era of intelligence. Machine learning algorithms enable smart devices to understand user habits and preferences over time, a concept first applied in devices like smart thermostats. This learning capability allows for the creation of personalized schedules for heating and cooling, optimizing energy usage for greater comfort.

The global smart home automation market is projected to experience substantial growth, with an anticipated annual growth rate of 27.3% from 2023 to 2030, according to Grand View Research. This surge is attributed to the increasing demand for smart applications like voice control and energy management.

The kitchen segment appears to be a hotspot for smart home innovations, with a predicted high compound annual growth rate. Notable introductions include General Electric's Profile smart mixer and LG's smart MoodUP refrigerator, both featuring voice assistant support and connectivity. As AI continues to permeate the kitchen space, it raises questions about its role in cooking, cleaning, and food storage.

AI-assisted kitchen appliances extend beyond traditional cooking tasks. Smart ovens with built-in AI can accurately predict when a dish is done, eliminating the need for manual timers. Products like the Bosch Series 8 smart oven use AI to continuously monitor metrics like temperature and humidity, learning over time to predict when dishes will be ready.

In cleaning, AI-enabled dishwashers assess the number of dishes, level of grime, and type of food residue to select the most appropriate washing cycle. These intelligent appliances offer maintenance reminders and even place orders for spare parts when needed. Washing machines, such as Samsung's AI EcoBubble, utilize AI to learn and remember laundry habits, suggesting the most suitable cycles for optimal efficiency and effectiveness.

In food storage, AI-equipped refrigerators utilize temperature sensors and cameras to monitor food conditions, reducing the risk of food poisoning. They can read NFC labels to track expiration dates and suggest meals based on ingredients, contributing to reduced food waste.

As AI becomes an integral part of everyday appliances, especially in the kitchen, we can anticipate more efficient and convenient living. The ongoing integration of AI into smart home systems is poised

to bring about substantial changes in how we interact with and manage our living spaces, making them more responsive, intuitive, and adaptable to individual preferences.

## **Smart Assistants**

Voice-powered virtual assistants, exemplified by Siri and Alexa, have become integral to daily life, revolutionizing how we interact with devices through simple voice commands. These AI-driven digital assistants, rooted in artificial intelligence (AI), significantly enhance customer experiences by interpreting and responding to user voice commands.

Siri, developed by Apple, is prominent on Apple devices, while Alexa, from Amazon, extends across a variety of devices like smart speakers and displays. These virtual assistants leverage AI to perform tasks ranging from setting reminders to controlling smart home devices, showcasing their versatility and widespread adoption.

### **1. AI-Powered Digital Assistants:**

Virtual assistants, driven by AI, interpret and respond to voice commands.

AI, particularly Natural Language Processing (NLP) and Natural Language Understanding (NLU), empowers them to understand the context and meaning behind user commands.

### **2. Automatic Speech Recognition (ASR):**

ASR converts spoken language into written text for analysis.

The process involves capturing voice commands, pre-processing audio to enhance clarity, and using ASR algorithms to transcribe speech into text.

### **3. Natural Language Understanding (NLU):**

NLU algorithms extract relevant information from user input, understanding intent and context.

Syntax, grammar, and structure of spoken language are analyzed to derive meaning and context.

### **4. Natural Language Generation (NLG):**

NLG generates human-like responses for natural interactions.

Tailors responses based on user commands, preferences, and available information.

### **5. Machine Learning (ML) in Virtual Assistants:**

ML enables virtual assistants to learn from interactions, adapting to user preferences.

Personalizes experiences by continuously improving response generation based on collected data.

### **6. Text-Based Virtual Assistants:**

Provide an alternative mode of interaction through text commands instead of voice.

Suited for noisy environments and accommodates users with hearing impairments or preferences for written communication.

These technologies have transformed the smart home automation market, with a projected annual growth rate of 27.3% from 2023 to 2030. Siri and Alexa, as leading examples, showcase the evolving capabilities of virtual assistants. They exemplify how AI, through ASR, NLU, NLG, and ML, facilitates seamless and personalized interactions, making our lives more efficient and convenient. As these virtual assistants continue to evolve, their integration into various devices and environments demonstrates the profound impact of AI on enhancing user experiences.

### **Intelligent search engines**

In the ever-evolving landscape of information retrieval, traditional search engines have given way to a new era marked by AI-powered search engines. These cutting-edge tools leverage advanced technologies to enhance the search experience, providing users with more relevant and accurate results. This article explores 11 top AI search engines that have reshaped the way we seek and find information, offering features ranging from personalized responses to privacy-focused solutions.

#### Site Search and its Importance:

Site search, also known as internal search or website search query, is a functionality that enables users to search for specific information within a particular website. It enhances user experience, facilitates navigation, and aids users in efficiently navigating through large amounts of data on a website.

#### AI-powered Site Search Defined:

An AI-powered site search takes website search functionality to the next level by incorporating artificial intelligence (AI) technologies. These systems utilize advanced algorithms, natural language processing (NLP), machine learning, and other AI techniques to interpret user queries, understand context, and deliver intelligent search results.

#### Differentiation from Traditional Systems:

Unlike traditional site search systems that rely on basic keyword matching, AI-powered site search delves deeper. It comprehends user intent, analyzes contextual information, and provides contextually relevant results, surpassing the limitations of mere keyword matching.

#### Role of Natural Language Processing (NLP) and Machine Learning:

AI-powered search engines excel in understanding natural language queries, enabling users to interact in a more conversational and intuitive manner. NLP allows for flexible and human-like phrasing of queries. Machine learning contributes to continuous improvement by learning from user interactions, feedback, and relevance judgments, refining algorithms over time.

#### AI Search Workflow:

AI search systems follow a systematic workflow:

1. **Data Indexing:** Content across websites is analyzed and indexed, including metadata, keywords, and structure.
2. **Query Understanding:** NLP techniques break down user queries, identifying keywords and understanding context and intent.
3. **Relevance Ranking:** Algorithms determine the relevance of indexed items through keyword matching, semantic analysis, and machine learning.
4. **Result Retrieval:** The system retrieves search results based on relevance scores, presenting them in a ranked order.
5. **Personalization:** AI systems can personalize results based on user data, demographics, behavior, and past interactions.
6. **Continuous Learning:** Machine learning ensures continuous learning and improvement by incorporating user feedback and relevance judgments.

In conclusion, AI-powered search engines represent a paradigm shift in information retrieval, offering enhanced capabilities and improved user experiences. From understanding natural language to continuous learning, these engines usher in a new era of efficient and personalized search functionalities.

## **Chatgpt**

The Evolution of Chatbots:

In recent years, chatbots, akin to ChatGPT, have emerged as integral components of conversational AI. These bots, powered by advanced language models, facilitate human-computer interactions through natural language conversations. Unlike their predecessors, modern chatbots aim not only to understand and respond to user queries but to engage in dynamic and context-aware conversations, significantly enhancing user experiences.

Working Mechanism of Chatbots:

The underlying technology of chatbots involves Natural Language Processing (NLP) and machine learning algorithms. NLP enables these bots to comprehend and interpret user inputs, breaking down complex sentences into meaningful components. The machine learning aspect allows chatbots to learn from vast datasets, refining their language understanding, contextual awareness, and response generation over time.

Key Components of Chatbot Functionality:

1. **Intent Recognition:** Chatbots use NLP algorithms to identify the user's intent behind a query, discerning the purpose of the interaction.
2. **Entity Recognition:** Understanding specific entities within a user's input, such as names, locations, or dates, contributes to more contextually relevant responses.
3. **Context Management:** Effective chatbots maintain context throughout a conversation, remembering past interactions and responses to provide coherent and relevant information.

4. Response Generation: Leveraging machine learning models, chatbots generate responses that align with the identified intent and context. This involves predicting the next sequence of words based on the input and existing conversation history.

Despite their advancements, chatbots face challenges. They may struggle with ambiguous queries, context switches, or understanding user emotions. Ensuring ethical use and preventing biases in their responses also pose ongoing challenges.

While current chatbots, including ChatGPT, exhibit impressive capabilities, the potential for more advanced versions remains vast. Future iterations may overcome current limitations and introduce features such as improved contextual understanding, emotional intelligence, and the ability to handle multi-turn conversations seamlessly.

Generative pre-trained models, like ChatGPT, play a crucial role in advancing chatbot capabilities. These models are pre-trained on vast amounts of diverse data, enabling them to capture nuanced language patterns and contextual understanding. The fine-tuning process tailors these models for specific applications, such as chatbot functionality.

Advancing chatbots to a more sophisticated level requires addressing challenges like ethical considerations, reducing biases, and enhancing their ability to handle complex user queries. Striking a balance between user privacy and personalization is another critical aspect.

The future of chatbots holds exciting prospects. More advanced versions may seamlessly integrate into various domains, including customer service, healthcare, and education. Customizable and domain-specific chatbots could cater to specific industry needs, providing highly tailored and efficient interactions.

## **The Evolution of AI-Based Chatbots in Customer Support: A Transformative Journey**

In recent years, major companies such as Amazon, Delta Airlines, and Google have increasingly embraced AI-based chatbots to revolutionize customer support services. This shift towards automation is gradually transforming the customer service landscape, providing users with more convenient and efficient ways to seek assistance.

### **Amazon's Lex: Transforming Customer Interactions:**

One notable example is Amazon's Lex, a chatbot service designed to create sophisticated conversational interfaces. Amazon has seamlessly integrated Lex into its customer support framework, allowing users to interact with intelligent chatbots for swift issue resolution. This innovation has significantly impacted the e-commerce giant's customer service efficiency.

### **Airlines' AI-Powered Customer Support:**

Airlines have also leveraged AI in customer support, integrating chatbots to enhance the overall experience for travelers. These chatbots assist users in tasks such as flight information, booking changes, and general inquiries. The integration of AI-based support has not only streamlined processes but has also provided users with quick and accessible assistance.

### **Google's AI Chatbot as a Service:**

Google, a pioneer in AI research, has developed powerful chatbot services that extend beyond its search engine capabilities. The tech giant offers AI-based chatbot services, allowing businesses to integrate



intelligent virtual assistants into their customer support systems. Google's commitment to AI technologies is evident in its efforts to make chatbot functionalities accessible to a broader audience.

#### The Seamless Integration into Daily Life:

The adoption of AI-based chatbots by major corporations reflects a broader trend of slowly immersing artificial intelligence into people's daily lives. These chatbots are now a familiar presence, providing instant assistance through websites, mobile apps, and messaging platforms. Users have become accustomed to the convenience of interacting with virtual assistants that understand natural language and offer quick solutions.

#### The Convenience Factor:

The convenience of AI-based chatbots cannot be overstated. Users appreciate the immediacy of responses, the availability 24/7, and the ability to multitask while seeking assistance. Unlike traditional human call support, chatbots eliminate the need for waiting on hold, providing a seamless and time-efficient communication channel.

#### Cons and Challenges:

However, the integration of AI into customer support is not without its challenges. One significant concern is the potential lack of empathy and emotional understanding in AI-based interactions. While chatbots excel in providing factual information, they may struggle to navigate nuanced and emotionally charged conversations that humans handle adeptly.

Another challenge is the risk of biases embedded in AI algorithms, potentially leading to unfair or discriminatory treatment of certain users. Companies must ensure thorough testing and ongoing monitoring to mitigate these risks and maintain a high standard of customer service.

## References

<https://www.aitimejournal.com/how-the-biggest-social-media-sites-use-ai/>

<https://www.linkedin.com/pulse/does-youtube-use-artificial-intelligence-marcus-nyoung-o3txc/>

<https://ai.meta.com/blog/ai-alliance/>

<https://www.linkedin.com/pulse/linkedin-s-new-ai-features-ventsi-tsachev/>

<https://www.leewayhertz.com/build-recommendation-system/>

<https://www.linkedin.com/pulse/cheat-codes-needed-ais-epic-quest-gaming-david-cain/>

<https://www.boostability.com/content/best-ai-search-engine>

<https://www.techtarget.com/whatis/definition/ChatGPT>

<https://aws.amazon.com/lex/>

<https://cloud.google.com/use-cases/ai-chatbot?hl=en>

