REPORT

Introduction and Implementation of Decision Trees

Event date: 7th March 2024

Organized by:

AI Club, SCET

Team Behind the Event:

Faculty Coordinator: Prof. Mukesh Patel
President: Vinay Aditya
Student Coordinator: Tisha Choksi(Vice President)

Event Details:

Event Type: University / Institute Level Program
Event Platform: Sarvajanik College of Engineering & Technology, SCET
Category: Technical Workshop Series
Schedule: 7 March, 2024; 11:00 AM to 1:30 PM, IT Lab III, SCET
Host: Prof. Mukesh Patel and Tisha Choksi
Aspirants: UG students of Sarvajanik College of Engineering & Technology, SCET
Accessibility: Open to club members

Introduction:

The second in this workshop series was meticulously designed to offer participants a comprehensive understanding of Decision Trees in the context of Machine Learning (ML) and their practical application in solving real-world problems. Guided by Prof. Mukesh Patel's insightful introduction and with hands-on implementation assistance from Tisha Choksi, Vice President of the club, attendees explored the intricacies of Decision Trees, from theory to application, focusing on heart failure prediction as a case study. This endeavor aimed to equip participants with the knowledge and skills to apply Decision Trees in various domains, enhancing their problem-solving capabilities in AI-driven projects.

Workshop Overview:

Introduction to Decision Trees:

- Prof. Mukesh Patel provided a foundational understanding of Decision Trees, covering their significance in ML, how they work, and their advantages and disadvantages. The session underscored the algorithm's utility in classification and regression tasks, setting the stage for deeper exploration.

Implementation Guidance:

- Tisha Choksi offered practical insights into implementing Decision Trees, leveraging Python's scikit-learn library. This session emphasized hands-on learning, with participants applying concepts to real datasets, focusing on predicting heart failure.

Practical Application:

- Attendees engaged in a guided project on heart failure prediction, applying Decision

Trees to a healthcare dataset. This exercise illustrated the steps involved in data preprocessing, model training, and evaluation, reinforcing learning through practical experience.

Workshop Highlights:

Decision Trees Fundamentals:

- Participants were introduced to key concepts such as entropy, information gain, and tree pruning. Prof. Patel elucidated the algorithm's decision-making process, enabling attendees to grasp the theoretical underpinnings of Decision Trees.

Python and scikit-learn:

- Tisha Choksi demonstrated the use of Python and the scikit-learn library for Decision Trees implementation. The session covered data loading, cleaning, and splitting, followed by model training and evaluation.

Hands-on Implementation:

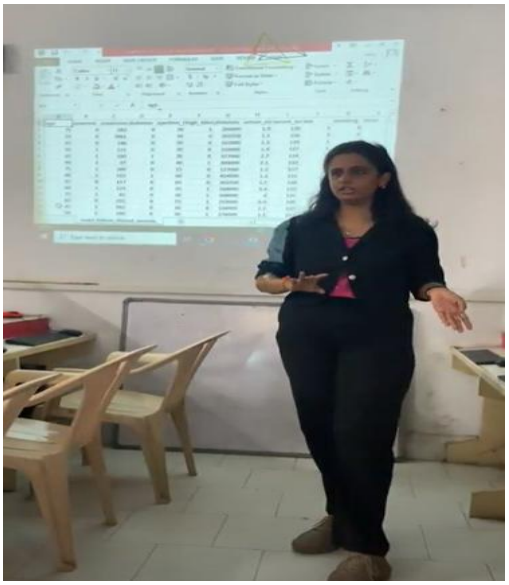
- The heart failure prediction project served as a capstone, allowing participants to apply their knowledge. Guidance was provided on feature selection, dealing with imbalanced data, and interpreting model outputs.

Evaluation and Optimization:

- Techniques for model evaluation, such as confusion matrices and ROC curves, were discussed. Strategies for optimizing Decision Trees, including hyperparameter tuning and cross-validation, were also explored.

Key Takeaways:

- **Foundational Knowledge:** Attendees gained a solid understanding of Decision Trees, appreciating their utility and limitations in ML projects.
- **Practical Skills:** Through hands-on sessions, participants learned to implement Decision Trees using Python and scikit-learn, enhancing their coding and ML skills.
- **Real-World Application:** The heart failure prediction project highlighted the real-world applicability of Decision Trees, encouraging participants to consider their use in healthcare and beyond.
- **Collaboration and Learning:** The workshop fostered a collaborative learning environment, with participants sharing insights and learning from experts in the field.

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Conclusion:

The workshop series on Decision Trees and their implementation, spearheaded by Prof. Mukesh Patel and Tisha Choksi, was a resounding success, enriching participants with both theoretical knowledge and practical skills. By demystifying the complexity of Decision Trees and demonstrating their application in heart failure prediction, the series has empowered attendees to leverage this powerful ML tool in their future projects, paving the way for innovation and enhanced problem-solving in AI.