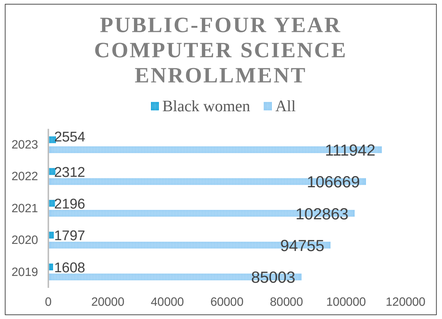
The Ontological-Centered AI Tool (OCAIT)

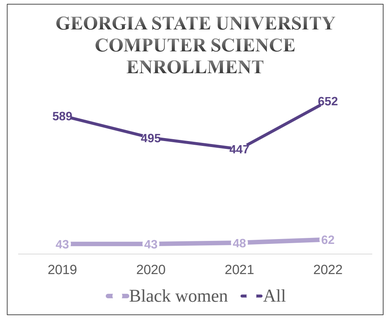
Ashlyn Campbell

Georgia State University, Department of Computer Science, Atlanta, United States

Motivation

- In 2019, of the 85,003 students who graduated with Bachelor's degrees in computing, Black women made up only **2%** [1].
- There is a gap in practical AI applications that analyze **intersectionality** in computing education research.

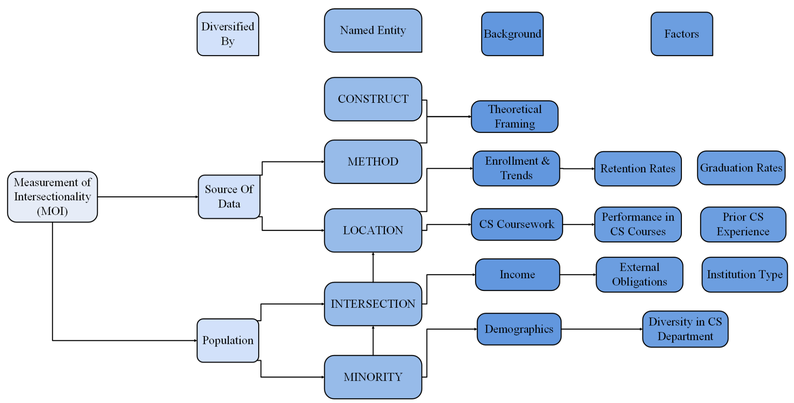




Objectives

- Utilize **computational methods** (e.g., natural language processing, machine learning) to automate the identification of key themes in computing education research with intersectional populations.
- Develop OCAIT, an interactive data collection & quantification method, to analyze overlapping experiences of computing students at predominantly Black institutions like **Georgia State University**.

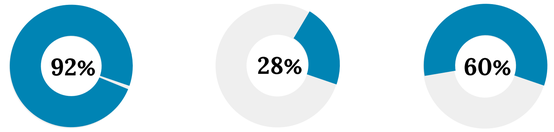
Ontological Definition



Evaluation

Step 1: Demographic Collection

A total of **25** participants opted to engage in this study.



Identified as Black Women | First Generation College Students | Pell Grant Recipients

Step 2 & 5: Intersectional Factor Analysis

- Participants were asked to rank the importance of 7 factors related to persistence in computing, both before and after the intervention. The analysis utilized Latent Class Analysis (LCA), a probabilistic modeling algorithm**:**

$$x_i = \lambda_{i1}F_1 + \lambda_{i2}F_2 + \cdots + \lambda_{im}F_m + \varepsilon_i$$

- LCA results indicated 4 distinct classes of students, emphasizing academic merit-based and structural views of persistence.

Step 3: Academic Paper Extraction

- Participants were given Likert Scale questions to evaluate how well ***sense of belonging*** correlates with the 7 previously ranked factors.
- Papers were processed for Custom Named Entity Recognition (NER) using DistilBERT (Bidirectional Encoder Representations from Transformers).

Figure 1: Pre vs. Post-Ranked Factor Importance by Latent Class

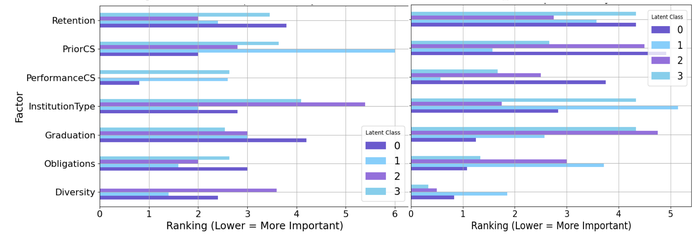


Figure 2: Custom DistilBERT Named Entity Recognition

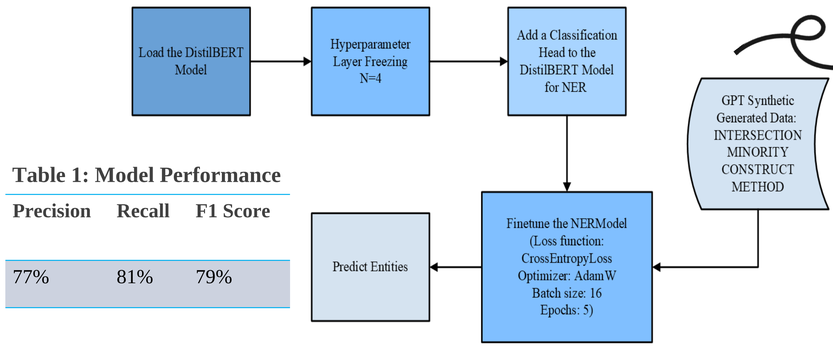


Table 1: Model Performance

Precision	Recall	F1 Score
77%	81%	79%

Step 4: Contextual Evidence Discovery

- **72%** of participants took computer science courses in high school, yet **54%** have considered changing their majors.
- While **72%** of participants believe GSU is diverse, only **16%** feel this way about their computer science courses.

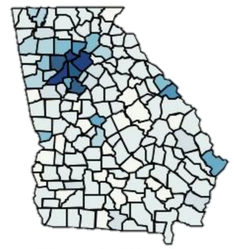


Figure 3: High School Computer Science Courses in Georgia

Future Work

- Investigate strategies to enhance the user experience to encourage additional students to complete submissions.

Acknowledgements

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References

1) Beldon, M., Cameron, M., Dubow, W., Hovey, C., Semczuk, P., Sundar, S. (2024) NCWIT Scorecard: The Status of Women in Technology. Boulder, CO: NCWIT.

Contact

Ashlyn Campbell

acampbell89@student.gsu.edu