**King Fahd University of Petroleum and Minerals**

**Introduction to Artificial Intelligence (COE292-05)**

**Quiz 3 (10 marks)**

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**Instruction(s): Fill in the table below with appropriate answers. Use internet resources.**

Q1. Write 5 application areas of Machine Learning related to your major and the Strategy Utilized.

|  |  |  |
| --- | --- | --- |
|  | Application Area | Machine Learning Strategy Utilized |
| 1 | Social Media Marketing | Text Mining  [5] |
| 2 | Healthcare and IoMT | Artificial Nural Network  [4] |
| 3 | CRM customer resource management | Data Minning  [1] |
| 4 | Logistics and Transportation | Reinforcement Learning  [2] |
| 5 | Cybersecurity | Design Patterns  [3] |

Q2. **Briefly** describe any two of the “**Machine Learning Strategy Utilized**” from question 1 above.

**Social Media Marketing usage of text mining**

Social media marketing is used often on the internet nowadays. An article written to find a way to enhance social media marketing using machine learning used text mining to analyze the large volume of unstructured data/text from the internet to a structured form to gain insights from the data. They used text mining to retrieve facts from data, extract knowledge from the data, summarize the main points, categorize it for unsupervised learning, cluster it for supervised learning, and filter the data for sport vector machine analysis. The researchers choose a tool called WEKA to analyze the data in addition to the ML approach of text mining, they concluded that using both the tool and ML learning technique is effective for data analysis.

**Healthcare and IoMT usage of ANN**

Artificial Nural Network is part of machine learning and was used in a study to monitor elderly people with the help of IOT medical devices. For the analysis of the data ANN was used to predict if elderly people have a health issue or not. ANNs are usually used to make predictions from data, and they work similar to the human brain by making connections to different events to come to a conclusion. In this study ANN was used to validate the results of weather the patients had a health issue or not based on previous data that was collected.

**Customer Relationship Management CRM and Data Mining**

CRM or customer relationship management is a way of managing customers to help attract customers to your store by building a mutually beneficial relationship with them as the business will provide a better experience for the customer and the customer will be loyal to the brand/store meaning more sales for the store [6]. Data mining is when you extract data and features from a large set of data to help in identifying patterns that help in making decisions for decision makers [7]. In a study that looked at using CRM with the help of Machine Learnings data mining technique to better attract customers to their organization. They used two classification models, Multilayer Perception Neural Network and Naïve Bias, they concluded that MPNN showed better accuracy than NB although NB showed better true positive rate and false positive rates and took less time to complete.

**Logistics and Transportation usage of Reinforcement Learning**

A study used reinforcement learning that is a branch of ML that is used for decision making as it looks at the environment to make the best decision that has the longest return. The study wanted to see if DRL or deep reinforcement learning can help in scheduling of transportation systems. It concludes that to make this possible we need more IOT devices that are implemented in equipment like bikes and cars to help in more data collection and that DRL helps us more when we have less data about a specific area and can generalize the results from a small data size to make better decisions.

**Cybersecurity and decision patterns**

Cybersecurity is a growing problem nowadays and we need to analyze the threats that come from a device, to do that we collect data from computer systems, the amount of data collected is vast so a person cannot go through that data, we use Machine learning to find the important data that we need, a technique that can be used is finding the Decision Patterns from the data. Decision Patterns find the features in a dataset that are needed for analyzing by a cybersecurity expert to figure out if the file is a threat or not. An article wanted to manage IOT devices cybersecurity issues using Machine Learning. They trained models to find if an electronic device is IOT capable or not IOT capable, in addition to classifying the different devices, and finding the normal functions of each IOT device. This allows them to validate their results and get them faster and to detect a network change or a cyber security attack.

References

[1]

T. F. Bahari and M. S. Elayidom, “An Efficient CRM-Data Mining Framework for the Prediction of Customer Behaviour,” *Procedia Computer Science*, vol. 46, pp. 725–731, 2015, doi: <https://doi.org/10.1016/j.procs.2015.02.136>.

[2]

G. Li *et al.*, “Towards Smart Transportation System,” *Journal of Organizational and End User Computing*, vol. 33, no. 3, pp. 35–49, May 2021, doi: <https://doi.org/10.4018/joeuc.20210501.oa3>.

[3]

A. Sivanathan, H. Habibi Gharakheili, and V. Sivaraman, “Managing IoT Cyber-Security Using Programmable Telemetry and Machine Learning,” *ieeexplore.ieee.org*, Feb. 04, 2020. <https://ieeexplore.ieee.org/abstract/document/8981946> (accessed Sep. 23, 2023).

[4]

M. F. Khan *et al.*, “An IoMT-Enabled Smart Healthcare Model to Monitor Elderly People Using Machine Learning Technique,” *Computational Intelligence and Neuroscience*, vol. 2021, pp. 1–10, Nov. 2021, doi: <https://doi.org/10.1155/2021/2487759>.

[5]

B. S. Arasu, B. J. B. Seelan, and N. Thamaraiselvan, “A machine learning-based approach to enhancing social media marketing,” *Computers & Electrical Engineering*, vol. 86, p. 106723, Sep. 2020, doi: <https://doi.org/10.1016/j.compeleceng.2020.106723>.

[6]

briticana, “customer relationship management | information system | Britannica,” *www.britannica.com*. <https://www.britannica.com/topic/customer-relationship-management>

[7]

IBM, “What is Data Mining? | IBM,” *www.ibm.com*, 2023. <https://www.ibm.com/topics/data-mining>