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A Survey on Recent Technologies in Computer Science

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Abstract: **- Computer science is the study of the theory, experimentation, and engineering which forms the basis for the design and use of computers. It is the scientific and practical approach for doing computation, storage, communication of, and access to information. A computer scientist specializes in the theory of computation and the design of computational systems. Its fields have been divided into a variety of theoretical and practical disciplines. Some fields, such as computational complexity theory (which explores the fundamental properties of computational and intractable problems), are highly abstract, while fields such as computer graphics emphasize real-world visual applications. There has been many trends evolving in day to day life of the computer science. There are plenty of technologies have been evolving for different fields of computer science.**

Key Words:**-- Cyber Physical Systems, Network Virtual Function, Virtual Reality and Augmented Reality.**

I. INTRODUCTION

In this paper the discussion is about some of the trending technologies such as 1.5th generation mobile networks abbreviated 5G, are the next upcoming telecommunications standards which beyond the current 4G/IMT-Advanced standards. 2. A cyber-physical system (CPS) is a type of mechanism handled by different types of computer-based algorithms, majorly integrated with the internet and its followers. 3. Network functions virtualization (NFV) is an architecture of networking which utilises the different technologies and ideas of IT virtualization to make virtualize almost all classes of node networking functions into building blocks that may form to connect, or chain all together, to produce communication services.

5th generation mobile networks: 5th generation mobile networks abbreviated 5G, are the next upcoming telecommunications standards which beyond the current 4G/IMT-Advanced standards. In addition to the faster peak Internet connection speeds, 5G mobile network planning aims at higher capacity than current 4G, allowing greater number of mobile broadband users per area unit and allowing consumption of higher with unlimited data quantities in gigabyte per month. This would definitely make it as a feasible for a huge portion of the population to stream of high-definition media many hours per day through their mobile devices. 5G research and development will also aim at improved support of Device-to-device communication, at lower cost, lower latency than 4G equipment and also limited battery consumption, for better implementation of the Internet of things. Still, there is currently no standard for 5G deployments. The below are the requirements that Next Generation Mobile Networks Alliance should fulfil.

- Data rates of tens of megabits per second for tens of thousands of users.
- Data rates of hundreds of megabits per second for metropolitan areas.
- 1 Gb per second at a time to many workers on the same office floor.
- Several hundreds of thousands of concurrent connections for enormous wireless sensor network.
- Spectral efficiency significantly enhanced compared to 4G
- Coverage improved
- Signalling capability enhanced
- 1-10 ms latency (limited by speed of light) .

The Next Generation Mobile Networks Alliance feels that 5G should be rolled out by 2020 to meet the demands of business and consumer.]They predict that besides providing simply faster speeds, 5G networks also will need to meet new use cases, such as the Internet of Things (internet connected devices) as well as broadcast-like services and lifeline communication in times of natural disaster.

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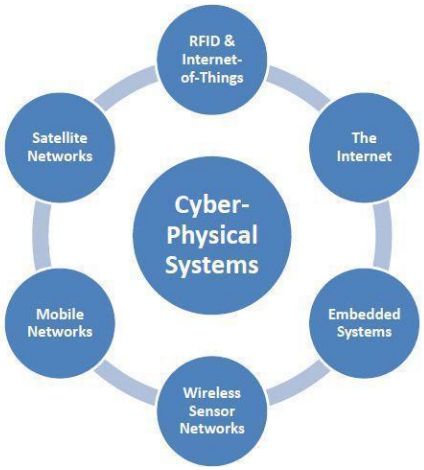


Cyber-physical system (CPS): A cyber-physical system (CPS) is a type of mechanism handled by different types of computer-based algorithms, majorly integrated with the internet and its followers. In cyber-physical systems, physical and software components are mostly twined together, each operating on various space related and temporal scales, exhibiting different behavioural modalities, and interacting with each other in a large number of ways that change with context. Some instances of CPS include smart grid, autonomous automobile systems, medical monitoring, process control systems, robotics systems, and automatic pilot avionics.

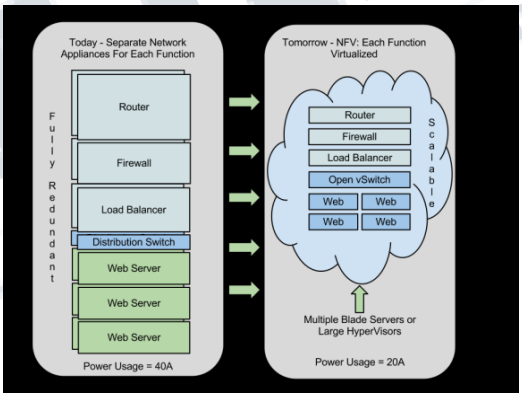
Some typical applications of CPS that fall under sensor-based communication-enabled autonomous systems. For example, most wireless sensor networks monitor few aspect of the environment and relay the processed information to a central node. And some other types of CPS include smart grid, medical monitoring, process control systems, distributed robotics, autonomous automotive systems and automatic pilot avionics.

A real-world example of such a system is the Distributed Robot Garden at MIT in which a team of robots tend a garden of tomato plants. This system combines distributed sensing (each plant is equipped with a sensor node monitoring its status), navigation, manipulation and wireless networking.

A focus on the control system aspects of CPS that penetrate critical framework can be found in the efforts of the Idaho National Laboratory and collaborators researching resilient control systems. This effort takes a comprehensive approach to next generation design, and considers the flexibility aspects that are not well evaluated, such as cyber security, human interaction and complex assurances.

II. NETWORK FUNCTION VIRTUALIZATION:

Network functions virtualization (NFV) is an architecture of networking which utilises the different technologies and ideas of IT virtualization to make virtualize almost all classes of node networking functions into building blocks that may form to connect, or chain all together, to produce communication services. NFV relies upon, but conflicts from, conventional server-virtualization techniques, such as those are used in enterprise IT. It may consist of one or more virtual machines running on diverse software and processes, on top of standard high-volume servers, switches and storage devices, or even cloud computing framework, rather having custom hardware appliances for each and particular networking function.



For an instance, a virt-ual session border controller could be deputed to assure a network without the typical cost and ramification of achieving and installing physical network protection units. And some alternate examples of NFV include virtualized load balancers, firewalls, intrusion detection devices and WAN accelerators.

NFV Framework

The NFV framework consists of three main segments:

1. Virtualized network functions (VNFs) are software operations of networking functions that can be used to set up on a network functions virtualization infrastructure (NFVI).

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2. Network functions virtua-lization infrastructure(NFVI) is the totality of all the types of hardware and software segments that frame the environment where VNFs are deployed. The NFV infrastructure can span plenty of locations. The network providing connectivity between these locations is considered as part of the NFV infrastructure.

3. Network functions virtual-ization management and interpretation architectural framework (NFV-MANO Architectural Framework) is the collection of all operational blocks, data repositories used by these blocks, and interfaces through which these operational blocks interchanging information for the purpose of managing and orchestrating NFVI and VNFs.

III. VIRTUAL REALITY AND AUGMENTED REALITY:

Virtual Reality: (VR) is an unreal, computer-generated reproduction or recreation of a real life environment or setting. It drowns the user by building them ambience like they are allowing the simulated reality first hand, mainly by stimulating their view and perception. VR is typically achieved by wearing a headset like Facebook's Oculus equipped with the technology, and is used certainly in two different ways:

- To generate and augment an fictional reality for gaming, entertainment, and play (Such as video and computer games, or 3D movies, head mounted display).
- To upgrade training for real life environments by creating a clone of reality where people can practice beforehand (Such as flight simulators for pilots).

Virtual reality is feasible through a coding language known as VRML (Virtual Reality Modelling Language) which can be used to develop a series of images, and define what types of interactions are possible for them.

Augmented Reality: (AR) is a technology that layers computer-generated enhancements upon an current reality in order to make it more relevant through the capability to interact with it. AR is developed into apps and used on mobile devices to mix digital components into the real world in such a way that they enhance one another, but can also be told apart easily.

AR technology is quickly coming into the mainstream. It is used to exhibit score superimposes on telecasted sports games and pop out 3D emails, pics or text messages on mobile devices. Leaders of the tech industry are also using AR to do fascinating and revolutionary things with holograms and motion activated commands.

***How are Virtual Reality and Augmented Reality Similar*?**
Technology

Augmented and virtual realities both advantage some of the same kinds of technology, and they individually exist to serve the user with an upgraded or enriched experience.

Entertainment Both technologies empower experiences that are enhancing more commonly conventional and desired after for entertainment purposes. While in the past they seemed merely an invention of a science fiction imagination, new artificial worlds come to life under the user's control, and deeper layers of interaction with the real world are also attainable. Leading tech executives are providing and creating new adaptations, improvements, and releasing more and more products and apps that support these technologies for the increasingly sharp users.

Science and Medicine Additionally, both virtual and augmented realities have great future in changing the landscape of the medical field by making things such as remote surgeries a real possibility. These technologies been already been used to treat and heal psychological conditions such as Post Traumatic Stress Disorder (PTSD).

How do Augmented and Virtual Realities Differ?
Purpose Augmented reality upgrades experiences by adding virtual peripherals such as images, digital graphics, or impressions as a new layer of interaction with the exiting world. Individually, virtual reality develops its own reality that is entirely computer developed and driven.

Delivery Method Virtual Reality is usually forwarded to the user through a head-mounted, or hand-held controller. This machinery connects people to the virtual reality, and allows them to control and operate their actions in an environment meant to replicate the real world. Augmented reality is being used more and more in mobile devices such as laptops, smart phones, and tablets to diversify how the real world and digital images, graphics intersect and interact.

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How do they work together? It is not always virtual reality vs. augmented reality– they do not always engage separately of one another, and in fact are often combined together to create an even more saturating experience. For example, hectic feedback-which is the vibration and impression added to interaction with graphics-is considered an enhancement. However, it is commonly used within a virtual reality setting in order to make the experience more lifelike though touch. Virtual reality and augmented reality are great examples of practices and cooperation fuelled by the desire to become consumed in a simulated land for entertainment and play, or to add a new dimension of interaction between digital equipments and the real world. Alone or combined together, they are undoubtedly opening up worlds-both real and virtual alike.

Future Work: Not only the above mentioned technologies but also some emerging new technologies like data science, Nano sensors, Organs on chips etc., are under the study for the future technology revolution.

IV. CONCLUSION

In this paper some of the latest trends has discussed with a brief about their working and how they are going to be useful for the future.

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