Exploring bias in LORs using NLP Techniques

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Introduction

- Standardized letters of recommendation (SLORs) provide anchored Likert scale ratings of residency applicants

- The written comments section has been criticized for potential to introduce gender and ethnicity biases

- We use natural language processing (NLP) to explore such biases for plastic surgery residency applicants

- Our study aims to contribute to the development of fairer evaluation processes, addressing the need for diversity, equity, and inclusivity in the selection process

Methods

Data Set

- 5-year dataset of ERAS applications submitted to UW-Madison Plastic Surgery Residency Program
- De-identified and partitioned by gender and ethnicity

Dictionaries

Two dictionaries will be created to analyze (a) linguistic differences based on gender and ethnicity, and (b) sentiments and emotions associated with each gender
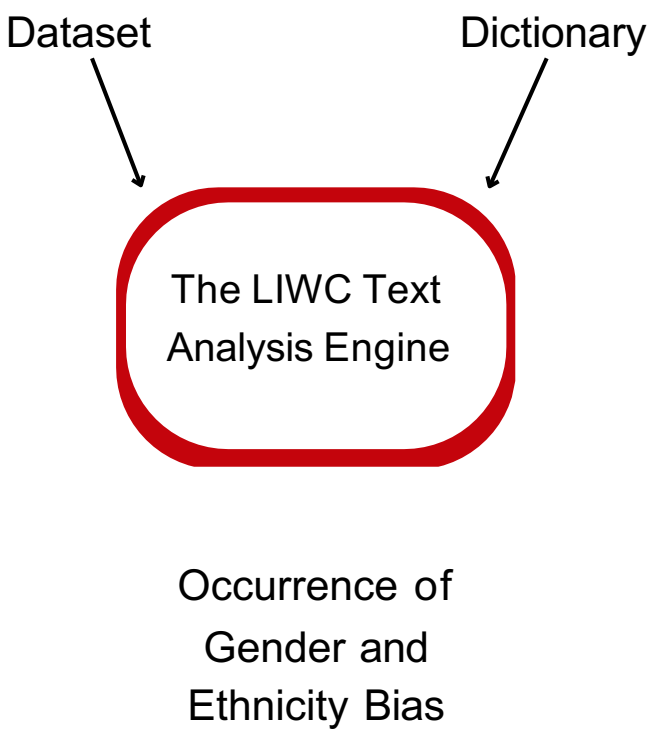
- Twenty four categories of textual cues compiled based on past studies and the research team
- Pre-made dictionary created by a Linguistic Inquiry and Word Count (LIWC) user

LIWC

- Dictionaries will be utilized by LIWC software to conduct text analysis and sentiment analyses
- LIWC is an industry-standard text analysis tool widely used in various fields
- Analyses will consider multiple aspects of letters - percentage of words used. word count, average number of words per sentence and letter

Example Dictionary and Analysis Process

Gendered Terms	Grindstone	Standout	Inventive/Curious	First Person
Easygoing/Careless	Outgoing/Energetic	Solitary/Reserved	Consistent/Cautious	Technical Skill
Friendly/Compassionate	Challenging/Detached	Sensitive/Nervous	Efficient/Organized	LGBTQIA+
Friendly/Compassionate	Challenging/Detached	Sensitive/Nervous	Secure/Confident	Desire
Social	Agentic Personality	Communal	Physical	Second Person

Dataset → The LIWC Text Analysis Engine ← Dictionary

Occurrence of Gender and Ethnicity Bias

Anticipated Results

- Detect the presence of linguistic differences between the different categories of gender and ethnicities
- Detect which categories from the dictionary are more frequently associated with specific genders or races/ethnicities
- Determine any positive or negative associations with specific genders or races/ethnicities.
- Identify common phrases creating implicit biases and create guidelines to mitigate them

Conclusion Future Directions

Findings of this study will provide:

- Valuable insights into trends of any biases in the plastic surgery residency application process
- Identification of the most common textual categories that lead to linguistic differences
- A benchmark for future studies in surgical training
- A basis to develop a set of guidelines to help writers produce bias-free letters of recommendation
- Information for working collaboratively to avoid biases when writing LORs

Select References

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