Dylan Gaines

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Education

Ph.D., Computer Science   2023
Michigan Technological University   Houghton, MI
Advisor: Dr. Keith Vertanen   **Thesis:** An Ambiguous Technique for Nonvisual Text Entry

M.S., Computer Science   2021
Michigan Technological University   Houghton, MI
Advisor: Dr. Keith Vertanen   **Thesis:** Towards Location-Independent Eyes-Free Text Entry

B.S., Computer Science: Game Development   2016 – 2019
Michigan Technological University   Houghton, MI
GPA: 4.00

Professional Experience

- Research Assistant Professor, Michigan Technological University   2023 – Present
- Graduate Teaching Instructor, Michigan Technological University   2020-2023

Research Description

My research is focused on leveraging statistical language models to enable accessible text input interfaces. In particular, I work to improve communication technologies for people with visual impairments and people with severe speech and physical impairments. My broader research interests include human-computer interaction (HCI), ambiguous text input, and brain-computer interfaces (BCI).

Awards and Fellowships

- Outstanding Scholarship Award, 2023
- National Science Foundation Graduate Research Fellowship, 2020
- Outstanding Graduate Student Teaching Award, 2020

Refereed Publications

[1] **Gaines, D.**, Baker, M., and Vertanen, K. 2023. FlexType: Flexible Text Input with a Small Set of Input Gestures. In *Proceedings of the ACM Conference on Intelligent User Interfaces (IUI '23)*. Acceptance rate: 24%

[2] **Gaines, D.**, Kristensson, P.O., and Vertanen, K. 2021. Enhancing the Composition Task in Text Entry Studies: Eliciting Difficult Text and Improving Error Rate Calculation. In *Proceedings of the ACM Conference on Human Factors in Computing Systems (CHI '21)*. Acceptance rate: 26%

[3] **Gaines, D.** and Kuhl, S. 2020. Methods for Evaluating Depth Perception in a Large-Screen Immersive Display. In *Proceedings of the ACM Conference on Spatial User Interaction (SUI '20)*.

[4] Vertanen, K., **Gaines, D.**, Fletcher, C., Stanage, A., Watling, R., and Kristensson, P.O. 2019. VelociWatch: Designing and Evaluating a Virtual Keyboard for the Input of Challenging Text. In *Proceedings of The ACM Conference on Human Factors in Computing Systems (CHI '19)*. Acceptance rate: 24%

[5] **Gaines, D.** Exploring an Ambiguous Technique for Eyes-Free Mobile Text Entry. 2018. In *Proceedings of the 20th International ACM SIGACCESS Conference on Computers and Accessibility Student Research Competition (ASSETS '18)*.

[6] Vertanen, K., Fletcher, C., **Gaines, D.**, Gould, J., and Kristensson, P.O. 2018. The Impact of Word, Multiple Word, and Sentence Input on Virtual Keyboard Decoding Performance. In *Proceedings of the ACM Conference on Human Factors in Computing Systems (CHI '18)*. Acceptance rate: 26%

Book Chapters

[7] **Gaines, D.**, Dudley, J., Kristensson, P.O., and Vertanen, K. Statistical Keyboard Decoding. In *Bayesian Methods for Interaction Design*. 2022.

Workshop and Poster Publications (Peer Reviewed)

[8] **Gaines, D.**, Vertanen, K., and CAMBI. 2023. Using a Pre-trained Neural Language Model to Make Character Predictions for Brain-Computer Interfaces. In *Proceedings of the 10th International BCI Meeting*. 180.

[9] **Gaines, D.** and Vertanen, K. 2022. A Phrase Dataset with Difficulty Ratings Under Simulated Touchscreen Input. In *MobileHCI 2022 Workshop on Shaping Text Entry for 2030*.

[10] Pellar-Kosbar, M., **Gaines, D.**, Monroe, L., Rospierski, A., Martin, A., Vigna, B., Stewart, D., Perttunen, J., Voss, C., Pastel, R., and Ureel, L.C. 2021. Modeling the Growth and Spread of Infectious Diseases to Teach Computational Thinking. In *Proceedings of the 26th ACM Conference on Innovation and Technology in Computer Science Education (ITiSCE '21)*. 658.

Theses

[11] **Gaines, D.** An Ambiguous Technique for Nonvisual Text Entry. Ph.D. Dissertation (2023), Michigan Technological University.

[12] **Gaines, D.** Towards Location-Independent Eyes-Free Text Entry. Master's Thesis (2021), Michigan Technological University.

Industry Experience

Epic Systems Corporation   **Verona, WI**
Software Development Intern   **Summer 2018**

- Interacted with customers and internal clinicians to design a user-centered interface
- Developed an Android module in an existing code base to assist nurses in common tasks
- Wrote M code to interface with the database
- Maintained project ownership and responsibility with one other intern
- Presented progress at weekly meetings and at the end of the internship

Academic Service

Organizing Committee:
- MobileHCI: ACM International Conference on Human-Computer Interaction with Mobile Devices and Services, Web and Publicity Chair (2023)

Reviewer:
- IJHCS: International Journal of Human-Computer Studies (2021, 2024)
- CHI: ACM International Conference on Human Factors in Computing Systems (2021, 2022, 2023, 2024)
- ISS: ACM Interactive Surfaces and Spaces Conference (2023)
- TACCESS: ACM Transactions on Accessible Computing (2021, 2022, 2023)
- MobileHCI: ACM International Conference on Human-Computer Interaction with Mobile Devices and Services (2020, 2022)
- IJHCI: International Journal of Human-Computer Interaction (2022)
- UIST: ACM Symposium on User Interface Software and Technology (2021)
- IEEE Access (2019)

Conference Talks

- FlexType: Flexible Text Input with a Small Set of Input Gestures.
  IUI '23: ACM International Conference on Intelligent User Interfaces, March 2023.
- Enhancing the Composition Task in Text Entry Studies: Eliciting Difficult Text and Improving Error Rate Calculation.
  CHI '21: ACM International Conference on Human Factors in Computing Systems, May 2021.
- Methods for Evaluating Depth Perception in a Large-Screen Immersive Display.
  SUI '20: ACM Conference on Spatial User Interaction, October 2020.
- Exploring an Ambiguous Technique for Eyes-Free Mobile Text Entry.
  ASSETS '18: Student Research Competition, ACM SIGACCESS Conference on Computers and Accessibility, October 2018.