Structural Characterization of Algebraic Tournaments

PID: 2021\DSAI\001

The project is about exploring connections between certain algebraic and structural properties of a special type of graph family called the Tournament graphs. Tournament graphs are complete directed graphs and find several real-world applications including ranking players in a sports tournament, ranking candidates in an election, etc. The project is about understanding a family of tournaments which are characterized by certain algebraic properties. While it is easy to generate tournaments from the class of interest, it is not known what exactly characterizes them. The goal of the project would be to simulate several such tournaments and look for interesting sub-tournament patterns in them.

Task to be assigned to the intern: The intern working on the project is expected to be sharp in spotting general patterns and curious/creative to find new possible patterns from a set of tournaments.

Learning outcome: The student would learn about state-of-the-art research in ranking from pairwise comparisons. He/She would develop a flavor for looking for patterns in data which is critical for any data scientist. If successful, the project might lead to high quality publications in top tier A.I/ML conferences which can boost the chance of admissions to top institutes not only in India but around the world.

Project Duration: 3 months

Skills required: Good programming ability, especially efficient large-scale programs, GPU programming would be a plus. Genuine mathematical curiosity is critical. Basic probability theory knowledge is necessary. Exposure to graph theory is a huge plus.

Number of Interns Required: 1 – 2