

Prithviraj Ammanabrolu

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Education

Ph.D. Computer Science

2018 - 2021

Georgia Institute of Technology

Advisor: Professor Mark O. Riedl

Thesis: Language Learning in Interactive Environments

Research Areas: Natural Language Processing, Reinforcement Learning, Interactive Narrative, Knowledge Graphs, and Computational Creativity

B.S. Computer Science

2015 - 2018

Georgia Institute of Technology

Threads: Intelligence and Theory, Overall GPA 3.9, Dean's List 2015-2018

Publications

[Learning Knowledge Graph-based World Models of Textual Environments](#)

P Ammanabrolu, and MO Riedl

Preprint. Under review.

[How to Avoid Being Eaten by a Grue: Structured Exploration Strategies for Textual Worlds](#)

P Ammanabrolu, E Tien, M Hausknecht, and MO Riedl

Preprint. Under Review.

[Code](#), [VentureBeat Article](#), [Recorded Talk](#)

Conferences/Journals

[Modeling Worlds in Text](#)

P Ammanabrolu, and MO Riedl

Proceedings of NeurIPS 2021 Datasets and Benchmarks Track.

[Code+Data](#)

[Telling Stories through Multi-User Dialogue by Modeling Character Relations](#)

WM Si, P Ammanabrolu, and MO Riedl

Proceedings of SIGDIAL 2021.

[Situated Language Learning via Interactive Narratives](#)

P Ammanabrolu and MO Riedl

Patterns. Cell Press

[How to Motivate Your Dragon: Teaching Goal-Driven Agents to Speak and Act in Fantasy Worlds](#)

P Ammanabrolu, J Urbanek, M Li, A Szlam, T Rocktäschel, J Weston

Proceedings of The North American Chapter of the Association for Computational Linguistics (NAACL-HLT) 2021

[Project Page](#), [Tech Review Article](#), [Tech Xplore Article](#)

[Bringing Stories Alive: Generating Interactive Fiction Worlds](#)

P Ammanabrolu*, W Cheung*, D Tu, W Broniec, and MO Riedl

The 16th AAAI Conference on Artificial Intelligence and Interactive Digital Entertainment (AIIDE-20)

[Code](#), [Demo](#), [Recorded Talk](#)

[Automated Storytelling via Causal, Commonsense Plot Ordering](#)

P Ammanabrolu, W Cheung, W Broniec, and MO Riedl

Thirty-fifth AAAI Conference on Artificial Intelligence (AAAI-21),

[Code](#)

[Toward Automated Quest Generation in Text-Adventure Games](#)

P Ammanabrolu, W Broniec, A Mueller, J Paul, and MO Riedl

International Conference on Computational Creativity (ICCC-20)

[Graph Constrained Reinforcement Learning for Natural Language Action Spaces](#)

P Ammanabrolu, M Hausknecht

International Conference on Learning Representations (ICLR-20), Addis Ababa, Ethiopia.

[Code](#), [Video Presentation](#), [Conference Site](#)

[Story Realization: Expanding Plot Events into Sentences](#)

P Ammanabrolu, E Tien, W Cheung, Z Luo, W Ma, LJ Martin, and MO Riedl

Thirty-fourth AAAI Conference on Artificial Intelligence (AAAI-20), New York City, NY.

[Code](#), [Slides](#)

[Interactive Fiction Games: A Colossal Adventure](#)

M Hausknecht, **P Ammanabrolu**, MA Cote, and X Yuan

Thirty-fourth AAAI Conference on Artificial Intelligence (AAAI-20), New York City, NY.

[Code](#), [Blog](#)

[Playing Text-Adventure Games with Graph-Based Deep Reinforcement Learning](#)

P Ammanabrolu and MO Riedl

Proceedings of The North American Chapter of the Association for Computational Linguistics 2019, Minneapolis, MN.

[Code](#), [Slides](#), [Blog](#)

[Event Representations for Automated Story Generation with Deep Neural Nets](#)

LJ Martin, **P Ammanabrolu**, X Wang, W Hancock, S Singh, B Harrison, and MO Riedl

Thirty-Second AAAI Conference on Artificial Intelligence (AAAI-18), New Orleans, LA.

[Code](#)

Peer-Reviewed Workshops

[Telling Stories through Multi-User Dialogue by Modeling Character Relations](#)

WM Si, **P Ammanabrolu**, and MO Riedl

Workshop on Narrative Understanding @ NAACL-2021.

[Transfer in Deep Reinforcement Learning using Knowledge Graphs](#)

P Ammanabrolu and MO Riedl

Text Graphs @ Empirical Methods in Natural Language Processing (EMNLP) 2019. Hong Kong.

[Code](#)

[Playing Text-Based Games with Commonsense](#)

S Dambekodi, S Frazier, **P Ammanabrolu**, MO Riedl

Wordplay: When Language Meets Games @ NeurIPS 2020

[Guided Neural Language Generation for Automated Storytelling](#)

P Ammanabrolu, E Tien, W Cheung, Z Luo, W Ma, LJ Martin, and MO Riedl

Proceedings of StoryTelling at the Association of Computational Linguistics 2019, Florence, Italy.

[Code](#), [Slides](#)

[Bringing Stories Alive: Generating Interactive Fiction Worlds](#)

P Ammanabrolu*, W Cheung*, D Tu, W Broniec, and MO Riedl

Narrative Understanding, Storylines, and Events (NUSE) @ ACL 2020

[Code](#), [Demo](#), [Recorded Talk](#)

[How To Avoid Being Eaten By a Grue: Exploration Strategies for Text-Adventure Agents](#)

P Ammanabrolu, E Tien, Z Luo, and MO Riedl

Knowledge-based Reinforcement Learning Workshop @ International Joint Conference on Artificial Intelligence (IJCAI-20).

[Toward Automated Quest Generation in Text-Adventure Games](#)

P Ammanabrolu, W Broniec, A Mueller, J Paul, and MO Riedl

Computational Creativity in Natural Language Generation @ International Conference on Natural Language Generation 2019. Tokyo, Japan.

[Interactive Fiction Games: A Colossal Adventure](#)

M Hausknecht, P Ammanabrolu, MA Cote, and X Yuan

Deep Reinforcement Learning Workshop at Neural Information Processing Systems (NeurIPS) 2019. Vancouver, CA.

[Playing Text-Adventure Games with Graph-Based Deep Reinforcement Learning](#)

P Ammanabrolu and MO Riedl

Neural Information Processing Systems (NeurIPS) 2018 Wordplay: Reinforcement and Language Learning in Text-based Games Workshop, Montreal, QC.

[Improvisational Storytelling Agents](#)

LJ Martin, P Ammanabrolu, X Wang, S Singh, B Harrison, M Dhuliawala, P Tambwekar, A Mehta, R Arora, N Dass, C Purdy, and MO Riedl

Neural Information Processing Systems (NeurIPS) 2017 Workshop on Machine Learning for Creativity and Design, Long Beach, CA.

[Event Representations for Automated Story Generation with Deep Neural Nets](#)

LJ Martin, P Ammanabrolu, X Wang, W Hancock, S Singh, B Harrison, and MO Riedl

Conference Knowledge Discovery and Datamining (KDD) 2017 Workshop on Machine Learning for Creativity, Halifax, NS.

Patent Publications

[Techniques for Building a Knowledge Graph in Limited Knowledge Domains](#)

G Singaraju, P Ammanabrolu

US Patent US20200057946A1, Priority to US16/542.017

Teaching Experience

Teaching Assistant

CS-3600: Intro to Artificial Intelligence, Georgia Tech - Atlanta, GA

Aug 2017 - Dec 2019

Student Research Mentorship

Aug 2018 - Present

- Ethan Tien, MS Computer Science
 - Now Software Engineer at Citadel
- Wai Man Si, MS Computer Science
 - Now Ph.D. Student at the Helmholtz Institute
- Ran (Renee) Jia, MS Computer Science
- William Broniec, MS Computer Science
- Alejandro Escontrela, BS Computer Science
 - Now Research Engineer at Google Brain
- Wesley Cheung, MS Computer Science
 - Now Software Engineer at Facebook
- Dan Tu, MS Computer Science
 - Now Software Engineer at Microsoft Azure AI
- William Ma, MS Computer Science
 - Now Software Development Engineer at Amazon
- Jeffery Luo, BS Computer Science
 - Now Research Analyst at Goldman Sachs
- Anush Mattapalli, BS Computer Science
 - Now Software Engineer at NCR Corporation

Work Experience

Research Assistant

Jan 2017 - Present

Entertainment Intelligence Lab, Georgia Tech - Atlanta, GA

- Exploring the use of deep reinforcement learning with natural language state and action spaces
- Using knowledge graphs to inject domain knowledge into language-based tasks
- Finding effective data representations and evaluation metrics for training neural networks in automated story generation and procedural world & quest generation for text-games
- **Mentored 10 Bachelor's and Master's students** on their research theses

Research Intern

May 2020 - Aug 2020

Facebook AI Research - New York City, NY

- Worked with [Jason Weston](#), [Arthur Szlam](#), [Tim Rocktächel](#) on the [ParlAI](#) team and [LIGHT](#), a large-scale crowdsourced text-game
- Collected and released datasets crowdsourced by **over 14,000 players** of natural language quests in LIGHT and a commonsense knowledge graph ATOMIC-LIGHT
- Developed goal-driven questing agents with reinforcement learning that act and speak in LIGHT

Research Intern

May 2019 - Aug 2019

Microsoft Research - Redmond, WA

- Worked with [Matthew Hausknecht](#) in the Reinforcement Learning team
- Aided in development of baseline text-game playing agents for [Jericho](#), a text-game playing platform
- Developed SOTA RL algorithm that is able to dynamically generate language in text-games

Software Engineering Intern

May 2018 - Aug 2018

Oracle Intelligent Bots Service - Redwood City, CA

- Developed a patented algorithm to create knowledge graphs for low resource natural language datasets
- Created a method that improves the natural language understanding capabilities by over 10% (classification rate) of the chatbot platform using the generated graph and graph embedding techniques

Machine Learning Intern

May 2017 - May 2018

Radix Health - Atlanta, GA

- Used machine learning and predictive analytics techniques to model patients' no-show risks for healthcare clinics
- Used natural language processing to design a chatbot to improve patient access
- Built and deployed machine learning systems for these cases from scratch to production, currently utilized by **over 40 clinics and over a 1,000 doctors** across America

Skills

Technical: Natural Language Processing, Reinforcement Learning, Machine Learning, Knowledge Graphs, Semantic Web Technologies, Computer Vision, Predictive Analytics, Agile Methodologies, NoSQL

Programming Languages: Python, R, Java, C/C++, C#, SQL, SPARQL

Frameworks and Tools: pyTorch, scikit-learn, Tensorflow, nltk, AutoML, Couchbase, MongoDB, Spring Boot

Languages: English, Telugu, Sanskrit

Professional Activities

Organizer

[Wordplay: When Language Meets Games Workshop](#) at NeurIPS 2020

Program Committee

- Neural Information Processing Systems (NeurIPS) 2019, 2020
- Meeting of the Association for Computational Linguistics (ACL) main and demo tracks 2020
- North American Chapter of the Meeting of the Association for Computational Linguistics (NAACL) 2019, 2021
- AAAI Conference on Artificial Intelligence (AAAI) 2019, 2020
- International Conference on Machine Learning (ICML) 2020
- International Conference on Learning Representations (ICLR) 2020
- Empirical Methods in Natural Language Processing (EMNLP) 2020
- ACM CSUR Computing Surveys
- TextGraphs Workshop at EMNLP 2020
- Language and Reinforcement Learning Workshop (LaReL) at ICML2020
- Workshop on Learning in Artificial Open Worlds (LAOW) at ICML 2020

Institutional Service

Georgia Institute of Technology

- Reviewer for President's Undergraduate Research Awards (PURA) 2019
- Co-founder of the MCV PhD Student Support Group 2018-2020
- School of Computer Science's Prospective Student Visit Week, Coordinator 2019
- School of Interactive Computing's Prospective Student Visit Week, Volunteer 2019, 2020

Hackathons and Video Game Development

2015 - 2017

- HackIllinois: Health Desk - Desktop app that checks posture using computer vision
- SwampHacks: Labyrinth - 3D survival maze game built with Unity engine and C#; top 10 overall
- HackGT: CorCal - App to sync multiple calendars; built with Java and the Swing library
- Video Game Development Club (VG Dev) at Georgia Tech: HowRogue a Roguelike built in C++

Selected Media Coverage

[How role-playing a dragon can teach an AI to manipulate and persuade](#)

MIT Tech Review. Will Douglas Heaven. November 20, 2020.

[How to Train Your AI: Researchers Teach AI How to Move Around Fantasy Worlds](#)

Science Times. Mark B. November 5, 2020.

[AI can make your favourite game characters speak to each other](#)

INDIAai National AI Portal of India. November 5, 2020.

[Teaching AI agents to communicate and act in fantasy worlds](#)

Tech Xplore. Ingrid Fadelli, November 3, 2020

[Researchers combine reinforcement learning and NLP to escape a Grue monster](#)

Venture Beat. Khari Johnson, June 30, 2020

[Sztuczna inteligencja jako pisarz: Generowanie fabuły](#)

(Translation from Polish: Artificial Intelligence as a Writer: Story Generation)

Zeszyty Maryny. Patrycja Świeczkowska, Oct 4, 2019.

[Georgia Tech Artificial Intelligence Research Includes Collaborative Approaches with Humans, Automating Content, and More](#)

Georgia Tech GVU Center. Joshua Preston, Feb 2, 2018.

[Changing the Conversation: Georgia Tech Researchers Provide New Approach to Automated Story Generation](#)

Georgia Tech School of Interactive Computing. David Mitchell, Feb 4, 2020.

References

1. Mark O. Riedl (PhD Advisor), Professor Georgia Institute of Technology, riedl@cc.gatech.edu
2. Devi Parikh, Associate Professor Georgia Institute of Technology, parikh@gatech.edu
3. Charles Lee Isbell Jr., Professor and Dean Georgia Institute of Technology, isbell@cc.gatech.edu
4. Matthew Hausknecht, Senior Research Scientist, Microsoft Research, matthew.hausknecht@microsoft.com
5. Jason Weston, Research Scientist Facebook AI Research, jase@fb.com