Mahsa Bazzaz

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 mahsa-bazzaz | Mahsa Bazzaz | MahsaBazzaz

Boston, MA, US

OBJECTIVE

I am a doctoral student at Northeastern Universitys Khoury College of Computer Sciences, specializing in procedural content generation for discrete data types like game levels. I integrate traditional constraint-based models with modern machine learning techniques to generate diverse, playable, and computationally efficient levels. My goal is to develop ensemble methods that leverage the reliability of constraint-based models alongside the speed of machine learning approaches.

Beyond generation, I conduct user studies to explore how users interact with procedurally generated content, their preferences, and the factors that influence engagement and satisfaction. These studies help identify design principles that improve the usability and adaptability of generative systems. I analyze player behavior, and subjective feedback to refine generative models, ensuring they produce content that aligns with user expectations and enhances player experience.

I am especially interested in bridging communities that rely on generative models for structured outputs, such as molecular design, arithmetic expression generation, and source code synthesis. These domains share fundamental challenges with game level generation, making game levels an ideal testbedfree from ethical concerns and excessive complexitiesfor advancing generative techniques.

EDUCATION

- **Northeastern University** *Jan 2023 - Dec 2027*
  PhD in Computer Science Boston, US
  ◦ **Advisor**: Professor Seth Cooper

- **Northeastern University** *Jan 2023 - April 2025*
  MS in Computer Science Boston, US
  ◦ **GPA**: 4.00/4.0
  ◦ **Selected Coursework**: Statistical Methods for Computer Science, Procedural Content Generation via Machine Learning, Foundations and Applications of Information Theory

- **Amirkabir University of Technology (Tehran Polytechnic)** *Sep 2017 Dec 2022*
  BS in Computer Engineering Tehran, Iran
  ◦ **GPA**: 3.4/4.0
  ◦ **Selected Coursework**: Principles and Applications of Artificial Intelligence, Principles of Computational Intelligence, Introduction to Machine Learning

- **National Organization for Development of Exceptional Talents** *Sep 2013 Aug 2017*
  Diploma in Mathematics and Physics Tehran, Iran
  ◦ **GPA**: 19.55/20

EXPERIENCE

- **Northeastern University** *Jan 2023 - present*
  Graduate Research/Teaching Assistant Boston, US
  ◦ CS 3540 Game Programming $\times$ 4
  ◦ CS 5340 Human-Computer Interaction
  ◦ CS3520: Programming in C++ $\times$ 2
  ◦ CS5800: Algorithms

- **Limoome** *Jul 2020 Feb 2021*
  Internship Tehran, Iran
  ◦ Node.js, Nest.js, TypeScript
  ◦ PostgreSQL, Jest.js
  ◦ Azure DevOps, Agile Development

- **Amirkabir University of Technology (Tehran Polytechnic)** *Feb 2020 - Jul 2020*
  Teaching Assistant Tehran, Iran
  ◦ Algorithm Design course

[S.1] Mahsa Bazzaz and Seth Cooper. (2026). **Playing the Imitation Game: How Perceived Generated Content Shapes Player Experience**. In *conference on Human Factors in Computing Systems (CHI)*. 2026.

[C.1] Seth Cooper and Mahsa Bazzaz. (2025). **A Constraint-Based Graph Grammar Approach Unifying Level and Playthrough Generation**. In *Proceedings of the Twelfth Experimental Artificial Intelligence in Games Workshop (EXAG)*. 2025.

[C.2] Mahsa Bazzaz and Seth Cooper. (2025). **Analysis of Robustness of a Large Game Corpus**. In *Proceedings of the 20th International Conference on the Foundations of Digital Games (FDG)*. 2025. ***Early Career Best Paper Award**

[C.3] Mahsa Bazzaz and Seth Cooper. (2025). **Analysis of Uncertainty in Procedural Maps in Slay the Spire**. In *Proceedings of the 20th International Conference on the Foundations of Digital Games (FDG)*. 2025.

[C.4] Seth Cooper and Mahsa Bazzaz. (2025). **Stuck in the Middle: Generating Levels without (or with) Softlocks**. In *Proceedings of the 20th International Conference on the Foundations of Digital Games (FDG)*. 2025.

[C.5] Mahsa Bazzaz and Seth Cooper. (2025). **Level Generation with Constrained Expressive Range**. In *Proceedings of the 20th International Conference on the Foundations of Digital Games (FDG)*. 2025.

[C.6] Mahsa Bazzaz and Seth Cooper. (2024). **Guided Game Level Repair via Explainable AI**. In *The 20th AAAI Conference on Artificial Intelligence and Interactive Digital Entertainment (AIIDE)*. PKP. 2024.[⟳]

[C.7] Seth Cooper and Mahsa Bazzaz. (2024). **Sturgeon-MKIV: Constraint-Based Level and Playthrough Generation with Graph Label Rewrite Rules**. In *The 20th AAAI Conference on Artificial Intelligence and Interactive Digital Entertainment (AIIDE)*, PKP. 2024.

[C.8] Mahsa Bazzaz and Seth Cooper. (2024). **Controllable Game Level Generation: Assessing the Effect of Negative Examples in GAN Models** . In *The 20th AAAI Conference on Artificial Intelligence and Interactive Digital Entertainment (AIIDE)*. PKP. 2024.[⟳]

[C.9] Seth Cooper and Mahsa Bazzaz. (2024). **Literally Unplayable: On Constraint-Based Generation of Uncompletable Levels**. In *Proceedings of the 19th International Conference on the Foundations of Digital Games (FDG)*, pp. 1-8. ACM. 2024. DOI: 10.1145/3649921.3659844.

[C.10] Lincroft, Gwenyth and Cho, Minsung and Hough, Katherine and Bazzaz, Mahsa and Bell, Jonathan. (2024). **Thirty-Three Years of Mathematicians and Software Engineers: A Case Study of Domain Expertise and Participation in Proof Assistant Ecosystems**. In *2024 IEEE/ACM 21st International Conference on Mining Software Repositories (MSR)*, pp. 1-13. Association for Computing Machinery. 2024. DOI: 10.1145/3643991.3644908.

[C.11] Mahsa Bazzaz and Seth Cooper. (2023). **Active learning for classifying 2d grid-based level completability**. In *2023 IEEE Conference on Games (CoG)*, pp. 1-4. IEEE. 2023. DOI: 10.1109/CoG57401.2023.10333212. [⟳]

SKILLS

- **Programming Languages:** Python, TypeScript, JavaScript, Java, C, C++
- **Game Development:** Unity2d, Unity3d, Godot, Babylon.js, Blender, Game mechanics, Game Design
- **Web Technologies:** JavaScript, TypeScript, Node.js, Nest.js, Express.js, Angular, Vue.js, HTML, CSS, SASS, jQuery, Bootstrap, PHP
- **Database Systems:** MySQL, PostgreSQL
- **Data Science & Machine Learning:** PyTorch, pandas, NumPy, scikit-learn, LaTeX, SLURM
- **DevOps & Version Control:** Git, Azure DevOps

HONORS AND AWARDS

- **Early Career Best Paper Award** *Apr 2025*
  Conference on the Foundations of Digital Games (FDG)

VOLUNTEER EXPERIENCE

- **Conference Reviewer** *Dec 2025*
  IEEE Transactions on Games
- **Conference Reviewer** *July 2025*
  AAAI Conference on Artificial Intelligence and Interactive Digital Entertainment (AIIDE)
- **Summer School Organizer** *May 2025*
  Machine Learning for Mathematicians and Physicists Summer School - Northeastern University
- **Conference Reviewer** *Feb 2025*
  Conference on Human Factors in Computing Systems (CHI2025)
- **Conference Reviewer** *Feb 2025*
  The 16TH Workshop on Procedural Content Generation (PCG2025)

- **[Conference Program Committee](#)** *Aug 2024*
  AAAI Conference on Artificial Intelligence and Interactive Digital Entertainment (AIIDE)
- **Conference Reviewer** *Mar 2024*
  IEEE Conference on Games (CoG)
- **Conference Reviewer** *Jan 2024*
  IEEE Transactions on Games

PROFESSIONAL MEMBERSHIPS

- **IEEE**, Membership ID: 99443749 *Dec 2022 - Present*
- **Association for Computing Machinery (ACM)**, Membership ID: 1644560 *Feb 2023 - Present*
- **Association for the Advancement of Artificial Intelligence (AAAI)**, Membership ID: 642895 *Oct 2024 - Present*

CERTIFICATIONS

- **Coursera:** Experimental Design Basics *Sep 2025*
- **Coursera:** Designing, Running, and Analyzing Experiments *Jul 2025*
- **CITI Program:** Social and Behavioral Research *Jan 2023*
- **CITI Program:** Social and Behavioral Responsible Conduct of Research *Jan 2023*
- **Coursera:** Game Design *Aug 2021*
- **Coursera:** Gamification *Jul 2021*

ADDITIONAL INFORMATION

Languages: Persian (Native), English (Proficiency level)