

Real-world Applications of Cognitive Computing and AI: A Multi- Industry Perspective

Artificial Intelligence

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Introduction

Cognitive computing can simulate human thought processes and mimic the way the human brain works, addressing complex situations that are characterized by ambiguity and uncertainty.



Problem in Healthcare

Lack of Real-time Situation Management

The COVID-19 crisis required real time situation management i.e using real-time data analysis to understand how an event is unfolding, and reacting to it accordingly. A major problem with hospital management systems is they don't provide access to the kind of real-time metrics that could improve response times and outcomes.

Ineffective Internal Communication

Particularly during a pandemic, there is a need to communicate with both internal and external audiences about things like safety precautions, test availability, PPE supplies, etc. But even in “normal” times, organizations need better ways to share data and information across teams to empower and engage employees, promote collaboration, and drive strategic initiatives.

Data Security

Another challenge mentioned by multiple respondents was data security. Between 2009 and 2020, 70% of the U.S. population was affected by healthcare data breaches—a trend that isn’t likely to go away. The recent growth of digital health initiatives—like telehealth doctor visits during the pandemic—has been a major contributor to increasing breaches. As more healthcare functions continue to move online, it’s essential to ensure these processes are protected.

Lack of System Interoperability

Another major challenge identified by more than one healthcare provider is the lack of interoperability across health technology systems. Without a national healthcare database in place, medical providers in one office or healthcare system are precluded from seeing a patient's information in another system, to the detriment of the patient. Even if all of your doctors and specialists are in the same network and use the same EHR, they may not have your entire health record and history. Interoperability challenges are seen by many as an obstacle to improving the quality of healthcare and lowering costs.

Information Overload

The problem of going through hundreds of pages of test data at a time, or tens of thousands of data points to find key information. Whether that information is generated by medical devices or lab tests, or used for patient care or administrative purposes, data overload is undeniably a problem across all types of healthcare organizations. Clearly there are advantages to having an abundance of data, but it can quickly become overwhelming. Since most data is available in electronic form, technology can help. Healthcare organizations should look for advanced solutions that support.

The Role of Cognitive Computing in Healthcare

Cognitive computing involves self-learning systems that use data mining techniques, pattern recognition, natural language and human senses processing, and system refinements based on real time acquisition of patient and other data. Its use with unstructured data (data that is generally text-heavy and not organized in a predefined manner, with more than 80 percent of medical data being defined as such), best practice data, published clinical studies, and clinical trial data allow it to examine unlimited amounts of information in helping to make diagnosis and treatment decisions on these patients. It has become an important clinical support tool for clinicians in their decision making.



IBM Watson in Healthcare

Implementation of Watson Analytics in healthcare has significantly revolutionised the sector by assisting both patients and healthcare professionals. Even though across industries consequential uncertainty of artificial intelligence prevails, the healthcare industry can exploit Watson to resolve the ever-growing pile of data.

Watson Analytics, which was initially developed as a pure question and answer (QA) computing system, has evolved dramatically with the advantage of cloud technology, improved machine learning and hardware capabilities. Although Watson hasn't been able to fully showcase its purported potential, it can rescue the healthcare sector from severe failures by systematically addressing the aforementioned challenges.

Improved organizational performance, effective diabetes management, advanced oncology care, and ameliorated drug discovery are prominent trends of Watson that are transforming the healthcare sector.

Google Photos

Challenges of managing personal photos and data types

One major Challenge with google photos is that If you use a weak password or reuse passwords, hackers can easily hack into your account, once the hacker has access to your Google Photos, they can download every media there and use it however they like. If it contains sensitive content, the hacker may use the images as blackmail to threaten you

Another major problem is backup and sync failures. Sometimes, Google Photos may fail to back up your photos or sync them across your devices because your Wi-Fi or mobile internet may not be excellent, or it may get filled up pretty fast when you allow backup of videos and photos.

Another issue with Google Photos are the bugs in the application, even if every application does have bugs, in google photos it can be harmful to your privacy. A privacy incident involving Google in 2019 was brought on by one such bug, which only referred to as a "technical issue". since this problem was not solved on time, it led to some users' private videos being shared with other users.

Google did not publicly address the problem or provide information regarding the number of videos shared or users impacted. The affected users had only quietly received an email message

Another major issue is that Google Photos does not offer unlimited data storage space. The 15GB of free data storage space is not that sufficient when users have a large number of images, and if your data storage gets exhausted, you lose proper access to all Google services that are storage based.

Google Photos

How does Google Photos uses AI to categorise structured and unstructured data

1) Object Recognition: Through deep learning algorithms, Google Photos can identify and recognize objects in photos, such as people, animals, landmarks, and even specific items like cars or trees. This helps in categorizing the structured data based on the objects present.



4) Contextual Understanding: Google Photos also takes into account the contextual information surrounding the media, including time, location, and associated metadata. By combining this information with visual analysis, it can organize photos based on events, trips, or specific time frames.

3) Scene Recognition: Google Photos can recognize different scenes or landscapes, such as beaches, mountains, cities, or parks. This helps in categorizing the unstructured data according to the environment or setting captured in the images.



Google Photos uses AI to categorize structured and unstructured data by analyzing the visual content of photos and videos, it works in the following ways:

2) Facial Recognition: The AI in Google Photos can analyze faces in photos and videos to recognize individuals. By comparing facial features and patterns, it can group photos of the same person together, allowing for easy organization and searchability.



5) Image Analysis: The AI algorithms analyze various visual elements like colors, shapes, and compositions to classify and categorize photos. For example, it can determine if a photo contains food, nature, architecture, or other common themes.

Google Photos

The impact on efficient photo organization and retrieval

The use of AI in Google Photos has had a significant impact on efficient photo organization and retrieval. Here are some ways it has improved these processes:

1) Automatic Sorting: With AI-powered object recognition and scene recognition, Google Photos can automatically sort and group photos based on their content. This eliminates the need for manual tagging or organizing, saving users a considerable amount of time and effort.



2) Smart Albums: Google Photos creates smart albums by intelligently grouping photos of people, places, events, or specific objects. For example, it can create albums for family members, vacations, birthdays, or pets. Users can easily access and browse through these albums, facilitating efficient retrieval of specific memories.



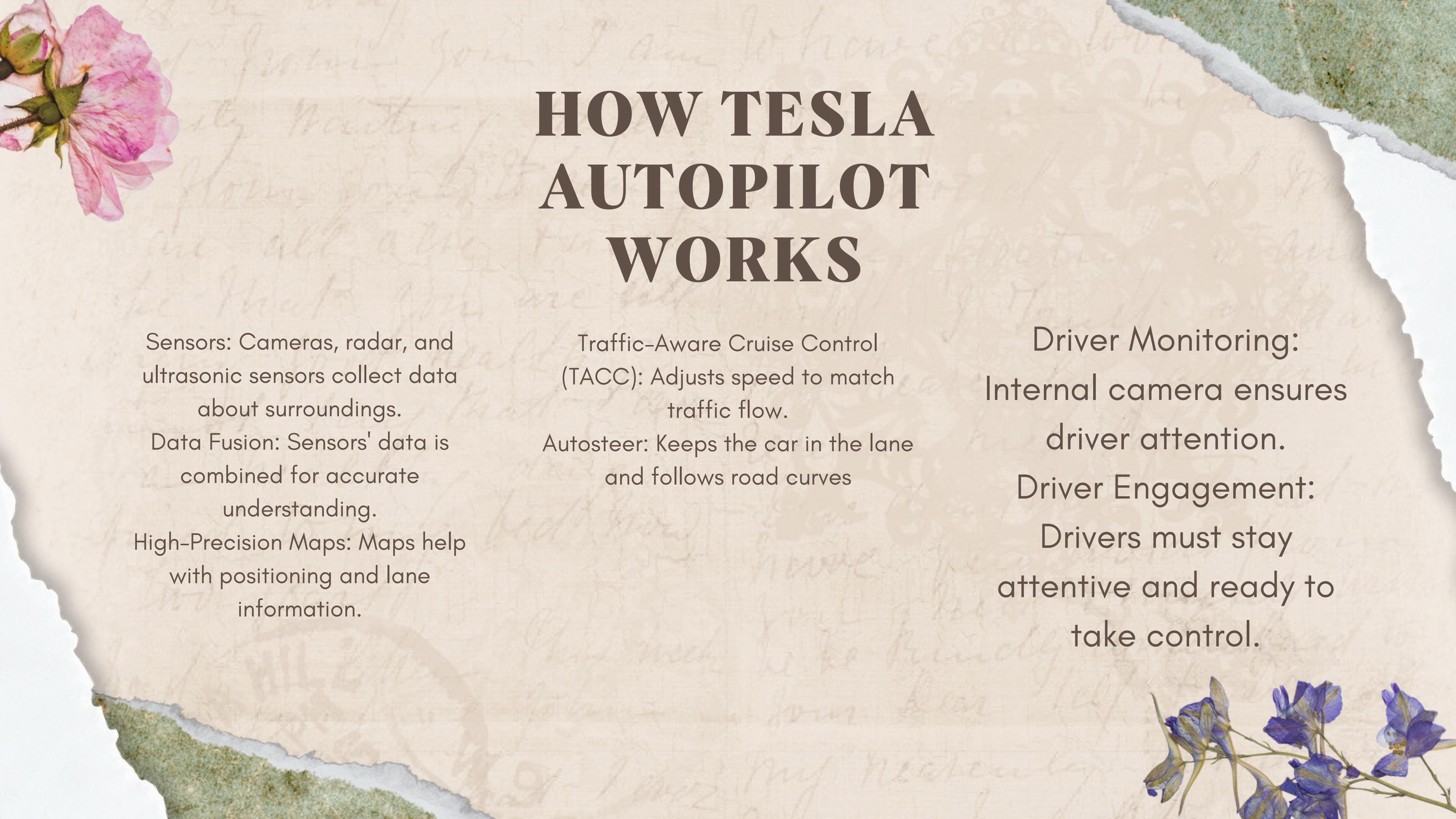
4) Content-Based Search: The AI algorithms analyze the visual content of photos, enabling users to search for specific objects, scenes, or even text within images. For instance, users can search for "beach," "dog," or "birthday cake," and Google Photos will identify and display relevant photos. This makes it effortless to find specific images without having to remember album names or dates.



5) Assistant Suggestions: Google Photos' Assistant feature uses AI to provide helpful suggestions for organization and retrieval. It suggests creating albums, animations, collages, or movies based on related photos, or reminds users of old memories to revisit. These suggestions enhance the overall experience of efficiently organizing and retrieving photos.

3) Facial Recognition: The facial recognition capabilities of Google Photos allow users to quickly find photos of specific individuals. Instead of manually searching through thousands of images, users can simply search for a person's name, and Google Photos will display all photos with that person, making retrieval much faster and easier.





HOW TESLA AUTOPilot WORKS

Sensors: Cameras, radar, and ultrasonic sensors collect data about surroundings.

Data Fusion: Sensors' data is combined for accurate understanding.

High-Precision Maps: Maps help with positioning and lane information.

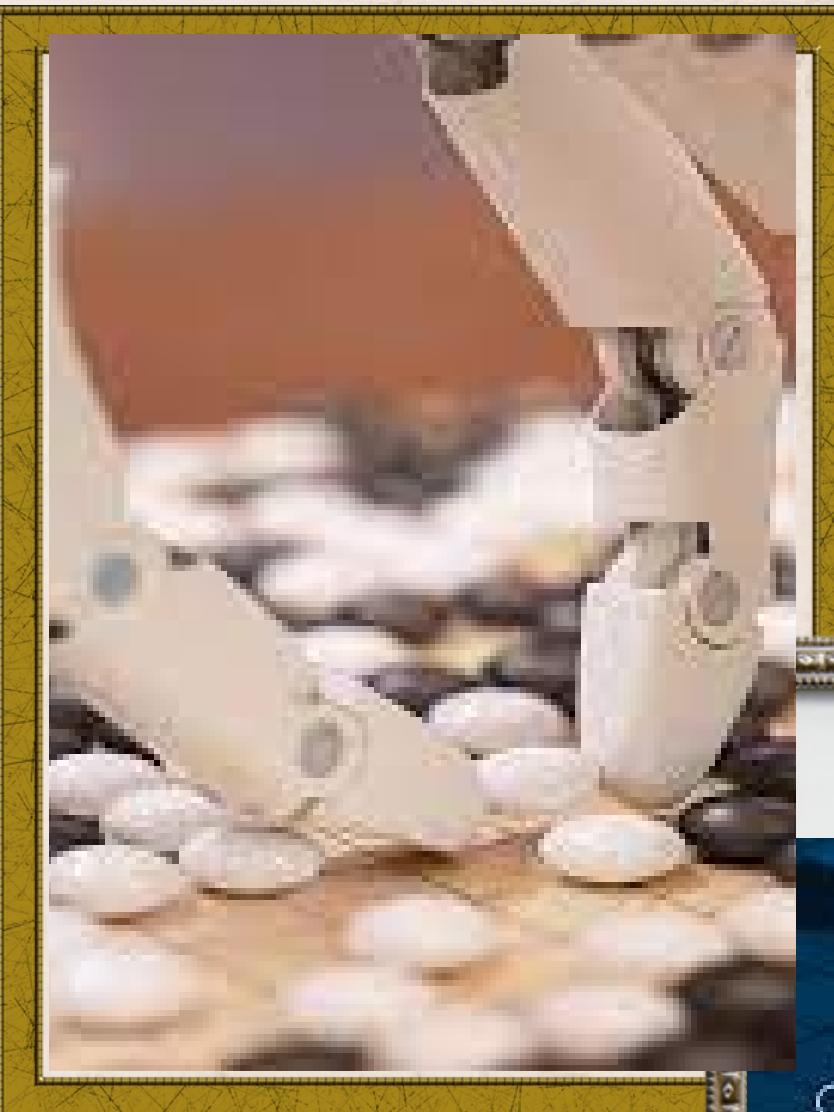
Traffic-Aware Cruise Control (TACC): Adjusts speed to match traffic flow.

Autosteer: Keeps the car in the lane and follows road curves

Driver Monitoring:
Internal camera ensures driver attention.

Driver Engagement:
Drivers must stay attentive and ready to take control.

ALPHA GO!



Monte Carlo Tree Search:
AlphaGo uses a technique
called Monte Carlo Tree
Search to simulate possible
sequences of moves and
determine the best actions.
This allows it to look ahead and
make strategic decisions.



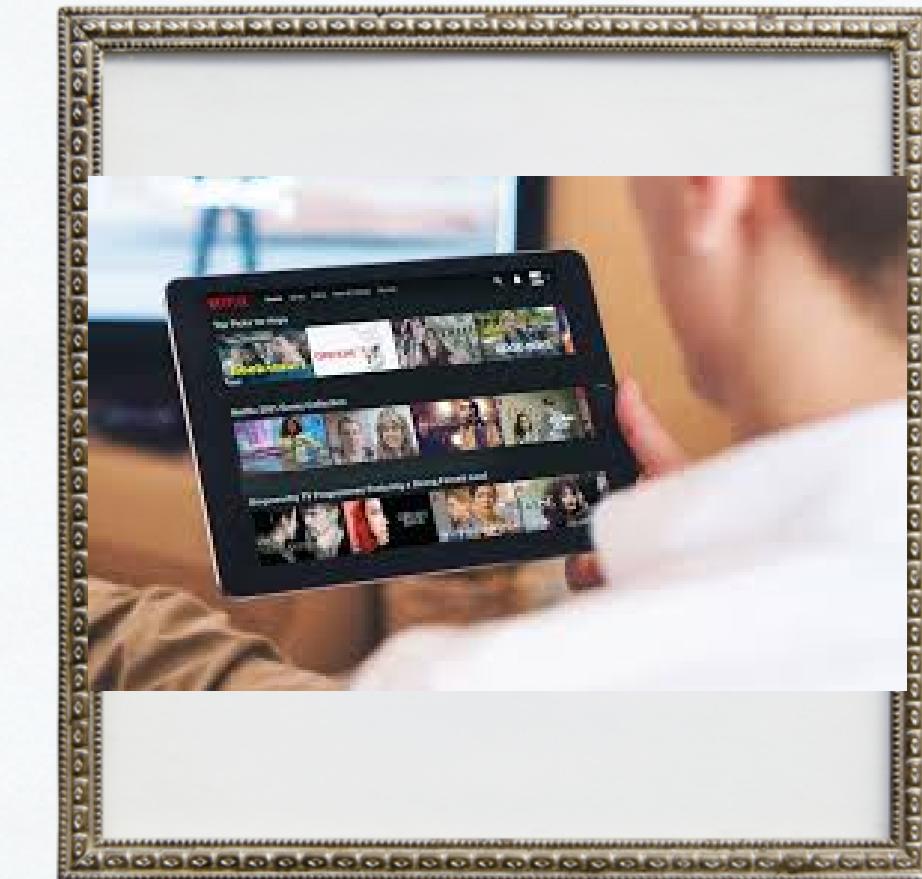
AlphaGo was developed by DeepMind's AI researchers using a combination of advanced machine learning techniques, including deep neural networks. In 2016, AlphaGo made headlines by defeating Lee Sedol, a world champion Go player, in a five-game match. This achievement was significant because Go is much more complex than chess, and its gameplay requires a deep understanding of strategy and intuition.



NETFLIX RECCOMENDATION SYSTEM

NETFLIX





Whenever you access the Netflix service, our recommendations system strives to help you find a show or movie to enjoy with minimal effort. We estimate the likelihood that you will watch a particular title in our catalog based on a number of factors including:

- your interactions with our service (such as your viewing history and how you rated other titles),
- other members with similar tastes and preferences on our service, and
- information about the titles, such as their genre, categories, actors, release year, etc.

In addition to knowing what you have watched on Netflix, to best personalize the recommendations we also look at things like:

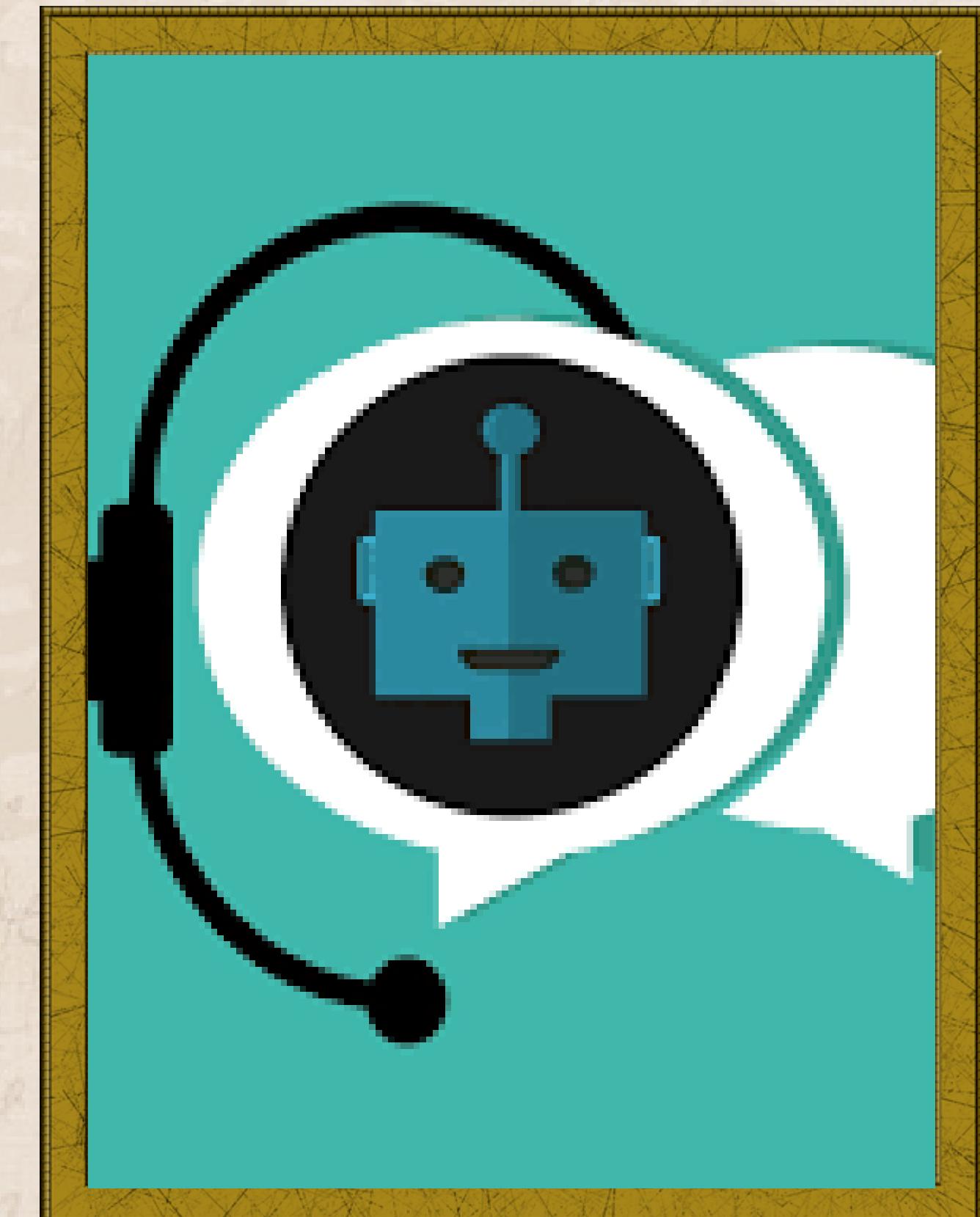
- the time of day you watch,
- the devices you are watching Netflix on, and
- how long you watch.



Customer service chatbots

A customer service chatbot is a conversational commerce tool that provides customer assistance via text chat, voice command or both. Brands implement these chatbots on their websites and social messaging platforms like Facebook and Twitter DMs.

Machine-learning AI chatbots are programmed to self-learn as they're introduced to new words, questions, sources of information and dialogue. These bots learn over time—the accuracy of their service improves as the volume of messages they engage with increases



The Challenge of Streamlining Appointment Scheduling

Time management is at the center of any challenge that may come your way while you are trying to set up an efficient scheduling process. The back and forth between attendees and organizers can really eat into your productive time. And the worst thing is that the real problem with scheduling manually will emerge down the line when it's the actual time for the appointment or the meeting. Clients may lose the information about the meeting they copied on a piece of paper. There might be a double booking of the conference room, or a client may get miffed for your unprofessional scheduling efforts and take their business to your competition. Hence, it is important that you understand the significance and impact of appointment scheduling software on your scheduling and appointment booking processes. These apps take on particular significance, especially when your business requires frequent client interactions, sessions, or meetings.



Google Duplex

Google Duplex is an artificial intelligence (AI) technology that mimics a human voice and makes phone calls on a person's behalf. Google Duplex represents a giant step forward in the development of conversational AI by using Google Assistant to speak on behalf of individuals with AI-powered software. Duplex, which uses natural language understanding and natural language generation to carry on a two-way conversation, incorporates interjections and pauses in such a lifelike manner that someone listening in could easily mistake a human-to-computer transaction for a human-to-human natural conversation. Duplex is built on a recurrent neural network using TensorFlow Extended, a general-purpose machine learning platform used at Google. It imitates real-world human speech patterns using the latest natural language processing innovations, including Google DeepMind's WaveNet audio-generation technology. The Duplex automated AI system is designed to perform tasks autonomously but signals a human operator if the program can't complete the task.





Thank you

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