



## Colorado Science and Engineering Fair

## 2024 Individual Project Abstract Form

**Please print 2 copies of the completed form. Sign both copies, keep 1 for your notebook and submit 1 copy to your Regional Fair Director with your other paperwork.**

Title of Project: Predictive Football Analysis: Leveraging a Random Forest Model and Double Deep Q-Network

Finalist's Name: Anirudh Gadepalli

School and City: Cherry Creek High School, Greenwood Village

Sponsor's Name: Praveen Gadepalli

Category: Mathematics & Computer Sciences (MACS)

Division: Senior (9th - 12th grades)

Abstract (250 words or less):

In the fast-paced landscape of sports, technology, and algorithms are becoming pivotal forces, creating a new era of performance and allowing athletes to rise to higher levels. Offenses and defenses are constantly evolving and transforming, and with the help of technology, teams are becoming better than ever, and coaching is as difficult as ever.

I present two algorithms to approach coaching sports. In the current football arena, the accurate prediction of the next play has been a longstanding challenge. Therefore, I used an optimized Random Forest Model (RFM) to anticipate what play a team might run, enabling coaches to strategize and teams to create better defenses. Along with that, I developed a second network using Deep Double Q-Learning (DDQN) to attempt to simulate an offense that a coach would call for his players.

*I hereby certify that the above statements are correct and the information provided in the Abstract is the result of one year's research. I also attest that the above properly reflects my own work.*

Finalist's Signature:

Date:

In addition, all students must complete the ISEF Student Checklist (1A), Research Plan, Approval Form (1B), and Checklist for Adult Sponsor (1), and any other ISEF forms required for this type of project. See the International Rules and Guidelines for form requirements. Return COPIES of all of these forms to your Regional Fair Director with you Finalist Verification/Permission Form. A signed copy of this form must be included in your notebook.