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Internal Assesment Test – I

Sub:	EMERGING EXPONENTIAL TECHNOLOGIES							Code:	**20MBA301**
Date:	16/12/2021	Duration:	90 mins	Max Marks:	50	Sem:	III	Branch:	MBA

		Marks	OBE CO	OBE RBT
	Part A -Answer Any Two Full Questions (20*02=40 Marks)			
1(a)	What makes "emerging technologies" happen?	[03]	CO1	L2
(b)	How does Industry 4.0 'work'?	[07]	CO1	L4
(c)	Based on the level of strength we can classify AI into three levels. Briefly explain each of them.	[10]	CO3	L4
2(a)	What is Human Computer Interaction technology?	[03]	CO1	L1
(b)	Discuss the pros and cons of human-computer interaction technology?	[07]	CO1	L2
(c)	What is the reason for taking care of design a good computer-human interface?	[10]	CO1	L3
3(a)	Define AI and explain why it is needed.	[03]	CO3	L1
(b)	What are the pros and cons of AI?	[07]	CO3	L2
(c)	Explain the various types and uses of Object Tracking	[10]	CO3	L3
4	**Part B - Compulsory** **(02*05=10 marks)** What do you think are the applications of AI in the following fields: (a) Our everyday lives (b) Healthcare		CO3	L4

Course Outcomes		PO1	PO2	PO3	PO4	PO5	PO6	PO7
CO1:	Identify different emerging technologies	1a, 1b, 2a, 2b,c						
CO2:	Select appropriate technology and tools for a given task							
CO3:	Identify necessary inputs for application of emerging technologies	3a, b	3c		4a,b			
CO4:	Understand the latest developments in the area of technology to support business							

Cognitive level	KEYWORDS
L1	List, define, tell, describe, identify, show, label, collect, examine, tabulate, quote, name, who, when, where, etc.
L2	summarize, describe, interpret, contrast, predict, associate, distinguish, estimate, differentiate, discuss, extend
L3	Apply, demonstrate, calculate, complete, illustrate, show, solve, examine, modify, relate, change, classify, experiment, discover.
L4	Analyze, separate, order, explain, connect, classify, arrange, divide, compare, select, explain, infer.
L5	Assess, decide, rank, grade, test, measure, recommend, convince, select, judge, explain, discriminate, support, conclude, compare, summarize.

PO1 - *Knowledge application; PO2 - Analytical and logical thinking; PO3 - Team work; PO4 - Leadership; PO5 - life-long learning; PO6 - Analyze and practice aspects of business;* PO7- *Personal and Societal growth*;

Answers:

1. a. What makes “emerging technologies” happen?

Emerging technologies are technologies whose development, practical applications, or both are still largely unrealized, such that they are figuratively emerging into prominence from a background of nonexistence or obscurity. These technologies are generally new but also include older technologies that are still relatively undeveloped in potential, such as gene therapy (which dates to circa 1990 but even today still has large undeveloped potential). Emerging technologies are often perceived as capable of changing the status quo. Emerging technologies are characterized by radical novelty (in application even if not in origins), relatively fast growth, coherence, prominent impact, and uncertainty and ambiguity. In other words, an emerging technology can be defined as "a radically novel and relatively fast-growing technology characterized by a certain degree of coherence persisting over time and with the potential to exert a considerable impact on the socio-economic domain(s) which is observed in terms of the composition of actors, institutions and patterns of interactions among those, along with the associated knowledge production processes. Its most prominent impact, however, lies in the future and so in the emergence phase is still somewhat uncertain and ambiguous." Emerging technologies include a variety of technologies such as educational technology, information technology, nanotechnology, biotechnology, cognitive science, robotics, and artificial intelligence. New technological fields may result from the technological convergence of different systems evolving towards similar goals. Convergence brings previously separate technologies such as voice (and telephony features), data (and productivity applications) and video together so that they share resources and interact with each other, creating new efficiencies. Emerging technologies are those technical innovations which represent progressive developments within a field for competitive advantage; converging technologies represent previously distinct fields which are in some way moving towards stronger inter-connection and similar goals. However, the opinion on the degree of the impact, status and economic viability of several emerging and converging technologies varies.

b. How does Industry 4.0 ‘work’?

Industry 4.0 will not only improve how your manufacturing works as a whole, it will change your individuals in the field work as well.

Industry 4.0 works by breaking down the barriers between the different departments, making the whole staff more connected. It also speeds up customization of orders, taking the stress of the individual worker and meeting the expectations of the customer. "Industry 4.0 is dawning a new age of personalized manufacturing, combining customized production with the speed and on-time delivery expectations of today’s consumers. This is the age of the customer, and customers demand bespoke products, fast."

Most importantly, industry 4.0 lets workers focus on important tasks, leaving the tedious work to the machines. There can be three distinct advantages that industry 4.0 has brought in:

i. Industry 4.0 is breaking down the traditional silos that separate the different departments within a business, with enterprise resource planning (ERP) software playing a crucial role.

ERP software acts as a single-source for business intelligence in the age of Industry 4.0, presenting employees with real-time data when they need it, thus bringing departments closer together. That data might include information about the status of a project, updates on a partner's requirements, or analytics about customer trends or equipment maintenance schedules. For example, jet engine makers GE and Rolls-Royce now routinely collect data from their products as they fly around the world to schedule maintenance. In doing so, they stand a better chance of reducing downtime for individual aircraft and keeping up with customer demand.

Software platforms are now available that collect data directly from equipment and operators on the shop floor in real time. This information is presented on touch-screen technology which arms operators and managers with a 360-degree picture of the what, why and when of downtime, cycle time, quality, and scrap. From on-the-fly production schedule changes, to daily operations meetings, to management dashboards and reports, manufacturing execution systems (MES) give everyone in the plant, and throughout the business, an opportunity to take action to improve manufacturing performance.

When sales teams, management, and production line staff alike can access real-time information like this, they can optimise conditions on the plant floor and improve orders and production output. In short, sharing data makes manufacturing more agile, bringing the days of moving in silos to an end.

ii. Industry 4.0 is dawning a new age of personalised manufacturing, combining customised production with the speed and on-time delivery expectations of today's consumers. This is the age of the customer, and customers demand bespoke products, fast.

One of many companies putting this into practice is German cereal manufacturer MyMuesli, which makes personalised breakfast cereal for customers out of a collection of 80 different grains, nuts and fruits. The very fact that an FMCG product like muesli can be customised on a grand scale is testament to the rapid progression of Industry 4.0, and to MyMuesli's successful digital transformation.

Intelligent and integrated systems play a vital role for manufacturers that want to put their customers first, delivering instructions to machines about specific customer orders as they progress along the production line, in an inversion of normal manufacturing. In the case of MyMuesli, each package moves around the factory on an intelligent product carrier, which tells filling machines what to add to each muesli box according to individual customer orders.

iii. Industry 4.0 requires a cultural change in the way humans work with machines. Not only will employees be able to work closer across different departments in an Industry 4.0 world, sharing real-time data and insights to make accurate decisions in the workplace, they will also be able to have some of their tasks automated by machines, allowing them to work on new, less tedious tasks instead, and crunching delivery timescales.

This involves a significant change in the industrial environment, a fresh approach to workplace dynamics. One example of this change is the 45,000 robots recruited across Amazon's 20 fulfilment centres. Taking instructions from digital databases and ERP systems, and working alongside Amazon employees, these robots pick and haul packages weighing over 300 KG at the fast pace needed to keep up with customer demand. They do a job that wouldn't be safe for humans, and staff can expect their job roles to become more digital and less manual as a result.

While the technologies associated with Industry 4.0—from robotics to the Internet-of-Things, and from big data analytics and artificial intelligence to 3D printing—are transforming business processes, an often-overlooked challenge is managing the inevitable shift in workplace dynamics, which is crucial to supporting the successful integration of Industry 4.0 technologies.

The three points above are fitting examples of attitudes that need to shift, as manufacturers break down barriers between departments, embrace customisation, and work in tandem with machines. It's up to employers and their teams alike, to embrace these changes and change their mindsets, as they grow their businesses in the Industry 4.0 world.

c. Based on the level of strength we can classify AI into three levels. Briefly explain each of them.

AI technologies are categorised by their capacity to mimic human characteristics, the technology they use to do this, their real-world applications, and the theory of mind, which we'll discuss in more depth below.

Using these characteristics for reference, all artificial intelligence systems - real and hypothetical - fall into one of three types:

Artificial narrow intelligence (ANI), which has a narrow range of abilities - Artificial narrow intelligence (ANI), also referred to as weak AI or narrow AI, is the only type of artificial intelligence we have successfully realized to date. Narrow AI is goal-oriented, designed to perform singular tasks - i.e. facial recognition, speech recognition/voice assistants, driving a car, or searching the internet - and is very intelligent at completing the specific task it is programmed to do.

While these machines may seem intelligent, they operate under a narrow set of constraints and limitations, which is why this type is commonly referred to as weak AI. Narrow AI doesn't mimic or replicate human intelligence, it merely simulates human behaviour based on a narrow range of parameters and contexts.

Consider the speech and language recognition of the Siri virtual assistant on iPhones, vision recognition of self-driving cars, and recommendation engines that suggest products you make like based on your purchase history. These systems can only learn or be taught to complete specific tasks.

Narrow AI has experienced numerous breakthroughs in the last decade, powered by achievements in machine learning and deep learning. For example, AI systems today are used in medicine to diagnose cancer and other diseases with extreme accuracy through replication of human-esque cognition and reasoning.

Narrow AI's machine intelligence comes from the use of natural language processing (NLP) to perform tasks. NLP is evident in chatbots and similar AI technologies. By understanding speech and text in natural language, AI is programmed to interact with humans in a natural, personalised manner.

Narrow AI can either be reactive, or have a limited memory. Reactive AI is incredibly basic; it has no memory or data storage capabilities, emulating the human mind's ability to respond to different kinds of stimuli without prior experience. Limited memory AI is more advanced, equipped with data storage and learning capabilities that enable machines to use historical data to inform decisions.

Most AI is limited memory AI, where machines use large volumes of data for deep learning. Deep learning enables personalised AI experiences, for example, virtual assistants or search engines that store your data and personalise your future experiences.

Artificial general intelligence (AGI), which is on par with human capabilities - Artificial general intelligence (AGI), also referred to as strong AI or deep AI, is the concept of a machine with general intelligence that mimics human intelligence and/or behaviours, with the ability to learn and apply its

intelligence to solve any problem. AGI can think, understand, and act in a way that is indistinguishable from that of a human in any given situation.

AI researchers and scientists have not yet achieved strong AI. To succeed, they would need to find a way to make machines conscious, programming a full set of cognitive abilities. Machines would have to take experiential learning to the next level, not just improving efficiency on singular tasks, but gaining the ability to apply experiential knowledge to a wider range of different problems.

Strong AI uses a theory of mind AI framework, which refers to the ability to discern needs, emotions, beliefs and thought processes of other intelligent entitles. Theory of mind level AI is not about replication or simulation, it's about training machines to truly understand humans.

The immense challenge of achieving strong AI is not surprising when you consider that the human brain is the model for creating general intelligence. The lack of comprehensive knowledge on the functionality of the human brain has researchers struggling to replicate basic functions of sight and movement.

Fujitsu-built K, one of the fastest supercomputers, is one of the most notable attempts at achieving strong AI, but considering it took 40 minutes to simulate a single second of neural activity, it is difficult to determine whether or not strong AI will be achieved in our foreseeable future. As image and facial recognition technology advances, it is likely we will see an improvement in the ability of machines to learn and see;

Artificial superintelligence (ASI), which is more capable than a human - Artificial super intelligence (ASI), is the hypothetical AI that doesn't just mimic or understand human intelligence and behaviour; ASI is where machines become self-aware and surpass the capacity of human intelligence and ability.

Superintelligence has long been the muse of dystopian science fiction in which robots overrun, overthrow, and/or enslave humanity. The concept of artificial superintelligence sees AI evolve to be so akin to human emotions and experiences, that it doesn't just understand them, it evokes emotions, needs, beliefs and desires of its own.

In addition to replicating the multi-faceted intelligence of human beings, ASI would theoretically be exceedingly better at everything we do; math, science, sports, art, medicine, hobbies, emotional relationships, everything. ASI would have a greater memory and a faster ability to process and analyse data and stimuli. Consequently, the decision-making and problem solving capabilities of super intelligent beings would be far superior than those of human beings.

The potential of having such powerful machines at our disposal may seem appealing, but the concept itself has a multitude of unknown consequences. If self-aware super intelligent beings came to be, they would be capable of ideas like self-preservation. The impact this will have on humanity, our survival, and our way of life, is pure speculation.

2. a. What is Human Computer Interaction technology?

Human-computer interaction (HCI) is a multidisciplinary field of study focusing on the design of computer technology and, in particular, the interaction between humans (the users) and computers. While initially concerned with computers, HCI has since expanded to cover almost all forms of information technology design.
HCI surfaced in the 1980s with the advent of personal computing, just as machines such as the Apple Macintosh, IBM PC 5150 and Commodore 64 started turning up in homes and offices in society-changing numbers. For the first time, sophisticated electronic systems were available to general consumers for uses such as word processors, games units and accounting aids. Consequently, as computers were no longer room-sized, expensive tools exclusively built for experts in specialized environments, the need to create human-computer interaction that was also easy and efficient for less experienced users became increasingly

vital. From its origins, HCI would expand to incorporate multiple disciplines, such as computer science, cognitive science and human-factors engineering.

b. Discuss the pros and cons of human-computer interaction technology?

Human-computer interaction (HCI) is the study of interaction between people (users) and computers. Interaction between users and computers occurs at the user interface (or simply interface), which includes both hardware (i.e. peripherals and other hardware) and software (for example determining which, and how, information is presented to the user on a screen)."

“Human-Computer Interaction is a discipline concerned with the design, evaluation and implementation of interactive computing systems for human use.

Human-Computer Interaction (HCI) research is performed to provide and promote a scientific understanding of the interaction between humans and the computer technology and tools that we use.

A basic goal of HCI is to improve the interactions between users and computers by making computers more usable and receptive to the user's needs.

There are 4 types of User Interfaces:

Command Line Interface (CLI)Menu Driven Interface Graphical User Interface (GUI)Natural Language Interface

i. Command Line Interface (CLI)

A CLI displays a prompt; the user types a command on the keyboard and executes the command. The computer executes the command, providing textual output.

Advantages

• Very flexible with the use of “switches” (options)

• Good for “expert” users - can quickly access commands

• Uses the fewest system resources

Disadvantages

• Requires the user to learn “complex” commands or language

• “Hidden” features i.e. if you don’t know the commands you won’t know the features are there!

• Not very good for novice users

Command Line Interface Applications

• System administration

• Engineering applications

• Scientific applications

• Ideal for visually impaired users!!!

ii. Menu Driven Interface

The user has a list of items to choose from, and can make selections by highlighting one.

Advantages

• No need to learn complex commands/language

• Easier for a novice to learn/use

• Ideal when there are a limited number of options (efficient)

Disadvantages

• Can be frustrating for experienced users i.e. the command they want to use is buried 5 levels deep!!!!

• User interface may be limited by screen space and number of options available

Menu Driven Applications

• ATM

• Mobile Phone

• MP3 Player

• Video recorder

• Household Devices

• Digital/Cable TV

iii. Graphical User Interface (GUI)

Uses windows, icons, menus and pointers (WIMP) which can be manipulated by a mouse (and often to an extent by a keyboard as well).

Most suitable interface for inexperienced or novice users but…

UIs use more system resources than other types of interface

Many generic packages for a GUI will share common features

• Layout of the screen

• Names given to commands

• Icons

• Order of menus

• Mouse operation

• Dialog boxes

Benefits of a common interface

There are five advantages to the ‘common user interface’:

• Increased speed of learning

• Ease of use

• Confidence for novice users

• Increase the range of solvable tasks by users

• Greater range of software available to the average computer user

c. What is the reason for taking care of design a good computer-human interface?

Computers play such an integral role in our lives that it would be difficult to imagine life without them.

Human-computer interaction studies the design and utilization of computer technology, which focuses on the interface between people and computers.

• A computer has countless uses, and this takes place as an open-ended dialog between people and computers.

• Human interaction with the computer is paramount when it comes to the achievement of mastering specific fields.

• This interaction includes communication theory, graphic design, industrial design and disciplines, linguistics, social sciences, cognitive psychology, social psychology, and engineering.

• The computer must assist the person who is learning through communication.

• A poor human-machine interface can create a lot of unexpected problems. Some examples of the computer-human interface include desktop applications, internet browsers, handheld computers, ERP, and computer kiosks make use of the graphical user interface.

3. a. Define AI and explain why it is needed.

Artificial intelligence (AI) is a wide-ranging branch of computer science concerned with building smart machines capable of performing tasks that typically require human intelligence. Norvig and Russell go on to explore four different approaches that have historically defined the field of AI:

Thinking humanly
Thinking rationally
Acting humanly
Acting rationally
The first two ideas concern thought processes and reasoning, while the others deal with behavior. Norvig and Russell focus particularly on rational agents that act to achieve the best outcome, noting "all the skills needed for the Turing Test also allow an agent to act rationally." (Russel and Norvig 4).

Patrick Winston, the Ford professor of artificial intelligence and computer science at MIT, defines AI as "algorithms enabled by constraints, exposed by representations that support models targeted at loops that tie thinking, perception and action together."

While these definitions may seem abstract to the average person, they help focus the field as an area of computer science and provide a blueprint for infusing machines and programs with machine learning and other subsets of artificial intelligence.

While addressing a crowd at the Japan AI Experience in 2017, DataRobot CEO Jeremy Achin began his speech by offering the following definition of how AI is used today:

"AI is a computer system able to perform tasks that ordinarily require human intelligence... Many of these artificial intelligence systems are powered by machine learning, some of them are powered by deep learning and some of them are powered by very boring things like rules."

Examples of AI:
Siri, Alexa and other smart assistants
Self-driving cars
Robo-advisors
Conversational bots
Email spam filters
Netflix's recommendations

b. What are the pros and cons of AI?

Pros:
Efficiency and Accuracy. AI is scalable and efficient. ...
Eliminate Human Error. ...
Reducing Costs (Cheaper Products & Services) ...
Improving Human Decision Making. ...
Improving Human Workflows. ...
The Mechanical Advantage. ...
Effective Data Acquisition and Analysis. ...
Understanding High-Dimensional Data.

Cons:
HIGH COST OF IMPLEMENTATION. Setting up AI-based machines, computers, etc. ...
CAN'T REPLACE HUMANS. It is beyond any doubt that machines perform much more efficiently as compared to a human being. ...
DOESN'T IMPROVE WITH EXPERIENCE. ...
LACKS CREATIVITY. ...
RISK OF UNEMPLOYMENT.

c. Explain the various types and uses of Object Tracking

Object tracking is used for a variety of use cases involving different types of input footage. Whether or not the anticipated input will be an image or a video, or a real-time video vs. a prerecorded video, impacts the algorithms used for creating object tracking applications.

The kind of input also impacts the category, use cases, and applications of object tracking. Here, we will briefly describe a few popular uses and types of object tracking, such as video tracking, visual tracking, and image tracking.

Video Tracking
Video tracking is an application of object tracking where moving objects are located within video information. Hence, video tracking systems are able to process live, real-time footage and also recorded video files. The processes used to execute video tracking tasks differ based on which type of video input is targeted.

Different video tracking applications play an important role in video analytics, in scene understanding for security, military, transportation, and other industries. Today, a wide range of real-time computer vision and deep learning applications use video tracking methods. I recommend you to check out our extensive list of the most popular Computer Vision Applications in 2021

Visual Tracking
Visual tracking or visual target-tracking is a research topic in computer vision that is applied in a large range of everyday scenarios. The goal of visual tracking is to estimate the future position of a visual target that was initialized without the availability of the rest of the video.

Image Tracking
Image tracking is meant for detecting two-dimensional images of interest in a given input. That image is then continuously tracked as they move in the setting. Image tracking is ideal for datasets with highly contrasting images (ex. black and white), asymmetry, few patterns, and multiple identifiable differences between the image of interest and other images in the image set. Image tracking relies on computer vision to detect and augment images after image targets are predetermined.

Object tracking camera
Modern object tracking methods can be applied to real-time video streams of basically any camera. Therefore, the video feed of a USB camera or an IP camera can be used to perform object tracking, by feeding the individual frames to a tracking algorithm. Frame skipping or parallelized processing are common methods to improve object tracking performance with real-time video feeds of one or multiple cameras.

4. AI in
(a) Our everyday lives:

There are so many amazing ways artificial intelligence and machine learning are used behind the scenes to impact our everyday lives. AI assists in every area of our lives, whether we're trying to read our emails, get driving directions, get music or movie recommendations.
Example of artificial intelligence used in day-to-day activities such as:
Social media
Digital Assistants
Self-Driving And Parking Vehicles
Email communications
Web searching
Stores and services
Offline experiences

How Artificial Intelligence Improves Social Media
Artificial intelligence makes it easier for users to locate and communicate with friends and business associates.
Twitter
From tweet recommendations to fighting inappropriate or racist content and enhancing the user experience, Twitter has begun to use artificial intelligence behind the scenes to enhance their product. They process lots of data through deep neural networks to learn over time what users preferences are.
Facebook

Deep learning is helping Facebook draw value from a larger portion of its unstructured datasets created by almost 2 billion people updating their statuses 293,000 times per minute. Most of its deep learning technology is built on the Torch framework that focuses on deep learning technologies and neural networks.

Instagram

Instagram also uses big data and artificial intelligence to target advertising and fight cyberbullying and delete offensive comments. As the amount of content grows in the platform, artificial intelligence is critical to be able to show users of the platform information they might like, fight spam and enhance the user experience.

Chatbots

Chatbots recognize words and phrases in order to (hopefully) deliver helpful content to customers who have common questions. Sometimes, chatbots are so accurate that it seems as if you're talking to a real person. For example, the chatbot conversation in the image below shows AI being used to schedule a hairdresser appointment.

How Artificial Intelligence Helps You Every Day Through Digital Assistants

Digital Assistents

Apple's Siri, Google Now, Amazon's Alexa, and Microsoft's Cortana are digital assistants that help users perform various tasks, from checking their schedules and searching for something on the web, to sending commands to another app. AI is an important part of how these apps work because they learn from every single user interaction.

How Artificial Intelligence Helps You Every Day Through Parking Your Car And Driving It

Self-Driving And Parking Vehicles

Self-driving and parking cars use deep learning, a subset of AI, to recognize the space around a vehicle. Technology company Nvidia uses AI to give cars "the power to see, think, and learn, so they can navigate a nearly infinite range of possible driving scenarios," . The company's AI-powered technology is already in use in cars made by Toyota, Mercedes-Benz, Audi, Volvo, and Tesla , and is sure to revolutionize how people drive and enable vehicles to drive themselves.

How Artificial Intelligence Improves Email Communications

Smart Replies in Gmail

Smart replies offer users a way to respond to emails with simple phrases like "Yes, I'm working on it." or "No I have not. " with the click of a button. Smart replies are tailored to the content of each email. Users can reply by typing a manual response or may instead choose a one-click smart reply.

For example, if you send an email to someone about an upcoming game and they reply to let you know that they interested in going to the game, Gmail offers "smart reply" options.

Email Filters in Gmail

Google uses AI to ensure that nearly all of the email landing in your inbox is authentic. Their filters attempt to sort emails into the following categories:

Primary
Social
Promotions
Updates
Forums
Spam

The program helps your emails get organized so you can find your way to important communications quicker. For example, Gmail sorts email into 4 different tabbed categories, and sends the spam mail to a separate folder.

How Artificial Intelligence Helps With Web Searches

AI has been used to help with Google searches for quite some time.

Google Predictive Searches:

When you begin typing a search term and Google makes recommendations for you to choose from, that's AI in action.

Predictive searches are based on data that Google collects about you, such as your location, age, and other personal details. Using AI, the search engine attempts to guess what you might be trying to find.

Google's Algorithm

Google search engines evolved over time by studying the linguistics used in searches. Its AI learns from results and adapts over time to better meet the needs of users.

For example, a search of "what are neural networks and how are they related to synapses" offers Google's choice of "best answer" highlighted at the top, followed by a list of sources that answer the question.

The purpose of Google's algorithm is to deliver the best possible results to the searcher. In order to do this, Google uses AI to try to determine the quality of content and match it to the user's query.

How Artificial Intelligence Improves Your Experience at Online Stores and Services

Product Recommendations

Amazon and other online retailers use AI to gather information about your preferences and buying habits. Then, they personalize your shopping experience by suggesting new products tailored to your habits. Below is an example of AI-powered recommendations on Amazon.com.

Music Recommendations

Music services use AI to track your listening habits. Then, they use the information to suggest other songs you might like to hear.

For example, Spotify offers suggestions for new discoveries, new releases, and old favorites, based on your listening habits.

Google Play also offers personalized music recommendations. Its AI-powered suggestions take into account factors like weather and time of day to offer music that can set the mood for activities. For example, you might be offered a playlist of dance music on a Friday night, or soft acoustic music on a rainy day.

Maps and Directions

When apps like Google Maps calculate traffic and construction in order to find the quickest route to your destination, that's AI at work.

In the example below, Google Maps offers directions based on the fastest route from Berlin to Potsdam according to the usual traffic. Orange sections of the route indicate where traffic is slower.

Commercial Airline Flights

You might be surprised to discover how little flying your friendly pilot actually does in the cockpit. A 2015 survey of airline Boeing 777 pilots reported spending only 7 minutes manually flying the plane during a typical flight, with much of the rest being done by AI technology.

According to a report by Wired Magazine, Boeing is working toward building jetliners completely piloted by artificial intelligence — with no human pilots at the helm.

(b) Healthcare

AI in healthcare is an umbrella term to describe the application of machine learning (ML) algorithms and other cognitive technologies in medical settings. In the simplest sense, AI is when computers and other machines mimic human cognition, and are capable of learning, thinking, and making decisions or taking actions. AI in healthcare, then, is the use of machines to analyze and act on medical data, usually with the goal of predicting a particular outcome.

A significant AI use case in healthcare is the use of ML and other cognitive disciplines for medical diagnosis purposes. Using patient data and other information, AI can help doctors and medical providers deliver more accurate diagnoses and treatment plans. Also, AI can help make healthcare more predictive and proactive by analyzing big data to develop improved preventive care recommendations for patients.

Healthcare is one of the most critical sectors in the broader landscape of big data because of its fundamental role in a productive, thriving society. The application of AI to healthcare data can literally be a matter of life and death. AI can assist doctors, nurses, and other healthcare workers in their daily work. AI in healthcare can enhance preventive care and quality of life, produce more accurate diagnoses and treatment plans, and lead to better patient outcomes overall. AI can also predict and track the spread of infectious diseases by

analyzing data from a government, healthcare, and other sources. As a result, AI can play a crucial role in global public health as a tool for combatting epidemics and pandemics.