CSE 450 – Case Study Performance Evaluation

Treat the questions in this evaluation like a professional document you would send to an executive team during a post-mortem. Write in complete sentences, using correct grammar and spelling.

1. During this module, what are two key ideas you learned during this case study related to machine learning and data analysis?

The importance of preprocessing: Handling categorical data through one-hot encoding and scaling numerical features can significantly impact model performance.

The versatility of neural networks: Even for regression tasks such as predicting the number of rented bikes, neural networks can be a suitable tool if designed and trained properly.

2. Choose one of your answers to the previous question and write a one-paragraph summary of that concept or idea as if you were teaching it to someone else.

Preprocessing is a critical step in the machine learning pipeline. Before feeding data to a model, especially a neural network, it's essential to ensure that the data is in an appropriate format and scale. For instance, in our bike rental dataset, we had categorical data like season and hour. Using one-hot encoding, we transformed these into a format suitable for our neural network. Additionally, numerical features like temperature and humidity can have varying scales, so we used standard scaling to bring them to a similar scale. Proper preprocessing helps the model learn more effectively and converge faster.

3. If you had additional time to work on this case study, what is one thing that you would you do to take things further?

I would consider exploring more complex architectures for the neural network, such as adding more layers or using convolutional layers to detect patterns over time. Additionally, I'd experiment with incorporating time-series forecasting techniques given the temporal nature of the data.

**4. Aside from having to learn a new and/or difficult concept, what do you think was the biggest obstacle your team faced during this case study?**

Ensuring the model generalizes well to new, unseen data, like the December dataset, was challenging. It underscores the importance of rigorous validation and potential pitfalls of overfitting.

**5. What is the most insightful thing you learned from hearing about what the other teams did?**

While I did manage to attend the class session via Zoom, unfortunately, the sound quality was poor and made it difficult to grasp all the nuances of what other teams shared. However, from the fragments I could understand, I was impressed by the diversity of approaches and strategies different teams applied to the same dataset. It reminded me that in data science, there isn't always a "one-size-fits-all" solution, and multiple paths can lead to valuable insights.

6. What insights did you gather about learning in general from this module?

Practical teamwork experience along with iterative feedback is very important. Working directly with data and observing how different strategies affect model performance can provide deeper insights than mere theoretical knowledge.

7. Could these insights apply to spiritual learning? If so, how?

Absolutely. As an LDS member, I've come to appreciate the parallels between learning in an academic or professional context and spiritual learning. For instance, just as in machine learning, where we iterate and improve our models based on feedback, in spiritual learning, we often turn to scriptures, prayer, and personal revelation to refine our understanding and better align our lives with gospel principles. Continuous effort, seeking understanding, and applying what we learn are critical in both domains. In the gospel context, the principle of "line upon line, precept upon precept" echoes the iterative learning process we see in machine learning. We're constantly learning, growing, and adapting, whether it's improving a model or striving to become more Christlike.

**8. You should have received an email from the TEAMMATES web app for you to enter your personal and team evaluations for this module. (If not, you should email Brother Allred to fix this.) Before submitting this document, go complete the TEAMMATES online feedback survey. Did you complete the online TEAMMATES evaluation survey?**

**Yes**