**Modified**

Let's explore the application of intelligent systems in business, a key reason for learning about them. The relevance extends beyond creating technologies like ChatGPT or self-driving cars; it's crucial in industries and business operations.

A prime example is Microsoft 365 Copilot, which leverages large language models (like ChatGPT) and Microsoft productivity products. It enables efficient creation of marketing plans, books, schedules, and more. Amazon uses AI to expedite deliveries through regionalization, predicting demand, and optimizing inventory and logistics.

Walmart employs AI for smarter substitutions in online grocery orders and robotic scrubbers that monitor inventory. Companies like Visa, Mastercard, and PayPal employ machine learning for fraud detection. In healthcare, AI aids drug discovery, diagnostics, and resource allocation. Qi Healthcare digitizes health services.

With AI impacting areas like driving, banking, insurance, healthcare, and more, the question arises: How can you learn about AI and intelligent systems? The answer lies in the characteristics these systems should possess to perform tasks and solve problems effectively. Our unit covers a broad range of AI technologies aligned with these characteristics, giving you the tools to develop intelligent systems.

For instance, technologies related to knowledge extraction, storage, and reasoning encompass AI techniques for knowledge representation, logic-based reasoning, rule-based reasoning, constraint-based reasoning, and more. Machine learning enables learning from experience through reinforcement learning, deep reinforcement learning, and training on large datasets using deep learning.

Imprecise expressions of facts also need to be handled; technologies like fuzzy logic, fuzzy systems, and rough set theory address this. Additionally, if an intelligent system's behavior can be inspired by natural evolution, computational intelligence methods like genetic algorithms, differential evolution, particle swarm optimization, and artificial neural networks are utilized.

Social interaction and cooperation, integral to human intelligence, are represented in multi-agent systems with agent communication, automated negotiation, natural language processing, and conversational abilities.

Now, the question is, where does your interest in AI fit, and what can AI help you develop?

**Summarise**

The application of intelligent systems in business highlights the relevance of learning about AI. Microsoft 365 Copilot, powered by large language models, aids in tasks like generating marketing plans and books. Amazon's Regionalization uses AI to optimize product shipping based on demand patterns. Walmart uses AI to suggest substitutions in online grocery orders. Fraud detection by companies like Visa and Mastercard employs machine learning algorithms. AI is also transforming healthcare, aiding drug discovery, diagnostics, and resource allocation.

For those interested in learning AI, understanding characteristics like knowledge extraction, reasoning, learning, and dealing with imprecision is key. Techniques include knowledge representation, reasoning, machine learning, fuzzy logic, and evolutionary computing. Multi-agent systems enhance social interaction skills.

The comprehensive coverage of AI technologies equips learners to develop intelligent systems. These technologies address different aspects of AI's potential, making it a dynamic field with diverse applications.

***Important***

**APPLICATIONS OF AI IN BUSINESS**

You. are going to learn these techniques and skills in order to develop Jack GPT or driverless car. Now let's have a look at the application of intelligent system in business. We have seen AI playing significant roles in our everyday life in many business.

**WHAT SHOULD I LEARN ABOUT AI AND INTELLIGENCE SYSTEMS?**

The next question is so I really want to learn about AI and intelligence systems, where should I start, what should I learn? So this again coming back to questioning what characteristic intelligence systems should have in order for them to perform those tasks and solve those problems. Here we cover a very broad spectrum of AI technologies to allow you to view intelligent systems.

**INTELLIGENT SYSTEMS: THE PROCESS OF NATURAL EVOLUTION**

Or the system need to deal with imprecise expressions of facts as well. The behavior of an intelligent system can be inspired by processes similar to natural evolution. Can we replicate this evolution process in order to enable the algorithm to become smarter and better?

**INTELLIGENT SYSTEMS**

Or there is one important aspect in human intelligence that is the ability to be social. And so again, we develop intelligent system technologies for having this ability. The next question is then what we interested fit in is AI. Then the question is what AI can help to develop?

**Original**

Now let's have a look at the application of intelligent system in business because clearly this is also the reason why you want to learn about intelligence systems. So not only that, you are going to learn these techniques and skills in order to develop Jack GPT or driverless car. These are very relevant in the context of industry and business squad. So just a simple example is that one of the AI technologies that has become quite popular these days is Microsoft 365 Copilot and they enable the power of large language models, which is the technology behind Chat GPT. And then together with some Microsoft productivity products such as Microsoft 365, apps such as Microsoft Words, Excel, PowerPoints and Microsoft Graph. And then with that you can enable the notes or the words that you enter into these apps. Then Copilot will allow you to develop some very powerful could be a marketing plan, could be a book that you can publish, could be a schedule for the project that you are trying to manage and so on and so forth. And so rather than having to produce those things yourself, you put in the notes and then Copilot will just produce those plans, those schedule, those books, those texts for you. Or AI has been used by Amazon substantially in order to speed up deliveries because Amazon has developed these technologies called Regionalization to enable the products to be shipped to customer from the warehouse closest to them. So if the customer is in the west coast then the product should be shipped from a product near the west coast rather than from warehouse along the east coast, right? And so to do this then Amazon has to use AI enabled technologies in order to analyze huge amount of data and patterns to predict what products will be in demand and where. And so that they are going to prepare the inventory for that locations with the right number of products in that warehouse and when the order is coming in and then the product is always readily available at that nearest warehouse and at the same time you don't want over inventory either. So if the warehouse in east coast doesn't have sufficient products while the warehouse in the west coast has more than the number of products that are demanded in the east coast then clearly that is not good because then the demand in the east coast will have to be served by a warehouse in the west coast. And so Amazon is able to use AI in order to make those inventory decision and then logistics decision before the customer actually placed the order. And so this is another example that has been used in business. So this in the case of Walmart which is the biggest supermarket chain in the world. And so they use AI in order to make smarter substitutions in online grocery orders. So when customer place an order for a product that is no longer available at a particular store that sell grocery to that customer, then the AI system at Walmart will be able to provide the optimal substitution to the customer. Or Walmart use this robotic scrubber that not only clean the floor but then also checking for inventory and then detecting the low inventory of certain shells at certain shells and then immediately provide the notifications to the people at the back office in order to supply that particular shells with a new inventory. And these are the case of fraud detection using machine learning algorithms to analyze data on customer behavior and this has been used extensively by companies such as Visa, Mastercard and PayPal in order to detect the fraud. This is another very important example of using AI in healthcare and so in this case drug discoveries and manufacturing and on so better diagnostics and allocation of resources for pharmaceutical company has been introduced using AI and machine learning. Or in the case of Qi healthcare they have been able to use AI in order to digitalize the health services. So now we have seen AI playing significant roles in our everyday life in a car we drive in many business such as banking, insurance or healthcare, hospital or supermarket and so on and so forth. Then now the next question is so I really want to learn about AI and intelligence systems, where should I start, what should I learn? So this again coming back to questioning what characteristic intelligence systems should have in order for them to be able to perform those tasks and solve those problems. And so with this list of characteristics that I list on this slide then you will see that we are going to learn the relevant technologies and technique in our unit in order to address these characteristics. And with that we cover a very broad spectrum of AI technologies to allow you to view intelligent systems. So we have the ability to extract and store knowledge and then use that knowledge for reasoning and then we can also learn from the experience of training on a very large data set and so on and so forth. So all of these characteristics indicate that there will be some relevant technologies that you want to learn and then by learning those technologies now you are equipped with the tools with the weapon to allow you to actually develop these intelligent systems. So starting with the ability to extract store knowledge and use knowledge for reasoning, then we dealing with AI techniques for knowledge representation and reasoning. They could be logic based, they could be rule based, or they could be something such as constraints, reflection and optimization, problem solving. So these are a number of techniques that we want to learn about in order to view system that have this ability to extract and store knowledge and also performing human like reasoning process or learning from experience or learning from training data set. And now we have machine learning to allow the system to learn from the experience through reinforcement learning or deep reinforcement learning or through training on a large data set such as using deep learning. Or the system need to deal with imprecise expressions of facts as well. So you probably know that in the real world with humans, what we actually state always have some extent, some level of imprecision. So if I say that a person is tall, then that is relative to my opinion, right? Because for a basketball player looking at a person, then they may not consider that person to be tall. But even though I would look at a person that is let's say that 178 centimeter tall and then say that the person is tall. So this imprecision in the expressions of facts need to be deal with by an intelligent system as well. And that's when we develop solutions and technologies such as fuzzy logic, including fuzzy systems, rough set theory, in order to deal with this imprecise expression of FAS, or if the behavior of an intelligent system can be inspired by processes similar to natural evolution. So we see that the natural evolution enable human to become smarter and smarter over generations or enable a specsy to evolve and become smarter over time. Now, the question is can we replicate this evolution process in order to enable the algorithm to become smarter and better? So again, there is solutions computer science solution to allow us to achieve this effect. So this paradigm of soft computing and computational intelligence, including evolutionary computing, including genetic algorithm, differential evolution, including particle swarm optimization and colony optimization, including artificial neural networks, are some of the examples of getting inspired by natural evolution and by the nature and then developing relevant algorithms and technologies to build intelligent systems. Or there is one important aspect in human intelligence that is the ability to be social, to work together, to get the assistance from all the intelligent beings and then assist from all the intelligent beings. And so this capability of being social is embedded in the ability to interact and deal with other agents. And so again, we develop intelligent system technologies for having this ability as well. So these are multi agent systems with the ability of agent communication, of automated negotiation, of natural language processing or natural language based conversational. And now that we have looked through the list of characteristics of intelligent systems and then we also look at the field of studies that again will be used as the key for the topic that we are going to cover in this unit. Now, the next question is then what we interested fit in is AI. Then the question is what AI can help to develop?