

ANURAG SARKAR

CONTACT INFORMATION	Northeastern University Khoury College of Computer Sciences 440 Huntington Avenue Boston, MA 02115	Office: 466 West Village H Email: sarkar.an@northeastern.edu https://riffsircar.github.io
RESEARCH INTERESTS	My current research focuses on using machine learning for procedural content generation in games and for informing game design. I'm broadly interested in computational creativity and exploring the use of AI and ML for applications in creative domains such as games, music and visual art. Through my research, I hope to build automated and co-creative design tools that leverage the affordances of creative ML techniques, particularly those that utilize latent variable modeling.	
EDUCATION	Northeastern University Ph.D. (in progress), Computer Science Adviser: Seth Cooper	2016-present
	MS, Computer Science GPA: 3.8/4.0	2016-2018
	St. Xavier's College (Autonomous), Kolkata M.Sc., Computer Science GPA: 9.11/10	2014-2016
	NSHM College of Management and Technology (under West Bengal University of Technology) Bachelor of Computer Applications (BCA) GPA: 9.06/10	2011-2014
RESEARCH EXPERIENCE	Northeastern University Research Assistant	9/2016-present
	<ul style="list-style-type: none">• Explore the use of machine learning, specifically variational autoencoders, for procedural content generation in games including game design techniques such as controllable level generation and blending.• Apply rating systems and skill chains for player skill modeling and dynamic difficulty adjustment in human computation games as well as studying difficulty progressions.	
CONFERENCE PUBLICATIONS	<ul style="list-style-type: none">[1] Exploring Level Blending across Platformers via Paths and Affordances Anurag Sarkar, Adam Summerville, Sam Snodgrass, Gerard Bentley, Joseph Osborn <i>AAAI Conference on Artificial Intelligence and Interactive Digital Entertainment (AIIDE)</i>, 2020[2] Game Level Clustering and Generation using Gaussian Mixture VAEs Zhihan Yang, Anurag Sarkar, Seth Cooper <i>AAAI Conference on Artificial Intelligence and Interactive Digital Entertainment (AIIDE)</i>, 2020[3] Evaluating and Comparing Skill Chains and Rating Systems for Dynamic Difficulty Adjustment Anurag Sarkar, Seth Cooper <i>AAAI Conference on Artificial Intelligence and Interactive Digital Entertainment (AIIDE)</i>, 2020[4] Towards Game Design via Creative Machine Learning (GDCML) Anurag Sarkar, Seth Cooper <i>IEEE Conference on Games (CoG)</i>, 2020 Best Paper Nomination[5] Multi-Domain Level Generation and Blending with Sketches using Example-Driven BSP and Variational Autoencoders Sam Snodgrass, Anurag Sarkar <i>International Conference on the Foundations of Digital Games (FDG)</i>, 2020[6] Using a Disjoint Skill Model for Game and Task Difficulty in Human Computation Games Anurag Sarkar, Seth Cooper <i>ACM SIGCHI Annual Symposium on Computer-Human Interaction in Play (CHI Play)</i>, 2019	

- [7] Using Rating Arrays to Estimate Score Distributions for Player-versus-Level Matchmaking
Anurag Sarkar, Seth Cooper
International Conference on the Foundations of Digital Games (FDG), 2019
- [8] Inferring and Comparing Game Difficulty Curves using Player-versus-Level Match Data
Anurag Sarkar, Seth Cooper
IEEE Conference on Games (CoG), 2019
- [9] Transforming Game Difficulty Curves using Function Composition
Anurag Sarkar, Seth Cooper
ACM SIGCHI Conference on Human Factors in Computing Systems (CHI), 2019
- [10] Comparing Paid and Volunteer Recruitment in Human Computation Games
Anurag Sarkar, Seth Cooper
International Conference on the Foundations of Digital Games (FDG), 2018
- [11] Meet your Match Rating: Providing Skill Information and Choice in Player-versus-Level Matchmaking
Anurag Sarkar, Seth Cooper
International Conference on the Foundations of Digital Games (FDG), 2018
- [12] Level Difficulty and Player Skill Prediction in Human Computation Games
Anurag Sarkar, Seth Cooper
AAAI Conference on Artificial Intelligence and Interactive Digital Entertainment (AIIDE), 2017
- [13] Predicting Human Computation Game Scores with Player Rating Systems
Michael Williams, **Anurag Sarkar**, Seth Cooper
International Conference on Entertainment Computing (ICEC), 2017
- [14] Engagement Effects of Player Rating System-based Matchmaking for Level Ordering in Human Computation Games
Anurag Sarkar, Michael Williams, Sebastien Deterding, Seth Cooper
International Conference on the Foundations of Digital Games (FDG), 2017
Best Paper Honorable Mention

WORKSHOP
PUBLICATIONS

- [1] Conditional Level Generation and Game Blending
Anurag Sarkar, Zhihan Yang, Seth Cooper
AIIDE Workshop on Experimental AI in Games (EXAG), 2020
- [2] Pathfinding Agents for Platformer Level Repair
Seth Cooper, **Anurag Sarkar**
AIIDE Workshop on Experimental AI in Games (EXAG), 2020
- [3] Extracting Physics for Blended Platformer Game Levels
Adam Summerville, **Anurag Sarkar**, Sam Snodgrass, Joseph Osborn
AIIDE Workshop on Experimental AI in Games (EXAG), 2020
- [4] Sequential Segment-based Level Generation and Blending using Variational Autoencoders
Anurag Sarkar, Seth Cooper
FDG Workshop on Procedural Content Generation in Games (EXAG), 2020
- [5] Game Design using Creative AI
Anurag Sarkar
NeurIPS Workshop on Machine Learning and Creativity, 2019
- [6] Controllable Level Blending between Games using Variational Autoencoders
Anurag Sarkar, Zhihan Yang, Seth Cooper
AIIDE Workshop on Experimental AI in Games (EXAG), 2019
- [7] Blending Levels from Different Games using LSTMs
Anurag Sarkar, Seth Cooper
AIIDE Workshop on Experimental AI in Games (EXAG), 2018

- [8] Desire Path-inspired Procedural Placement of Coins in a Platformer Game
Anurag Sarkar, Varun Sriram, Riddhi Padte, Jeffrey Cao, Seth Cooper
AIIDE Workshop on Experimental AI in Games (EXAG), 2018

PEER REVIEWING	ACM SIGCHI Conference on Human Factors in Computing Systems (CHI)	2021
	AAAI Conference on Artificial Intelligence (AAAI)	2021
	IEEE Transactions on Games (TOG)	2020
	AAAI AIIDE Workshop on Experimental AI in Games (EXAG)	2019
	ACM SIGCHI Annual Symposium on Computer-Human Interaction in Play (CHI Play)	2019
	FDG Workshop on Procedural Content Generation (PCG)	2019
	International Conference on the Foundations of Digital Games (FDG)	2018-2020
HONORS AND AWARDS	Best Paper Nomination	2020
	IEEE Conference on Games (CoG)	
	IEEE Computational Intelligence Society (CIS) Grant	2020
	IEEE Conference on Games (CoG)	
	PhD Network Travel Grant	2019
	Northeastern University	
	IEEE Computational Intelligence Society (CIS) Travel Grant	2019
	IEEE Conference on Games (CoG)	
	Game Narrative Review Gold Award	2018
	Game Developers Conference (GDC)	
	Best Paper Honorable Mention	2017
	International Conference on the Foundations of Digital Games (FDG)	
	Graduate Fellow	2016
	Northeastern University	
	Father Jacques de Bonhome S.J. Memorial Gold Award	2016
	M.Sc.Computer Science Class of 2016 Valedictorian, St. Xavier's College	
	All-State Rank 7th (out of 2261)	2014
	West Bengal Joint Entrance Exam for Computer Applications	
	NSHM Medal of Merit	2014
	BCA Class of 2014 Valedictorian, NSHM College of Management Technology	
TECHNICAL SKILLS	Programming Languages	
	Python, C# (experienced, active use) R, Javascript (experienced but use less frequently) Java, Actionscript (familiar, used in the recent past) C, C++, MATLAB, SQL (familiar but used less recently)	
	Software/Applications/Technologies	
	Unity, PyTorch, TensorFlow, Keras, Jupyter Notebook, Amazon Mechanical Turk, Amazon DynamoDB, Google Cloud Platform, Google Colab	