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CIS625HOS2P2025 Machine Learning for Business

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April 10, 2025

Unit 4: Discussion

SHAP in Car Price and Loan Predictions

In my analytics projects, I plan to use SHAP (SHapley Additive exPlanations) to bring transparency and trust into machine learning models, mainly when predicting outcomes in the automobile domain. For example, if I build a model that estimates the resale price of used cars, SHAP can show how each feature, such as mileage, brand, or accident history, affects the final predicted price. Suppose the average used car price is \$15,000, and my model predicts \$17,500 for a 2024 Toyota Camry (Acerta, 2021). SHAP could explain it like this:

Feature	SHAP Impact on Price	Explanation
Year = 2024	+\$1,500	Newer model year increases value
Brand = Toyota	+\$400	Reliable brand reputation adds value
Mileage = 40,000	+\$300	Low mileage suggests less wear and tear
No Accident History	+\$200	Clean record improves resale confidence
Automatic Transmission	+\$100	More popular with buyers, especially in cities
Fuel = Gasoline	\$0	Common fuel type with neutral effect
Total SHAP Effect	+\$2,500	Final prediction increase from base price

This breakdown makes it easier for customers or dealers to understand what drives the price prediction, building trust in the system. SHAP allows each feature to "speak for itself" in the prediction, which is particularly useful in high-stakes industries like automotive pricing

That said, I do have concerns about SHAP's limitations. It can be computationally expensive on large datasets and assumes that features are independent of each other, which may not always be true in real-world data. For instance, in predicting car loan approvals, income level and employment type are often correlated. In such cases, SHAP might misattribute the influence of these features. However, when model explainability is a priority, especially in customer-facing applications, SHAP offers an intuitive and powerful way to interpret model behavior (Dev, 2024).

References

- Acerta. (2021, February 17). *Understanding machine learning with SHAP analysis*. Acerta Blog. Retrieved April 6, 2025, from <https://acerta.ai/2021/02/17/understanding-machine-learning-with-shap-analysis/>
- Dev, V. (2024, July 21). *A complete guide to SHAP values*. Medium. Retrieved April 6, 2025, from <https://easyml.medium.com/a-complete-guide-to-shap-values-ae2de0d38fbd>