

Jatin Ganhotra

Software Engineer
Dialog Systems Group
IBM Research AI
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Education

1. M.S. Computer Science, GPA: 4.00/4.00
University of Illinois, Urbana-Champaign, Illinois 2014-2015

Academic Projects

- Worked on research project to formally analyze consistency behavior of Cassandra (eventual consistency) using formal model, and prove correctness of mechanisms such as read repair, hinted handoff etc.
- **VR Balance** - Worked on Virtual Reality project using Oculus Rift to investigate the influence of real and virtual height on state anxiety and postural control in older adults. More details at - [VR Balance](#)
- **CloudHaven** - As part of 2-man team, developed a unified and secure web interface using Django, which safely manages user's cloud storage, among cloud storage providers such as Dropbox, Google Drive and Box. CloudHaven combines available free storage and provides security and fault tolerance by state of the art encryption and Reed Solomon erasure codes.
- **GIT Examiner** - Developed a novel search and comparison algorithm in Ruby that reports all reverts, partial reverts, cherry-picks, partial cherry-picks and merges performed in a project, given it's commit history. Available at [GIT Examiner Github](#)
- **Teaching Assistant for Computer Networks, CS 438, Fall 2014.** Conducted weekly office hours, handled Piazza and assisted faculty members with writing homework assignments, exams.

Publications

- Liu Si, Peter Csaba Ölveczky, **Jatin Ganhotra**, Indranil Gupta, José Meseguer. "Exploring Design Alternatives for RAMP Transactions through Statistical Model Checking". *19th International Conference on Formal Engineering Methods – ICFEM 2017*
- Liu Si, Peter Csaba Ölveczky, Muntasir Raihan Rahman, **Jatin Ganhotra**, Indranil Gupta, José Meseguer. "Formal modeling and analysis of RAMP transaction systems". *31st Annual ACM Symposium on Applied Computing – SAC 2016*
- Si Liu, **Jatin Ganhotra**, Muntasir Raihan Rahman, Son Nguyen, Indranil Gupta, José Meseguer. "Quantitative Analysis of Consistency in NoSQL Key-Value Stores". *Leibniz Transactions on Embedded Systems – LITES 2016*
- Christopher Widdowson, **Jatin Ganhotra**, Mohammed Faizal, Marissa Wilko, Saurin Parikh, Zainulabidin Adhami, Manuel Hernandez. "Virtual Reality Applications in Assessing the Effect of Anxiety on Sensorimotor Integration in Human Postural Control". *38th International Conference of the IEEE Engineering in Medicine and Biology Society - EMBC 2016*
- Liu Si, Son Nguyen, **Jatin Ganhotra**, Muntasir Raihan Rahman, Indranil Gupta, José Meseguer. "Quantitative Analysis of Consistency in NoSQL Key-value Stores". *12th International Conference on Quantitative Evaluation of SysTems - QEST 2015*

2. BTech Computer Engineering, GPA: 9.16/10
National Institute of Technology (REC-NITK), Kurukshetra; India 2007-2011

Academic Projects

- Developed a web application OnlinePdfSuite that lets users create and edit PDF documents from a WYSIWYG interface, with capabilities to publish and manage documents from the web.
- Developed CodeAnywhere, a web application using Ruby on Rails that runs C/C++ programs in the browser, to help beginners with learning without local installation.
- Worked on developing a MLSCE (multi-language source code compiler), an IDE for C, C++ and Java (May - Aug 2009). It is built on Core Java, Java Swing UI and batch files for system calls.

Employment

1. Software Engineer, Dialog Systems Group,
IBM Research AI, Yorktown Heights, NY. Mar 2016-current

Research and Projects

- Developed new and implemented existing deep learning methods for agent-assist setting in customer care chat for recommending relevant documents to the agent which can be provided to the user to solve the problem.
- Developed a novel deep learning end-to-end trainable method for dialog systems, which can automatically identify a new user behavior during deployment that the system might fail at and transfer the task to a human agent; and also allows one to choose the trade-off between maximizing user's task success and minimizing the workload on human agents. *TACL 2019 - ACL 2019 oral presentation.*
- Developed a novel deep learning architecture for learning embedding representations for Named Entities on-the-fly, which handles rare and Out-of-vocabulary named entities. *RANLP 2019.*
- Worked on multiple projects involving distributed systems, knowledge extraction and web development:
 - Developed Ansible scripts for automated one-button click deployment of Watson Dialog Service
 - Developed parser scripts for creating a structured Knowledge base from XML manuals for a client engagement
 - Developed the UI interface and implemented backend handling for a unified interface between internal frequent-QA engine and 3rd party interface for agent-based customer support for internal IBM-HR bot
- Research Division Award
 - March 1, 2017 - Awarded 'Research Division Award' for contributions to Watson Engagement Advisor, Watson Dialog Service and Watson Conversation Service
- Manager's Choice Awards
 - July 26, 2018 and Nov 19, 2018 - For demonstrating IBM Practice: 'Dare to create original ideas' for two internal projects
 - June 26, 2017 - For demonstrating IBM Practice: 'Unite to get it done now' for project 'CHIP'
 - Nov 10, 2016 - For demonstrating IBM Practice 'Put the Client First' for project 'Boson'
- Primary Languages/Libraries used: Python, Tensorflow, PyTorch, Docker, Ansible.

Publications

- Janarthanan Rajendran, **Jatin Ganhotra***, Xiaoxiao Guo, Mo Yu, Satinder Singh and Lazaros Polymenakos. “NE-Table: A Neural key-value table for Named Entities”. *Proceedings of Recent Advances in Natural Language Processing*, pages 980–993, Varna, Bulgaria, Sep 2–4 2019.
- Janarthanan Rajendran, **Jatin Ganhotra**, and Lazaros C. Polymenakos. “Learning End-to-End Goal-Oriented Dialog with Maximal User Task Success and Minimal Human Agent Use”. *Transactions of the Association for Computational Linguistics 2019 Vol. 7*, 375-386 - ACL 2019 oral presentation.
- Jonathan K. Kummerfeld, Sai R. Gouravajhala, Joseph J. Peper, Vignesh Athreya, Chulaka Gunasekara, **Jatin Ganhotra**, Siva Sankalp Patel, Lazaros C Polymenakos, Walter Lasecki. “A Large-Scale Corpus for Conversation Disentanglement”. *Proceedings of the 57th Annual Meeting of Association for Computational Linguistics - ACL 2019*
- R. Chulaka Gunasekara, David Nahamoo, Lazaros C. Polymenakos, David Echeverría Ciaurri, **Jatin Ganhotra**, Kshitij P. Fadnis. “Quantized Dialog – A general approach for conversational systems”. *Computer Speech and Language*, Volume 54, 2019, Pages 17-30, ISSN 0885-2308
- **Jatin Ganhotra**, Siva Sankalp Patel and Kshitij Fadnis. “Knowledge-incorporating ESIM models for Response Selection in Retrieval-based Dialog Systems”. *Dialog System Technology Challenge 7 (DSTC7) Workshop at AAI 2019*
- Janarthanan Rajendran, **Jatin Ganhotra***, Satinder Singh, Lazaros Polymenakos. “Learning end-to-end goal-oriented dialog with multiple answers”. *Proceedings of the 2018 Conference on Empirical Methods in Natural Language Processing*, 2018
- **Jatin Ganhotra**, Lazaros Polymenakos. “Knowledge-based end-to-end memory networks”. *CoRR. abs/1804.08204 2018*
- R. Chulaka Gunasekara, David Nahamoo, Lazaros C. Polymenakos, **Jatin Ganhotra**, Kshitij P. Fadnis. “Quantized-Dialog Language Model for Goal-Oriented Conversational Systems”. *Dialog System Technology Challenge 6 Workshop – DSTC6 2017*

Patents

- Raimo Bakis, Song Feng, **Jatin Ganhotra**, Chulaka Gunasekara, David Nahamoo, Lazaros Polymenakos, Sunil D Shashidhara, Cheng Wu, Li Zhu. Implicit dialog approach for creating conversational access to web content, filed Aug 2018.
 - Raimo Bakis, Song Feng, **Jatin Ganhotra**, Chulaka Gunasekara, David Nahamoo, Lazaros Polymenakos, Sunil D Shashidhara, Cheng Wu, Li Zhu. Implicit dialog approach operating a conversational access interface to web content, filed Aug 2018.
 - Chulaka Gunasekara, David Nahamoo, Lazaros Polymenakos, Kshitij Fadnis, David Echeverria Ciaurri, **Jatin Ganhotra**. Quantized dialog language model for dialog systems, filed Mar 2018.
 - Rangachari Anand, Ashima Arora, Raimo Bakis, Song Feng, **Jatin Ganhotra**, Chulaka Gunasekara, David Nahamoo, Lazaros Polymenakos, Sunil D Shashidhara, Li Zhu. Semantic representation and realization for conversational systems, filed Jan 2018.
 - **Jatin Ganhotra**, Cheng Wu. Context-aware knowledge base system, filed Dec 2017.
2. Software Development Intern, Core Team
CleverSafe, IBM, Chicago, Illinois. June 2015 – Aug 2015
- Designed and developed from scratch, a tool ‘SystemSnapshot’ for system state validation, anomaly detection and monitoring a performance run

- Built a first version of the formal model of the in-house 3-phase distributed commit protocol in Maude to verify its correctness
 - Primary Languages/Libraries used: Python, Django, MongoDB, Maude
3. Teaching Assistant, **University of Illinois at Urbana Champaign**
Computer Networks - CS 438. **Aug - Dec 2014**
- Conducted weekly office hours, handled Piazza and assisted faculty members with writing homework assignments, exams.
4. Senior Engineer, RTL Front End
Calypto Design Systems, Noida, Uttar Pradesh India. **Apr 2012 – July 2014**
- Contributed to the development and continuous enhancement of RTL compiler by optimizing and maintenance of existing compiler optimizations such as dead-code elimination, constant propagation and if-else-pruning
 - Reduced runtime and improved QoR (Quality of Results) by 8-21% by enhancing the core API
 - As part of 2-man team, designed and developed from scratch a key API for the backend team; upgraded it to crash-free status by using exception handling and extensive unit-testing, thereby increasing the QoR by 15-31%
 - Improved product quality by increasing code coverage by adding unit-tests for legacy code and fixed bad-logic bugs and memory leaks identified by Valgrind
 - Mentored and supervised 2 summer interns in 2013
 - Individually migrated the source code for one external component from CVS to GIT for easier source control management and reduced the integration time from 2-3 days to few hours
 - Primary Languages/Libraries used: C/C++, Verilog, VHDL, System Verilog, TcL, STL, GDB
5. Research Engineer, Network Management Group
Centre for Development of Telematics: C-DOT, Delhi, India. **Aug 2011 – Apr 2012**
- As part of Management Plane group in Next Generation Networks (NGN) team, developed application for Network Management based on Fault, Configuration, Accounting, Performance and Security (FCAPS) model parameters
 - Evaluated open-source and third-party commercial software for integration to the router management application
 - Primary Languages/Libraries used: C, XML, NetConf, YANG modeling protocol.
6. Intern, **CREDII**
Delhi/Bangalore, India. **June– July 2011, Dec 2010 – Jan 2011, June – July 2010**
- *Graduate Intern* - Facilitated upgrade of existing application to Rails 3.1.0 following Test-driven Development (TDD) approach.
 - *Fall Intern* - Upgraded existing application from Rails 2.3.8 to Rails 3.0.3 with major emphasis on using ARel for better and faster queries. Built custom 'user invitations and signup' module that had both authentication and authorization elements.
 - *Summer Intern* - As member of 3-man team, designed and built web-based product research tool. Evaluated data structures to be used and implemented core engine for the prototype.
 - Primary Languages/Libraries used: Ruby, Ruby on Rails (RoR), RSpec, ActiveRecord, MySQL, CSS, JQuery, JQuery UI, Blueprint CSS.