Module Code & Module Title

CC5068NI– Cloud Computing & IoT

Assessment Type

Weekly Assignment

Semester

2021 Spring/Autumn

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Assignment Due Date: 16th March 2022

Assignment Submission Date: 16th March 2022

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Word Count (Where Required):

Week 3 Tutorial

1.   Describe about Autonomous Intelligence System and how it is helping in industry.

 Answer:

        Autonomous Intelligent Systems (AIS) are AI software systems that operate without direct human supervision, such as self-driving automobiles, unmanned aerial vehicles (UAVs), smart manufacturing robots, elderly care robots, and virtual agents for training and assistance. In unforeseen scenarios, such systems must be able to make safe, reasonable, and human-values compatible decisions. To ensure the necessary confidence on behalf of human users, their decision-making should be intelligible by human users and partners.

        AI systems in industry are the same technology you use in your everyday life, but they're applied to industrial issues. The same AI that improves the clarity of our phone calls can detect defective blades in a sawmill. AI-powered programs, such as those that help us find new movies and music based on our personal tastes, can assist designers in picking the proper components to blend to create the optimal concrete for the job. Manufacturing facilities use the same arithmetic used to teach a toy dog to walk to plan and schedule maintenance well into the future!

2.   Find out if Artificial Intelligence and Autonomous Intelligence System are related to each other.

 Answer:

        Autonomous robotics systems are meant to execute tasks in a predictable environment, usually one that has been pre-planned. Sensors are essential for supplying robots with precise and detailed information about their location within the domain. These sensors are used by autonomous robot's systems to explore their environments and accomplish tasks swiftly and effectively. Traditional software or AI systems can fuel autonomous devices and systems, allowing them to learn and adapt as they go.

Yale University defines artificial intelligence as "developing systems that can tackle complex problems in ways that would normally need human intelligence." This usually entails the use of modern sensors and machine learning technologies to gather information about the environment and allow the system to respond properly to external stimuli.

3.   The hyped latest technology in vehicle braking world is ABS (Antilock Braking System), which is also a part of Autonomous Intelligence System. Find out how ABS works.

 Answer:

In harsh braking scenarios, ABS works by releasing and then reapplying or 'pumping' the brakes to a motorcycle wheel or automobile wheel. 'Locking,' or when a wheel stop moving and starts to skid, is detected by sensors on each wheel. However, not all ABS systems are created equal, with some just preventing the rear wheels from locking up. When ABS detects a lock-up, it pumps the brakes hundreds of times per second. This helps the driver maintain control of the vehicle by preventing the wheel or wheels from skidding. ABS, in essence, works in three stages:

- The brake pedal is pressed.
- Skidding or 'locking' is detected by wheel sensors.
- The brakes are pumped by ABS.

4.   Research about the autonomous driving levels from level 0 to level 5 and explain the changes in each level.

Answer:

- Level 0: No Automation

     This is where the human driver controls the car completely without any support from a driver assistance system.

- Level 1: Driver Assistance

SAE's Level 1 is an automated system on the vehicle that can sometimes assist the human driver to conduct some parts of the driving task. In fact, many top-of-the-range car models offer level one automation. You're still the driver with full-control on driving however, you may call upon technology like adaptive cruise control for active safety.

At Level 1, a computer can control either steering or acceleration/braking, but it is not programmed to do both at the same time. To sum it up, you still have full responsibility to monitor road situations and assume all driving functions if the assistance system cannot do so for any reason.

- Level 2: Partly Automated Driving

Functions that make partial automation possible are already a reality and in practice. Semi-autonomous driving assistance systems, such as the Steering and Lane Control Assistant including Traffic Jam Assistant, make daily driving much easier. They can brake automatically, accelerate and, unlike level 1, take over steering.

With the remote-controlled parking function, it's possible to pull into tight spots without a driver for the first time. In level 2, the driver continues to remain in control of the car and must always pay attention to traffic.

- Level 3: Highly Automated Driving

In the third development stage, drivers gain more freedom to completely turn their attention away from the road under certain conditions. In other words, they will be able to hand over complete control to the car. The driver, however, must

be able to take over control within a few seconds, such as at road construction sites.

- Level 4: Fully Automated Driving

Level 4 is considered to be fully autonomous driving, although a human driver can still request control, and the car still has a cockpit. In level 4, the car can handle the majority of driving situations independently. The technology in level 4 is developed to the point that a car can handle highly complex urban driving situations, such as the sudden appearance of construction sites, without any driver intervention.

The driver, however, must remain fit to drive and capable of taking over control if needed, yet the driver would be able to sleep temporarily. If the driver ignores a warning alarm, the car has the authority to move into safe conditions, for example by pulling over. While level 4 still requires the presence of a driver, cars won't need drivers at all in the next, final level of autonomous driving. However, their operations will be constrained to certain situations,

Limited to a geo-fenced area, such as paved streets in a defined area of town.

Limited by adverse weather, such as falling snow, snow-packed roads, intense rain, thick fog, etc.

Limited to a maximum speed, e.g., vehicles limited to 35 mph may be able to travel on most streets, but not on roads posted at 40 mph and above.

- Level 5: Full Automation (Driverless)

Unlike levels 3 and 4, the "Full Automation" of level 5 is where true autonomous driving becomes a reality.

Here drivers don't really even need to have a license. and everyone in the car is a passenger. Cars at this level will clearly need to meet stringent safety demands, and will only drive at relatively low speeds within populated areas. They are also able to drive on highways but initially, they will only be used in defined areas of city centres.

Week 3 Workshop

1.   Study about AWS cloud service and find out the models that AWS is providing.

 Answer: The models that AWS is providing are described below:

- Infrastructure as a Service (IaaS) is made up of basic cloud building pieces that give users access to a wide range of networking capabilities, virtual and well-built hardware computing resources, security, data storage, and backup space. IaaS is a popular choice for cloud computing services since it is similar to today's technology resources that developers and in-house specialists already utilize. You have maximum flexibility and management control over your newly purchased and existing resources with IaaS.
- Software as a Service (SaaS) (PaaS) provides the user with a platform that is hosted by the service provider and includes top-of-the-line hardware and software tools. PaaS eliminates the need to maintain a sophisticated hardware and operating system architecture. It helps developers to concentrate on the development, deployment, and administration of their applications.
- The best example of Software as a Service (SaaS) is email services such as Gmail. Users of email send and receive messages without giving a second thought to feature enhancements, servers, application management, or maintenance. They aren't required to think about which operating systems are required to run the email apps. Users can get technical products and services through SaaS without having to bother about configuration or management.

SaaS refers to software end-user applications that are delivered without the need for underlying infrastructure.

2.   Study about AWS Academy Cloud Foundation.

Answer:

Cloud Foundation is an AWS Solutions Consulting Offer, delivered via a consulting engagement from Itoc, an AWS DevOps, Financial Services, SaaS and Security Competency Partner.

3.   Research about Amazon EC2 and S3 service.

Answer:

Amazon S3 is a data storage service for the internet. Amazon S3 gives you access to a dependable, quick, and low-cost data storage infrastructure. It's intended to simplify web-scale computing by allowing you to store and retrieve any quantity of data, at any time, from within Amazon EC2 or from anywhere on the internet. Amazon S3 stores data items redundantly on numerous devices across multiple facilities and allows multiple clients or application threads to view or write to these data objects at the same time. You may leverage Amazon S3's redundant data to recover from instance or application failures quickly and reliably.

4.   Find alternative of AWS cloud and compare their similarities and dissimilarities.

Answer:

Parameter	AWS	Azure
Date Of Initiation	2006	2010
Market Share	40%	30%
Open Source	More open to open source community	Less open to open source community
Hybrid Cloud	It is a work in progress	Excels in Hybrid Cloud Market
Licencing	Offers more flexibility	Catching up with AWS
Linux Ecosystem	Extensive support for Linux	Still building up