

# MGSC 662 Project Proposal

Adrian Alarcon Delgado, Addison Ji, Yusen Tang, Rebecca Zhang, Yvette Zhu

## Introduction

How to select the best team for the World Cup? In this project, we are going to use a [dataset](#) (size of 19240\*110) from FIFA 22 (A football simulation video game) which encompasses detailed information about each player. Our objective is to employ mixed integer programming techniques to construct a World Cup team that maximizes the overall rating while establishing constraints considering real world football game rules. We aim to not only revolutionize the way teams are composed but also to offer a personalized and strategic approach to team selection.

## Data Description

The potential key variables provide a comprehensive framework that aids management and coaching staff in understanding a player's holistic strength, adaptability, and their potential value within the team. Here are some key variables below:

Player positions: The playing positions of the player. To be specific, such as:

- Ls/st/rs: Left Striker/Striker/ Right Striker
- Note: values like "+3" in position-specific columns (e.g., "ls") can be interpreted as the potential additional score for that player when placed in that specific position.

Player skill attributes: These attributes capture a player's proficiency in specific skills, such as:

- Pace: Represents the speed of a player.
- Dribbling: Represents the control and movement ability of a player with the ball.

## Problem Formulation

Objective Function: The primary aim is to select a national team of players whose combined skill levels, as measured by their overall ratings, are as high as possible.

Decision Variables: Whether to include a player in the team or not. This decision is binary – a yes or no.

Potential Constraints: When forming a soccer team, considerations include player count (11 for a starting lineup, up to 23 for national teams), diverse positions, age range (e.g., 20 to 30), team nationality, potential ratings, and tactical preferences (such as player tags and traits). These factors ensure a balanced team, future strength, and effective strategies. For national teams, players must share the same nationality to represent their country. Additionally, the potential rating indicates a player's growth potential, and certain thresholds may be set to ensure a certain number of players have strong future prospects. Tactical preferences may prioritize players with specific tags or traits that align with the team's desired style of play.