**Data Analytics Capstone Topic Approval Form**

**Student Name:** Allison Casey

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**Capstone Project Name:** Used Car Value Prediction Using a Neural Network

**Project Topic**: Predictive Model on Used Car Data

**This project does not involve human subjects research and is exempt from WGU IRB review.**

**Research Question:** Can an accurate neural network model be constructed using the used car data?

**Hypothesis**: **Null hypothesis**-. An accurate predictive neural network model (accuracy less than 80%) cannot be constructed using the data set **Alternate Hypothesis**-. An accurate predictive neural network model (accuracy of 80% or higher) can be constructed using the data set

**Context:** Since cars depreciate over time it is common for consumers to buy used cars as well as for dealers to sell used cars. As a result, it is beneficial to both buyers and sellers of used cars to be able to accurately determine the value for a used car. This study will utilize a predictive neural network to see if this type of model can be used to accurately predict this value.

**Data:** An existing data set, car\_price\_dataset.csv, will be used that was obtained from Kaggle as a publicly available data set that is available for use and analysis by anyone so it will be fine to use for this capstone project. This data set contains 10000 rows with 10 columns that contain various attributes of used cars including the price.

**Data Gathering:** Data will be used from a pre-existing data set from Kaggle. This data set has been downloaded directly from Kaggle and will then be imported into Jupyter Lab utilizing Python.

**Data Analytics Tools and Techniques**: The data will first need to be explored and prepared for the analysis so this will involve using techniques to identify and drop null values and one hot encoding categorical variables. One the data is explored and treated appropriately it will need to be split into a training and test set for validation. The data may also need to be scaled at this point. Then the model can be built which will involve using a Keras Functional API model and then the model can be evaluated and adjusted to improve the model to get the final model created.

**Justification of Tools/Techniques:** Data preparation and exploration is needed to make sure that the data will be able to be used to build the model and that it will allow the model to produce the best output. The data needs to be clean for the model to be able to work and Nulls or improperly formatted variables may not be able to be used by the model hence the one hot encoding will be needed for the model to be able to make use of the categorical variables. Splitting the cleaned data into training and tests sets is important because this will allow for the model to be tested and checked for accuracy to answer the research question. Scaling the data will be useful because the data is not on the same scale for different columns. For example, the year and engine size columns are scaled quite differently. Using a Keras Functional API model in this scenario makes sense because it is flexible and can handle multiple inputs so it will be good for incorporating lots of features which this data set has. It would also make sense that not all the relationships between the features will be linear, and this type of model can handle those more complex interactions.

**Project Outcomes**: The anticipated outcome of the analysis would be determining if the neural network model created can accurately predict the value of used cars. The deliverables will be a Jupyter Lab Notebook containing the model, a report, and a presentation.

**Projected Project End Date**: 3/21/2025

**Sources**:

Team, Keras. “Keras Documentation: The Functional Api.” *Keras*, keras.io/guides/functional\_api/. Accessed 17 Feb. 2025.

Tech. “Car Price Dataset.” *Kaggle*, 26 Jan. 2025, www.kaggle.com/datasets/asinow/car-price-dataset/data. Accessed 17 Feb. 2025.

**Course Instructor Signature/Date:**

The research is exempt from an IRB Review.

An IRB approval is in place (provide proof in appendix B).

Course Instructor’s Approval Status: Approved

Date: Click here to enter a date.

Reviewed by:

Comments: Click here to enter text.