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Cross-Analysis on Emerging Trends in Cloud Computing, Artificial Intelligence, and the Internet of Things

I. DEFINITION OF TERMS

1. Cloud Computing

Cloud computing is a paradigm that delivers on-demand computing services like servers, storage, databases, networking, software, and analytics. It allows users to store data remotely rather than on local devices. Cloud computing helps individuals and businesses reduce costs, increase productivity, and enhance efficiency, performance, and security (Wang et al., 2010).

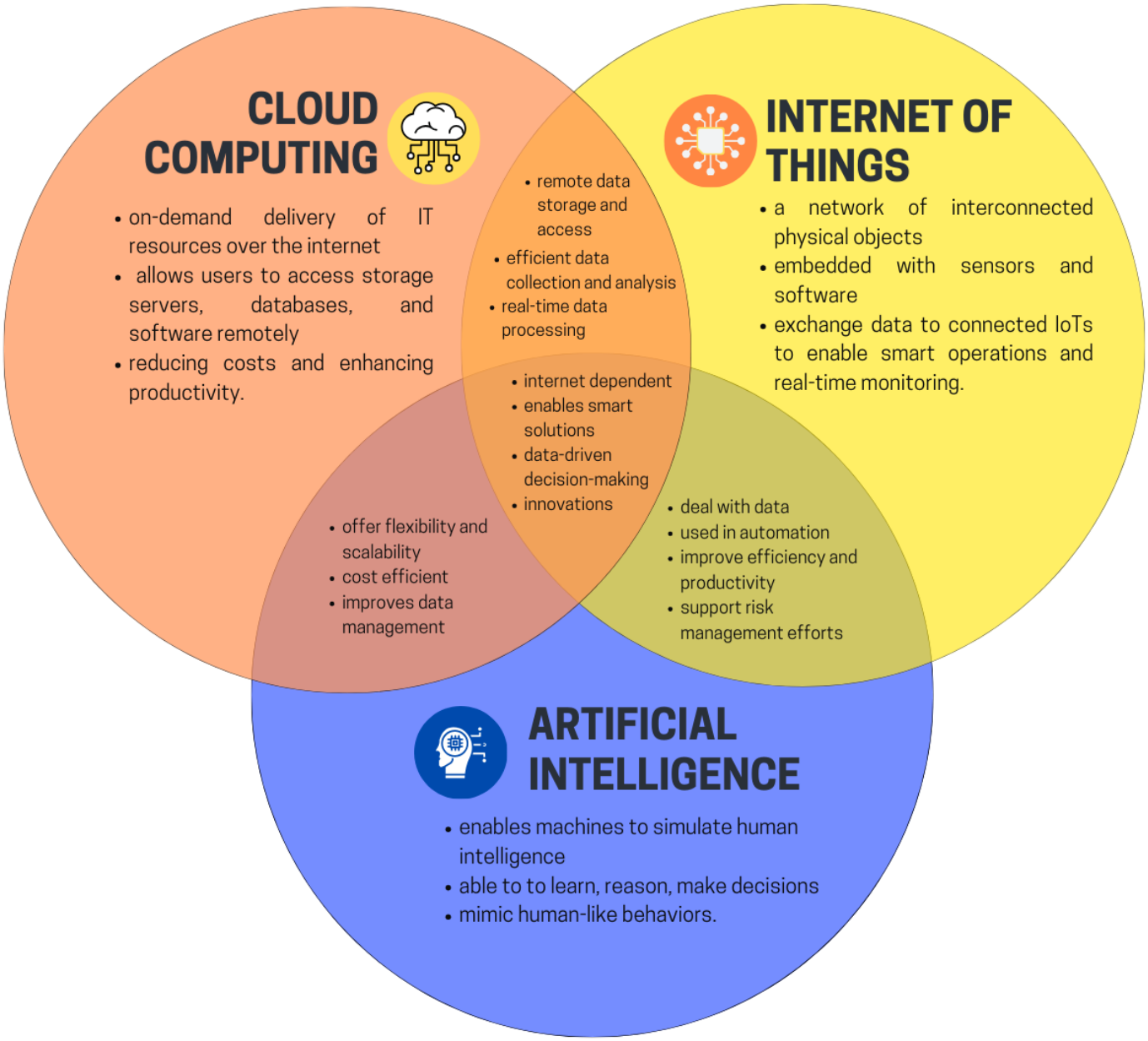
2. Artificial Intelligence

Artificial intelligence (AI) involves simulating human intelligence in machines, enabling them to think and act like humans (Cooper, 2024). As defined by Da Xu et al. (2021), AI is the science of using computers to replicate human behaviors such as learning, judgment, and decision-making. Additionally, AI is described as the imitation of human intelligence by a system or machine, with the goal of developing machines that can perceive, reason, learn, plan, predict, and exhibit other human characteristics (Xu et al., 2021).

3. Internet of Things

Internet of Things (IoT) is a network of physical objects. The internet is not only a network of computers, but it has evolved into a network of devices of all type and sizes, vehicles, smart phones, home appliances, toys, cameras, medical instruments and industrial systems, animals, people, buildings, all connected, all communicating & sharing information based on stipulated protocols in order to achieve smart reorganizations, positioning, tracing, safe & control & even personal real time online monitoring, online upgrade, process control & administration (Patel et al., 2016). IoT exchange data with other IoT devices and the cloud. IoT devices are typically embedded with technology such as sensors and software and can include mechanical and digital machines and consumer objects (Yasar & Gillis, 2024).

II. VENN DIAGRAM



II. FUTURE APPLICATIONS FOR VARIOUS INDUSTRIES

A.) Cloud Computing

Education

Cloud computing has had a profound impact on the education industry by enabling new applications that enhance learning experiences. One key benefit is the development of online collaboration tools that allow students and teachers to work together in real time, regardless of their physical locations. Cloud-based storage applications make it easier to store and share educational resources, ensuring that students and faculty can access materials at any time. Additionally, learning management systems (LMS) built on cloud platforms provide an integrated approach to managing courses, assignments, and grades, improving both teaching and learning efficiencies.

Healthcare

Cloud computing is revolutionizing the healthcare industry by enabling the creation of various applications that improve patient care and operational efficiency. One such application is cloud-based medical imaging, which allows healthcare providers to store and access high-resolution images from anywhere, facilitating advanced diagnosis and consultation (Narkhede et al., 2020). Another important use is the cloud-based decision support system, which aids healthcare professionals in making informed decisions by providing real-time data and predictive analytics (Narkhede et al., 2020). Additionally, Microsoft cloud services are being utilized specifically for healthcare, offering tailored solutions for patient data management, care coordination, and telehealth services (McGuinness, 2023).

Agriculture

Cloud computing is also making strides in agriculture by offering solutions that enhance productivity and decision-making. With the use of cloud platforms, farmers can utilize advanced tools for crop yield prediction, analyzing data from weather patterns, soil conditions, and crop performance to forecast harvest outcomes. Cloud technology can also support pest and disease detection by enabling farmers to gather and analyze data in real time, which helps in early intervention and reduces the use of pesticides (ForFarming Co., 2023). These cloud-based applications allow for smarter, data-driven approaches to modern farming.

B. Artificial Intelligence (AI)

Education

In education, AI technology has a broad range of applications that can significantly enhance learning experiences. AI systems can adapt to the individual learning needs of each student, targeting instruction based on their strengths and weaknesses. These systems are capable of managing entire schools, helping educators with administrative tasks and student performance analysis. AI can also be used for plagiarism detection, ensuring academic integrity, and improving learning management systems (LMS) that organize course materials, assignments, and grades. Additionally, AI supports academic research by analyzing vast amounts of data, generating insights, and identifying trends that might not be immediately apparent (University of San Diego, 2024).

Healthcare

In healthcare, AI is set to make significant contributions in diagnosing diseases, predicting health outcomes, and recommending personalized treatments. AI systems analyze medical data to identify patterns that might be missed by human practitioners, aiding in faster and more accurate diagnoses. In the near future, AI could play a crucial role in early disease detection and in suggesting individualized treatment plans based on a patient's unique health profile (Barth, 2023). As AI continues to evolve, it holds the potential to greatly improve the efficiency and accuracy of healthcare delivery.

Agriculture

AI offers several benefits to the agriculture industry, particularly in improving productivity and efficiency. One of the key applications of AI in agriculture is crop yield prediction, where AI models analyze weather patterns, soil conditions, and other factors to forecast the potential harvest. AI is also used to detect pests and diseases in crops, allowing for early intervention and reducing the need for chemical treatments. These advancements help farmers make more informed decisions, optimize resources, and increase overall crop yield (van Klompenburg, 2020; ForFarming Co., 2023).

C. Internet of Things (IoT)

Education

IoT devices play a crucial role in the education sector, enabling smarter and more efficient classrooms. Tools such as intelligent interactive whiteboards, tablets, and laptops allow for interactive learning experiences and improve student engagement. These devices help create a connected classroom where resources like textbooks and materials can be efficiently monitored and managed. IoT systems provide enhanced resource management capabilities, ensuring that schools can keep track of essential educational tools and supplies, helping reduce waste and optimize usage (Nagar, 2023).

Healthcare

IoT devices are transforming healthcare by improving patient care through innovative technologies. Remote monitoring tools and telemedicine systems allow healthcare professionals to monitor patients from a distance, reducing the need for frequent in-person visits and enabling quicker intervention when necessary. Robotic surgery is another area where IoT is making an impact, providing precision and minimizing the risks associated with traditional surgeries. Additionally, ingestible sensors are being developed to monitor patients' internal health conditions, providing real-time data to doctors and enabling more proactive care (Volterran & Sposato, 2019; Ordr, 2024).

Agriculture

In agriculture, IoT devices are transforming farming practices by providing real-time data and automation. Agri-bots are being developed to assist with tasks such as planting and harvesting, while drones are being used for crop surveillance and monitoring. Remote sensing technologies allow farmers to track soil health, moisture levels, and other environmental conditions, ensuring optimal growth. Additionally, computer imaging techniques are being used to analyze crop health and predict potential issues, making it easier for farmers to implement targeted interventions and improve yield (Cropin, n.d.).

IV. REFLECTION

ALQUIEN. After going through the research activity, I have learned deeper about Cloud Computing, AI and IoT. I have understand that these innovations are changing our way of approaching tasks efficiently and effectively. These innovations hold a significant value to the different industries around us. The activity made me comprehend more about their definition and their concepts.

Moreover, after I researched about the future applications on a certain field of industry, I have learned that there are many ways these tools can affect the improvement of our world. I further realized that we can create our own smart innovations that can positively impact our society if we don't limit our imaginations and keep working on our ideas.

CRISTINE. The activity made me understand that cloud computing, the Internet of Things, and artificial intelligence are connected in different ways. The Venn diagram showed how these three technologies overlap. Cloud computing provides access to things like software and storage online. The Internet of Things allows physical objects to gather and share data by connecting to the internet, while artificial intelligence helps machines understand, learn, and make decisions. For example, cloud computing lets us store a lot of data, and AI can help analyze data collected by IoT devices. Together, these technologies are driving new ideas across different industries and making life more convenient and efficient

DAVE. I'm incredibly amazed at how these technologies have already proven their existence in my daily life especially at school through the learning system. I'm really interested in how AI can adjust to different learning styles, which could make studying easier for everyone.

When I read about how these technologies are used in healthcare and farming, I thought of farmers and how these tools could help them with their work. Some parts of the research were hard to follow, but it made me realize how important these technologies will be for my future, whatever career path I take. I do worry a bit about privacy and internet issues, but I'm excited to be in a generation that will get to work with these tools and maybe even come up with new ways to use them.

HAZEL. I am immersed by how these technologies interact and create progress across multiple industries. Each of these technologies has a distinct purpose. Cloud computing allows us to store and process data without the need for all of the hardware. Artificial intelligence uses computers to imitate human behaviors, whereas the Internet of Things connects various types of devices, from phones to medical devices, allowing them to communicate with one another. But what truly stands out is how these three can collaborate to produce something even greater, particularly in industries such as education, healthcare, and agriculture.

As I looked into how these diverse technologies interacted, I discovered that they complemented one another in ways that benefited our daily lives. How these devices interact makes me understand how much they are impacting our daily lives. They are not just making things more efficient, they are also contributing to smarter, more connected surroundings that benefit everyone.

XYRHA. Reflecting on this activity made me understand how Cloud Computing, AI, and the Internet of Things are connected and how these technologies can be incredibly powerful when combined. They work together to make things easier to use and more helpful. I also learned that cloud computing, AI, and the Internet of Things are changing our world, improving the way we learn, enhance healthcare, and even transform agriculture. By combining AI, which helps us understand, learn, and make decisions, with IoT devices that connect and communicate, and cloud computing that provides access to software and storage online, these technologies can have a huge impact on our future. Together, they can create a smarter world for everyone.

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