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| **Participant Name:** | Sai Srujana Jakkala |
| **Project Title:** | Classifying the Coffee quality with the Aroma of Machine learning models  techniques |
| **Date:** | Dec-15-2024 |

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| **Project Summary (Overview):** |
| *One paragraph describing your approach to the project and what your outcomes were.*  My project was about the quality analysis and assessment of coffee using machine learning techniques. I used the dataset from coffee quality institute for analysis. My approach was classification technique with understanding the data, data preprocessing, EDA analysis and correlation, model building and comparison, model evaluation and interpretation of metrics.  This detailed methodology by dividing the data into premium and regular classes based of the target variable score gave me good insights into data. The clustering analysis was not very effective and then I moved to classification models where support vector model was the best model with accuracy of about 94% along with logistic regression classifier but the accuracy metrics was not the correct approach as there was imbalance in the data with regular coffee being more than premium coffee.  Then I switched to alternative metrics AUC-ROC curve that explains how well a classifier can distinguish between the positive and negative classes. This evaluates the model across all possible thresholds for classification and shows its ability to discriminate between classes. Extra trees are the best model with AUC score of 94. Extra trees model is good at classifying with randomness and generalizability. This model helps derive better insights using AUC-ROC metrics across different thresholds. |
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| **Relationship to your MSBA program:** |
| *How did you apply learning you have experienced from the MSBA program to your Capstone project?*  The MSBA course gave me good knowledge and experience in the field of analytics. I gained lot of insights from Machine learning, predictive analytics and forecasting, artificial intelligence along with critical thinking, programming skills, data management skills.  I applied the machine learning technique in the capstone project by researching in-depth about what exactly I want to do and what topic to choose. I decided on working in the field if food science and quality by choosing coffee analysis as my topic as it is one of the most consumed beverages in the world.  I applied my programming and critical thinking to the machine learning technique that helped in good analysis and interpretation of the metrics. There are lot of applications to Machine learning and using this technique can improve the efficiency of production, quality and decision making.  Implementing these skills with good guidance and encouragement with my advisor Prof. Itauma helped me brainstorm and work on the project weekly basis. The weekly meeting with the advisor and team helped understand my approach and interpret better. |

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| **Learning Outcomes Achieved:** |
| *What did you learn as a result of your project?*  I gained good hands-on experience with working on the dataset from defining the problem statement to methodology and an effective story telling of the coffee quality analysis by contributing to the world of coffee that comes under the food and beverage industry.  I learned a lot in the project from problem framing, communication, working and implementation real time, model building and comparison, Model metrics interpretation to writing the analysis. Each step had lot of learning from understanding to interpretation of results, presentation and writing effective report for the project.  My key takeaways are:   * Critical thinking * Communication * Problem understanding * Literature review * Methodology and metrics interpretation * Writing the recommendations * Effective story telling * Presentation * Time management * Team dynamics   Overall, this project helped me gain deeper understanding in the field of machine learning. |
| **Other comments:** |
| I would like to thank everyone associated with this program and mainly to my advisor Prof. Itauma for encouraging and being patient with our progress. I learned a lot from you and this knowledge will make me industry ready and I can effectively implement this further. |