INFO BUZZ

INVENTUS'19
JUN 19

DIGITAL TWIN

A **Digital Twin** is a digital replica of a living or non-living physical entity. Digital twin refers to a digital replica of potential and actual physical assets (physical twin), processes, people, places, systems and devices that can be used for various purposes. The digital representation provides both the elements and the dynamics of how an Internet of things device operates and lives throughout its life cycle.[3] Definitions of digital twin technology used in prior research emphasize two important characteristics. Firstly, each definition emphasizes the connection between the physical model and the corresponding virtual model or virtual counterpart. Secondly, this connection is established by generating real time data using sensors. The concept of the digital twin can be compared to other concepts such as cross-reality environments or co-spaces and mirror models, which aim to, by and large, synchronise part of the physical world (e.g., an object or place) with its cyber representation (which can be an abstraction of some aspects of the physical world).

Digital twins integrate Internet Of Things(IOT), Artificial Intelligence(AI), Machine Learning (ML) and software analytics with spatial network graphs to create living digital simulation models that update and change as their physical counterparts change. A digital twin continuously learns and updates itself from multiple sources to represent its near real-time status, working condition or position. This learning system, learns from itself, using sensor data that conveys various aspects of its operating condition; from human experts, such as engineers with deep and relevant industry domain knowledge; from other similar machines; from other similar fleets of machines; and from the larger systems and environment of which it may be a part. A digital twin also integrates historical data from past machine usage to factor into its digital model.

Characteristics of Digital Twin :

- Connectivity

  One of the main characteristics of digital twin technology is its connectivity. The recent development of the Internet of Things (IoT) brings forward numerous new technologies. The development of IoT also brings forward the development of digital twin technology. This technology shows many characteristics that have similarities with the character of the IoT, namely its connective nature.

- Homogenization

  Digital twins can be further characterized as a digital technology that is both the consequence and an enabler of the homogenization of data. Due to the fact that any type of information or content can now be stored and transmitted in the same digital form, it can be used to create a virtual representation of the product (in the form of a digital twin), thus decoupling the information from its physical form.

- Digital traces

  Another characteristic that can be observed, is the fact that digital twin technologies leave digital traces. These traces can be used by engineers for example, when a machine malfunctions to go back and check the traces of the digital twin, to diagnose where the problem occurred. These diagnoses can in the future also be used by the manufacturer of these machines, to improve their designs so that these same malfunctions will occur less often in the future.

- Modularity

  In the sense of the manufacturing industry, modularity can be described as the design and customization of products and production modules. By adding modularity to the manufacturing models, manufacturers gain the ability to tweak models and machines. Digital twin technology enables manufacturers to track the machines that are used and notice possible areas of improvement in the machines.

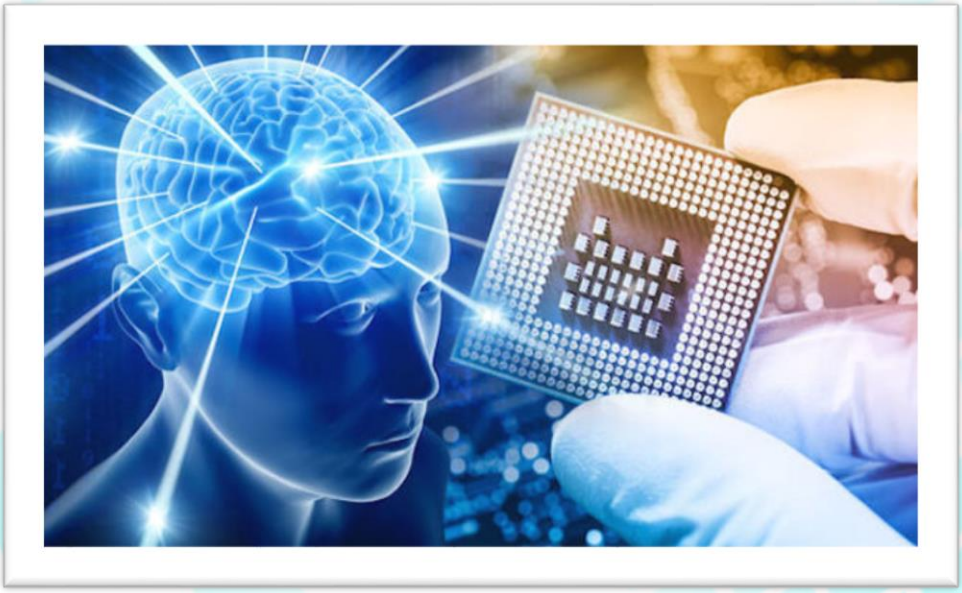
Digital Twin in Health Care Industry :

Looking more specifically on a firm-level, several incumbent firms are investing and developing healthcare solution with the digital twin. For example, Philips has explored the idea of a digital version of the patient so that patients can use a digital twin to better act in a preventive way instead of a reactive way.

"The Living Heart" is a collaboration between Stanford University and HPE where multi-scale 3D models of the heart were created to monitor circulation and to virtually test medications, which are still in development in order to ultimately prevent harmful side effects. Lastly, Siemens has developed a similar digital health twin. By making use of artificial intelligence, doctors can make more precise diagnoses.

Developing a digital twin is a considerable investment. However, by making use of a cloud-based platform and a modular organization, it may also be possible for smaller organizations to contribute to a certain module. One of those organizations is Sim&Cure, which is the first company to market a patient-based simulation model for treatment of aneurysms. This treatment allows prediction of deployment of medical devices. Their product Sim&Size is an implant composed of three applications used to heal patients of neurovascular disorders such as aneurysms.

BLUE BRAIN



Blue Brain is the world's first virtual brain which mimics the operations of a human brain and produces output. This operation requires a powerful supercomputer called Blue Gene and hence the name Blue Brain.It's main aim is to upload a human brain into the computer, so that it can think, and make decisions without the presence of a human body. After death, this virtual brain can act as the person. So, even after the death of a person, we will not lose the knowledge, intelligence, emotions, and memories of a person and this can

be used for various situations like to continue the pending work, to decide on something based on his/her area of expertise etc.

OPERATIONS OF SIMULATED BRAIN

INPUT:

Neurons are replaced by silicon chips. So, the electric impulses from the sensory cells can be received through these artificial neurons and sent to a supercomputer for interpretation.

INTERPRETATION:

Interpretation can be done by means of a set of registers. The different values in these register will represent different states of the brain.

OUTPUT:

Based on the states of the register, the output signals can be given.

MEMORY:

The required states of the registers can be stored permanently and when required this information can be retrieved and used.

PROCESSING:

Decision making can be done by the computer by performing arithmetic and logical calculations on the stored states and the new inputs.

HUMAN BRAIN UPLOADING:

Nanobots are responsible for interfacing human brain with computer.

QUIZ

1. The project was started in the year ?
   2005.

2. What is the size of nanobots ?
   ~50-100 nm.

3. What is the name of the software used in neural simulation ?
   NEURON.

4. The development was first experimented on a?

South American Sparrow

5. Some of the disadvantages of Blue Brain ?
    a. Dependency on computers increases.
    b. Large amount of memory and processing power is required.

APPLICATIONS:

- Even after the death of a person his intelligence can be used.
- This could boost study of animal behaviour. That means by interpretation of the electric impulses from the brain of the animals, their thought process can be understood easily.
- It would allow the deaf to hear via direct nerve stimulation, and also be helpful for many psychological diseases.
- We could make use of the information of the brain that was uploaded into the computer and use it to provide a solution to mental disorder.

INTELLIGENT APPS

What are Intelligent Apps?

Intelligent apps are pieces of software that leverage different Artificial Intelligence (AI) components such as Machine Learning (ML), Natural Language Processing (NLP), data analytics, deep learning, robotics, general intelligence, expert systems, etc.

The AI-powered algorithm helps these apps to take advantage of historical and real-time data to facilitate key user decisions. The smart integration and use of predictive and prescriptive analytics, customer data, and product insights help these apps to engage in continuous learning method, and hence the following benefits.

Benefits

• Offer predictions and decisions to deliver super-rich and custom-made experiences for users.
• Offer valuable solutions based on users' history of interactions with brands, people and machines.
• Deliver personalized and contextual content to facilitate constant engagement.
• Analyse multiple data sources to deliver valuable insights and help in

automating simple routine tasks without specifically waiting for user commands.

A Few Intelligent Apps that Revolutionize Our Daily Lives

1. Alexa, Siri, and Google Assistant

Amazon, Apple, and Google's digital voice assistants are great examples of intelligent apps that combine natural language generation, processing and machine learning. These digital voice assistants have made our lives super-easy and convenient as they give updates about weather, traffic, adjust a smart LED, coordinate meetings, and make your moments lighter by telling jokes and playing music. These virtual assistants converse sounding like a human thanks to Natural Language Processing (NLP) and Natural Language Generation (NLG).

2. Netflix

Netflix, one of the disruptive brands in the media industry, is the best example for leveraging intelligence systems and for developing a business model around them. Its personalized movie recommendation feature is powered by Big Data. It mainly uses explicit and implicit data. Its powerful algorithms examine and identify patterns from data helping users to efficiently pick what to watch next. Smart use of AI helps Netflix to can build a store of knowledge that will facilitate precise user prediction.

3. Ada Health

Ada Health is an AI-powered ‘doctor in your pocket, app that helps users to understand their health and navigate to the most suitable care. The app launched a fresh method to personalized health, reinforced by sophisticated AI, human medical know-how and the power of mobile technology. The app has a conversational interface. It asks simple and relevant questions and compares the answers to its rich data of similar cases to deliver custom-made responses to the unique health profiles. It ultimately helps you find the best possible explanations for your symptoms. It guides users to take the most appropriate care, and track and manage their health.

4. ELSA

ELSA (English Language Speech Assistant) is an AI-powered app that helps you improve your English speaking skills with the right pronunciation and accent. The app gives professional training with a series of exercises and teaching material. Powered by speech recognition technology, it understands your native language and teaches you how to speak like native English speakers based on a series of exercises and teaching material. By simply inputting a word you can learn its right pronunciation. They were in news recently when they secured funding of round of $7 million from Gradient Ventures, Google’s AI-focused venture fund.

5. Seeing AI

Seeing AI is an AI application developed by Microsoft. It's a talking camera app for the visually-impaired. The app helps the blind and low-vision community around the world to know about their surroundings through the cameras on their smartphones. Its computer vision narrates the visual world by reading out short text and documents and by describing about a person real-time. It helps blind users to identify currencies, colour, handwriting, emotion/age/gender, light and even images in other apps. It powerfully converts visual data into audio feedback.

Microsoft has recently added a new feature to Seeing AI. Now users can simply tap their finger on an image on a touch-screen to hear an instant audible description of the same.

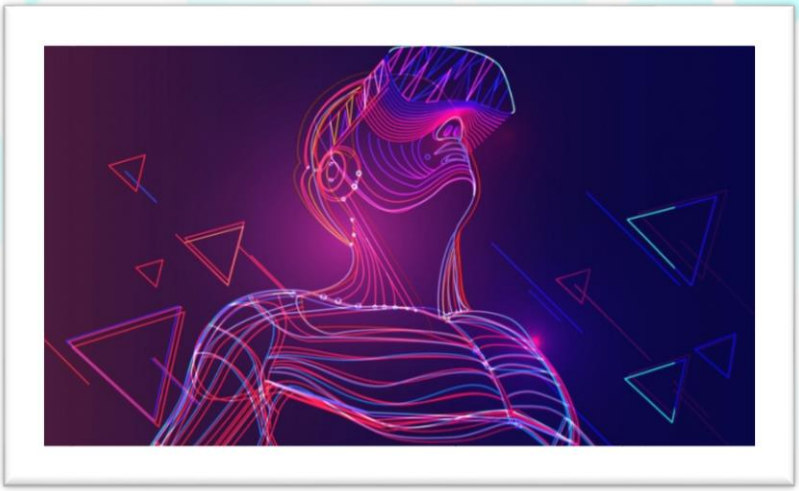
Conclusion

Intelligent apps are touching all areas of our lives – Media, Technology, Healthcare, Finance, Lifestyle, etc., by implementing tasks with the highest accuracy. Let's wait and see how intelligent apps are going to make everything smart around us. Feel free to comment your perspective on how we are moving towards a future that's incomplete without these AI-powered apps.

EXTENDED REALITY

WHAT IS XR?

Extended reality (XR) is an emerging umbrella term for all the immersive technologies. The ones we already have today—augmented reality (AR), virtual reality (VR), and mixed reality (MR) plus those that are still to be created. All immersive technologies extend the reality we experience by either blending the virtual and "real" worlds or by creating a fully immersive experience. Recent research revealed that more than 60% of respondents believed XR will be mainstream in the next five years.



APPLICATIONS:

There are many practical applications of XR. Here are a few:

- **Retail:** XR gives customers the ability to try before they buy.
- **Training:** Especially in life-and-death circumstances, XR can provide training tools that are hyper-realistic that will help soldiers, healthcare professionals, pilots/astronauts, chemists, and more figure out solutions to problems or learn how to respond to dangerous circumstances without putting their lives or anyone else's at risk.
- **Remote work:** Workers can connect to the home office or with professionals located around the world in a way that makes both sides feel like they are in the same room.
- **Marketing:** The possibilities to engage with prospective customers and consumers through XR will have marketing professionals pondering all the potential of using XR to their company's advantage.
- **Real estate:** Finding buyers or tenants might be easier if individuals can "walk through" spaces to decide if they want it even when they are in some other location.

QUIZ ON AR,MR,VR

1) A game based on which animated franchise propelled AR into the mainstream in recent years?

A. Pokemon

B. Super Mario

C. Legend of Zelda

D. Sonic the Hedgehog

2) Which definition best fits “augmented reality”?

A. Technology that turns physical objects into digital objects

B. Technology that overlays digital information on top of real world items

C. Technology that completely immerses users in a new digital environment

D. Technology that can achieve a human-level understanding of images

3) Which popular Netflix show also put AR on the mainstream map, with one particularly spooky episode featuring AR in gaming?

A. House of Cards

B. Black Mirror

C. Master of None

D. Sense8

4) In immersive technology, what does MR stand for?

A. Mixed Reality

B. Measured Reality

C. More Reality

D. Mirrored Reality

5) In 2009, who was the first celebrity to be brought to life in AR in a print magazine?

A. Taylor Swift

B. Brad Pitt

C. Robert Downey Jr

D. Beyoncé Knowles

6) Which industry was the first to use augmented reality for commercial purposes?

A. Auto

B. Fashion

C. Film

D. Food

7) According to Digi-Capital, the global AR market is predicted to be worth approximately how much by 2022?

A. $55 million

B. $1 billion

C. $10 billion

D. $85 billion

8) What is VR mostly used for?

Sports

Health

Entertainment

Technicality

PROJECT:

XR for Teaching and Learning

The HP/EDUCAUSE Campus of the Future project is in its second year of investigation into the benefits of augmented reality (AR), virtual reality (VR), and 3D scanning and printing technologies for teaching, learning, and research at the institution.

RPA (Robotic Process Automation)

Generally, any desk job in any industry involves tasks that are repetitive in nature and can be automated.

RPA or Robotic Process Automation allows you to automate such routine and repetitive tasks.

You don't need to write any code to automate repetitive tasks.

In 2019, the trend of bots and machine learning is only going to skyrocket, which means RPA will become an invaluable skill to have.

Quiz:

1._____ provides instructions to robot.

A) Process recorder

B) Robot Controller

C) Developer Tools

2._____ publishes data to the master repository

A) Process Recorder

B)Process Developers

C) Robot Controller

3. The lowermost layer in layered design of RPA is _____

A) Process

B) Sub process

C) Atoms

D) component layer

E) Object

4. RPA interacts with multiple application at the _____ layer.

A) object

B) data

C) presentation

D) None of the options

5. RPA stores data and enables automation. True false

A) True

B) False

RPA Projects: Email Query Processing

Thousands of emails get generated every day which need to be segregated, so as to ensure that proper replies are sent to all the senders in an organization.

Now, the problem is that a manual workforce team cannot sit and segregate each and every mail as the humongous amount of emails get generated on a daily basis. Apart from that it is a quite tiresome job and cannot be done by a single employee or a team.

So, industries can simply automate this task by segregating common issues or emails into specific folders. Below in this article, I am going to show you, how to automate this task using UiPath.

Problem Statement: Task is to segregate emails based on the email ID in respective folders present in the Outlook folder.