Department of Artificial Intelligence and Data Science
Academic Year 2022 – 2023 (Even Semester)

Degree, Semester & Branch : IV Semester & B.Tech AI / DS
Course Code & Title : AL3451 & Machine Learning
Name of the Faculty member (s) : Ms. S. Selva Birunda, AP / AD

Active Learning Practice Description

- **Unit / Topic:** Unit II / Decision Tree
- **Course Outcome:** CO2
- **Topic Learning Outcome:** TLO4
- **Activity Chosen:** Jigsaw Cooperative Learning Technique
- **Justification:**

  Decision Tree is a crucial supervised Machine learning algorithm. Students have the chance to surpass themselves by creating a decision tree model for a specific dataset and imparting their expertise to their team mates. The prime objective of Jigsaw is to encourage both self- and peer teaching, which requires students to understand the concept very clearly and engage in discussion and learning.

- **Time Allotted for the Activity:** 50 Minutes
- **Details of the Implementation:**

  The students are given a group activity to discuss the construction of a decision tree by determining the information gain and entropy for each feature available in a dataset. The students are made to work into groups to discuss and clearly understand the Decision Tree algorithm.

Learning Outcomes

- Describe the construction of Decision Tree algorithm based on Information Gain and Entropy
- To improve listening, communication, and presentation skills.

Procedure:

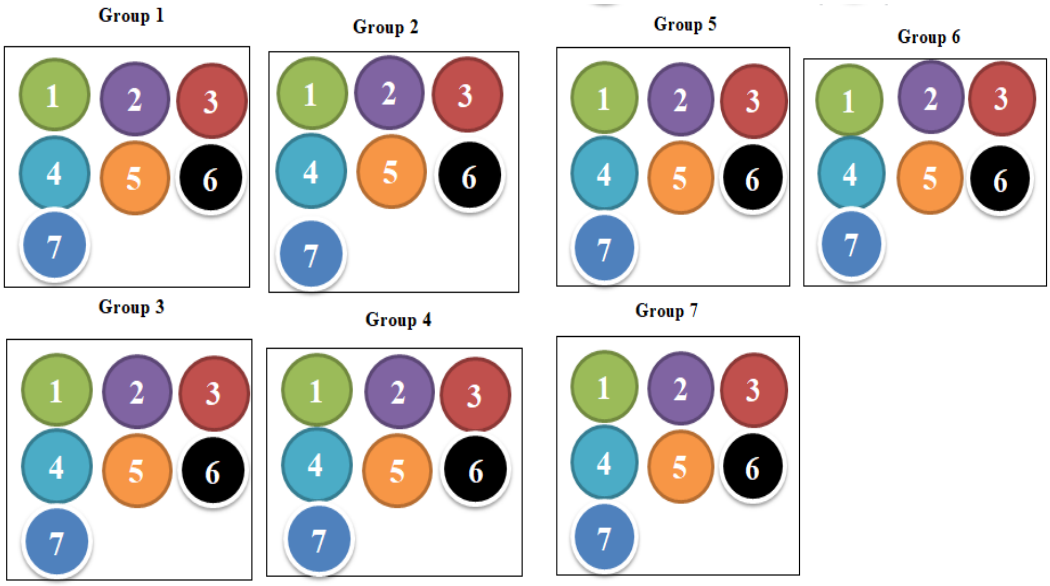
Step 1 (2 minutes**)**

- Students were divided into 7 groups with 7 members in each group based on the student's academic performance

Step 2 (2 minutes**)**

- Appoint one student from each group as the leader.
- Each student in a group is given a number from 1 to 7.

Jigsaw Groups



Step 3 (3 minutes**)**

- Divide students into 7-person Jigsaw groups as an expert group
- Divide the topic into 7 segments and assign it to each ***Expert Group***.
- The topics given are listed below:

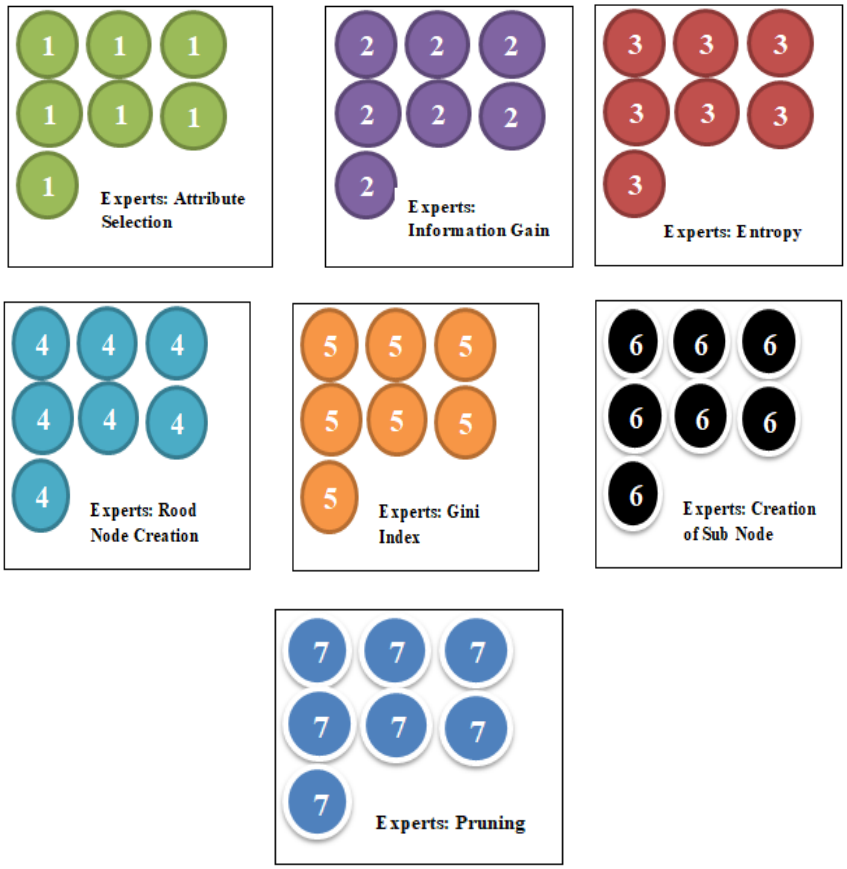
Select the best attribute at each node using information gain	**Group 1**
Calculate information gain for each feature in the dataset	**Group 2**
Calculation of entropy	**Group 3**
Assign the feature with highest information gain as root node	**Group 4**
Calculation of Gini index for best split	**Group 5**
Creation of sub node for the root node	**Group 6**
Apply pruning to reduce size and complexity of constructed Decision tree	**Group 7**

Step 4 (15 minutes**)**

- Assign each student to learn one segment and time is allotted for discussion
- Give students time to read over their segment at least twice and become familiar with it.

Step 5 (2 minutes**)**

- Form temporary "expert groups" by having one student from each jigsaw group join other students assigned to the same segment.



Step 6 (15 minutes**)**

- Bring the students back into their jigsaw groups.
- Ask each student to explain her or his segment to the other team members in the group.
- Encourage others in the group to ask questions for clarification.

Step 7 (5 minutes**)**

- Float from group to group, observing the process.

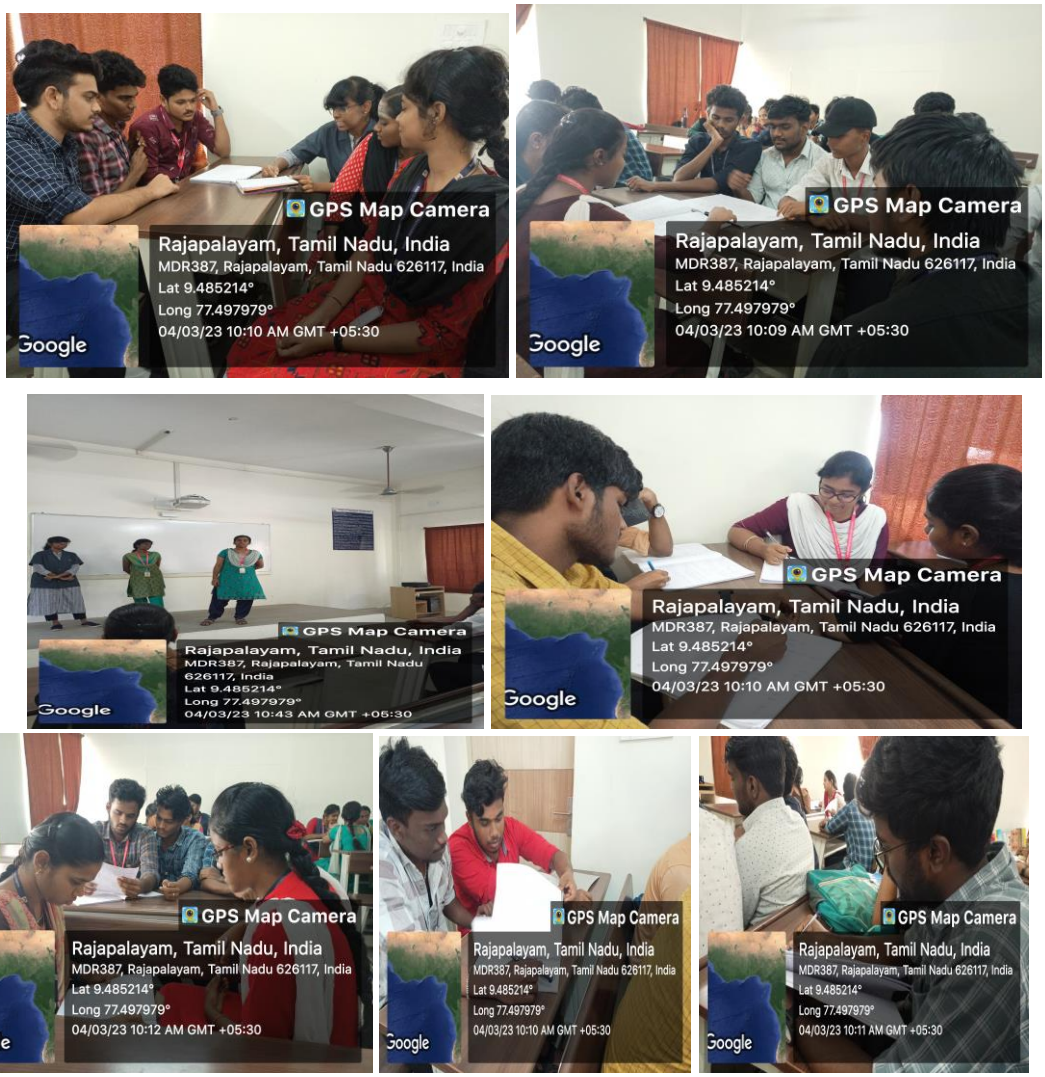
Step 8 (6 minutes**)**

- At the end of the session, give a quiz on the algorithm.

- **Images / Screenshot of the practice:**

At the end of the session, student from each group shared the knowledge what they learnt.

Glimpse



- **Reflective Critique:**
  - ❖ ***Feedback of practice from students and other stakeholders:***
    - Students felt the activity is very interesting.
    - Students felt the activity conducted gave them a chance to improve their communication skills, also working as a team they can face group discussions in future work place. Through learning from peer members, students felt comfortable to clarify their doubts.
    - Every student actively participated in the task and practice with their group members.

- ***Benefit of the practice:*** (E.g.: Outcome attainment would have increased due to innovative practice over conventional practice)
  - Through this activity, the students made to work as a team and explain to others also, like a group discussion activity.
  - The students are made to understand the Decision tree algorithm concepts through knowledge sharing.

- ***Challenges faced in implementation:***
  - Slow learners in the team did not participate actively in the team.
  - The grouping of the students was difficult, since some students were not present. Initially 7 teams were planned with team size of 7 members, but the team size is reduced and it was difficult to form the expert group.

References:

- **https://www.jigsaw.org/**
- **https://www.teachervision.com/group-work/jigsaw-groups-for-cooperative learning**

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FEEDBACK

Active Learning Best practices: JIGSAW- Cooperative Learning Technique

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Theme of discussion: Decision Tree Al

Date and Time: 04.03.2023 & 9.50 am to 10.40 am

Feedback collected in class and also through online

Feedback Questionnaire:

1. Does the activity encourage cooperative learning among yourself? **Yes No**
2. Do you have a clear understanding about the Decision Tree algorithm concepts? **Excellent Very Good Good Satisfactory**
3. Does this activity learning improve listening, communication and problem-solving skills? **Excellent Very Good Good Satisfactory**

Feedback Analysis: