

**GOLF AND GAMEFORGE: INNOVATIVE ANALYTICS
FOR RECOMMENDER SYSTEMS**

**COMPLEX AUTOMATED DECISION PROCESSES AND
MITIGATING IMPLICIT STAKEHOLDER BIASES**

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By

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The continued use of automation in impactful decision-making roles proliferates as technological access and computational efficacy increases, raising concerns over the implicit biases these machines can maintain. The technical topic recognizes this issue as it aims to ameliorate golf recruitment for coaches at U.S. universities while empowering junior players to make informed decisions. Through the development of a two-sided recruiting platform, the technical research aids in identifying junior players of best fit for college teams whilst recommending well-suited colleges for high school students. The development of this system reflects a greater modern trend of employing technology and advanced analytics to streamline decisions, which can have drastic effects on both direct and indirect users. The science, technology, and society (STS) research provides a framework that examines how biases can be analyzed and tracked across decision-making systems in order to mitigate threats to stakeholders. The loosely coupled technical and STS topics consider the greater trend of bias in recruiting systems, detailing the use of distinct data sources to empower stakeholders and discussing mitigation tactics to lessen the effect of harmful biases that arise in automated decision systems.

The technical paper recapitulates the creation of a comprehensive platform that seeks to streamline recruitment of junior golfers to U.S. colleges. Current methods of college golf recruitment often rely solely on player recognition at tournaments without considering the full range of performance statistics and player strengths, emphasizing top-tier junior players while trivializing mid-level players. Furthermore, junior players lack access to college recommendations not solely based on golf performance rankings, where additional metrics and personal preferences should be considered. The envisaged platform deploys big data and artificial intelligence in the creation of (1) a junior player ranking system for comparing head-to-head performance, (2) a transfigured SWOT analysis for evaluating player strengths and skill

gaps, and (3) a college recommender system for matching players to schools of best fit. The platform is powered by an exclusive, cloud-based program written in Python that uses machine learning and descriptive statistics with data from a proprietary database.

The resulting platform enables evaluation of both junior players in predicting subsequent college recruitment as well as collegiate players in enhancing tournament performance. Analysis finds that the ranking system outperforms rankings from AJGA and Golfstat with 20% and 17% better accuracy respectively, while the college recommender suggests fifteen best-fit schools that captures attendance with 80% accuracy. Subsequently, the SWOT analysis measures golfers on sixteen gameplay and five field-wise metrics, highlighting areas of improvement that bolsters training programs and enhancing recruitment that incorporates diverse characteristics.

Golf analytics and sports recruiting systems are further examples of the growing dependency and engagement of automated decision systems in modern decision-making processes, calling attention to the growing need for effective management and regulatory oversight to attenuate detrimental effects on stakeholders. The motivation for researching the social role that automated decision systems play comes from the persistent failures of automation in our daily lives, whether through the fatal crashes of autonomous vehicles or discriminatory practices in legal systems. The research seeks to assess the interaction between human and non-human information sources in decision processes and the permeation of biases that arise among each. Actor Network Theory is used to demonstrate the social and cultural effects that informative actors have on the outcome of a decision-making process, emphasizing the notion that biases are passed down from information sources to decision outcomes. A network of generic decision-making informative actors was summarized and described to demonstrate the compounding relationship these sources have on one another, where biases may flow and be

exchanged. While the research points out that discriminatory outcomes of decision-making processes that involve human and non-human information sources cannot and, in some cases should not, be solved, it highlights the use of algorithmic management and the tenets of behavioral economics as frameworks for resolution of technological and cognitive bias pervasion respectively.

Understanding the roles that bias and discrimination play in technology is critical to shaping innovation while upholding the rights of users. The STS research provides a platform for discussion of mitigatory and exploratory efforts in technology-based bias, while the technical research demonstrates effective regulatory oversight of such propounding problems during development of a software-backed platform. Together, these topics demonstrate the necessary considerations that engineers must make when developing products and technologies with the capacity to impact users on a global scale.

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PROSPECTUS

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