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Proposed Title

Modeling NBA Lineup Efficiency: A Probabilistic Graphical Model Approach

Project Description

This project aims to develop a Bayesian Network to model the probabilistic relationships between NBA player roles, in-game actions, and overall offensive efficiency of team lineups. Using publicly available statistics, the model will capture how different combinations of player skills, such as shooting accuracy, playmaking, and rebounding affect the likelihood of efficient possessions and positive outcomes. The approach will demonstrate core concepts of probabilistic graphical models, including structure design, parameter learning, and inference. In addition to prediction, the project will explore scenario-based queries (such as the effect of substituting a player with a strong three-point shooter) and sensitivity analysis to identify which factors most influence lineup performance. This combination of modeling, inference, and evaluation highlights the practical use of PGMs in sports analytics while remaining adaptable in scope based on time constraints.