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Research Experience for Undergraduates

Diversity and its Correlation to Group Performance

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Motivation

- Studies show that collaborative learning greatly enhances students' education and learning experiences
- Often, students get grouped together in nonhelpful ways
- We want to create an efficient way to group students
- We believe that diversity in a group may play a positive role in group performance

Goal

To determine if there is a correlation between gender diversity in groups and group performance in hopes of finding the best way to group students

Objectives

- Form groups using differing grouping method: hierarchical clustering and k-means
- Categorize these groups into male only, female only, and mixed, and then measure and compare the efficiency/performance of these categories for each method
- Evaluate how well the algorithm chooses groups

Expected Impact

- Find out if gender is related to group performance
- Findings can be used in the overall study of grouping student's together efficiently

Deliverables

- Correlation of diversity factor and performance of both grouping methods
- Score for how “similar” students are to each other within the groups for each method

Methods: Objective 1

- Students asked how well they know every other student in the class (scale: 1-10) which was recorded in acquaintance matrix and hierarchical clustering was applied on it
- To achieve k-means clustering, choose k to be the desired number of groups

Methods: Objective 2

- Categorize these groups into male only, female only, and mixed
  - The proportion of male or female of each group is called the diversity factor
- performance is based on grades of individual and group assignments
- Then compare the diversity factor to the performance of the group to ultimately determine whether gender diversity should be used in computing efficient groups

Methods: Objective 3

- Use silhouette coefficient to calculate how similar members of a group are to one another
  - This should be done for groups formed by hierarchical clustering and k-means
- This will determine how well the algorithm does to good groups

Results: Objective 1

- Groups have been formed for hierarchical clustering and students have received their grades, but the k-means method is not complete
- A survey filled out by the student's afterwards showed that students believe communication style should be considered as a factor

Remaining Work

- Apply K-means on another class
- Find correlation between performance and diversity factor on both k-means and hierarchical clustering groups
- Compare finding across both methods
- Evaluate how effective each grouping method was in grouping similar students

Conclusions

No major conclusions so far

Hoping to find out the best way to group students so that they will be motivated to participate efficiently in group work and enhance the retention rate (so student will not drop the course)

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