Building Effective Student Teams through Optimization

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Project Background

Praxis III is a second-year team-based Engineering Science design course. The teaching team currently manually forms student project teams based on the results of a student survey and diagnostic data.

Client Need:
A tool to reduce the manual effort in forming teams for Praxis III. The proposed tool optimizes team formation based on a student survey and demographic attributes.

Gap:
To create a group formation algorithm and data synthesis to build effective teams.

Objectives:
The tool should:
- Efficiently output teams
- Natively operate as as desktop application for data security
- Be user friendly with an intuitive User Interface (UI)
- Be useable in other Faculty of Applied Science and engineering term based courses

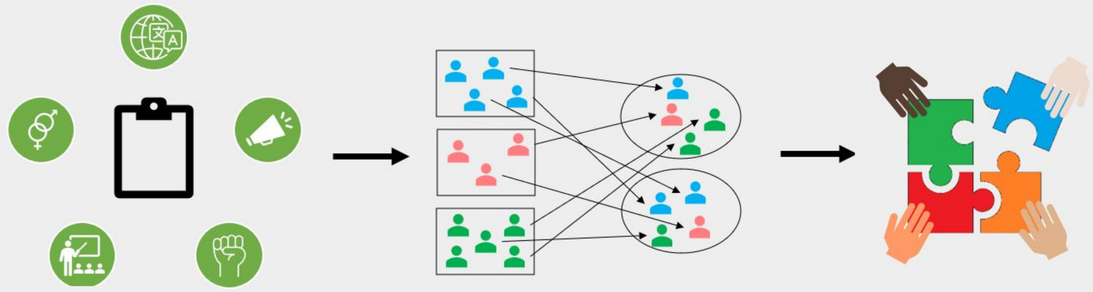
Integrated Technologies

Electron (Front-end)

Node.js (Back-end)

Python (Algorithm)

Application Overview



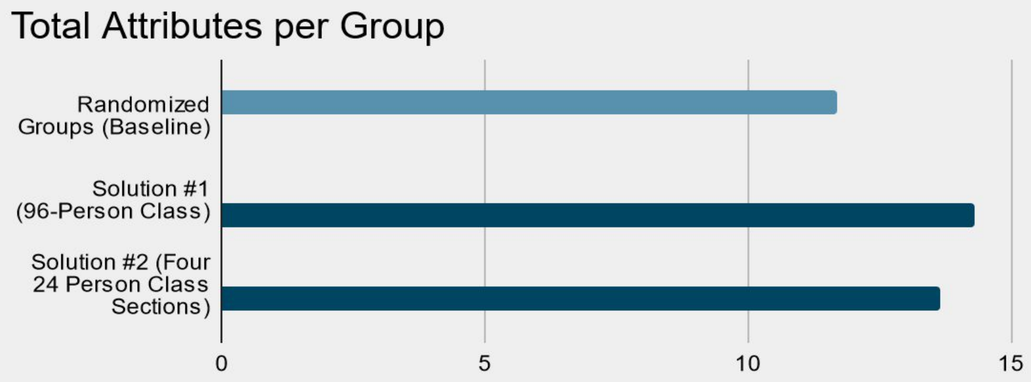
Step 1:
User inputs information from existing or chosen surveys

Step 2:
Desktop software solution runs this data through an algorithm

Step 3:
Result is optimally paired teams that foster diversity and inclusion

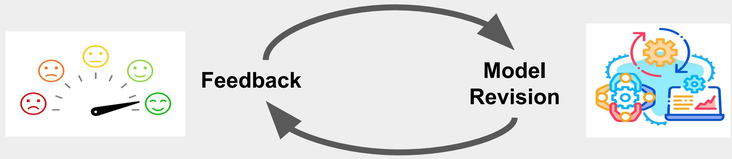
Optimized Team Selection Algorithm

- Integer program forms groups by maximizing the overall diversity of student attributes
- Dynamic implementation allows users to adjust model variables & constraints
- Model solutions are 20% more diverse on average compared to randomized group pairings



Future Development

- Dynamic nature of the algorithm allows it to be iterated and improved based on performance and feedback
- Optimal group pairing could take into consideration factors other than diversity, such as future aspirations or common interests



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