

2021 BOARD NOMINEE

Rachel Bellamy

Chair, Exploratory Computer Science Council,
IBM Research



CRA
Computing Research
Association

Awards and Honors and Year Received

- ACM Senior Member
- IBM Principal Researcher

Involvement in CRA Activities

I joined CRA in 2019, and attended the CRA Virtual Conference 2020.

Other Relevant Experience

- IBM Research, Chair of the Exploratory Computer Science Council, 2019-present.
- Chair of the ACM SIGCHI Student Travel Grant Board, 2017 & 2018.
- Steering Committee Member ABOUT ML (Annotation and Benchmarking on Understanding and Transparency of Machine learning Lifecycles), Partnership for AI, 2019-present.
- Member of Working Group for ,IEEE Recommended Practice for Assessing the Impact of Autonomous and Intelligent Systems on Human Well-Being, 2019-2020.
- Program Committee: IJCAI 2019 (Senior Member), DIS 2000 & 2002, ICSE 2011 (Demos), AAI-19, CHI 2010 (subcommittee: Understanding People), UAI 2021 (upcoming), Psychology of Programming Interest Group 2010 (Chair), CHI 1997 (Chair, Late-Breaking Results and Informal Presentations).

Research Interests

Human-Computer & Human-AI Interaction
User Experience Design
Psychology of Programming
Ethical AI
Educational Technology

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Personal Statement

In my career, I have watched technology become intimately woven into our lives and have seen its potential to further enrich society. However, in my recent work on AI Fairness, I have also seen the potential for technology to do harm, and to exacerbate existing divisions in society. If elected to the CRA board, I will bring the perspectives and insights gained as an industrial technical research leader with 30 years of experience to the work of ensuring technology reaches its potential to enrich our lives. I will do this by contributing to policy and preparing future technical leaders.

Bio

Rachel is a Principal Research Scientist and Chair of the Exploratory Computer Science Council at IBM T J Watson Research Center, Yorktown Heights, New York. Under her management, the Council oversees a research portfolio of exploratory science projects in research areas including Biologically-Inspired Computation, Socio-Technical Systems, Artificial General Intelligence and Distributed Computing. She has done extensive research on human-computer interaction, most recently contributing to IBM Research's Trusted AI toolkits, including AI Fairness 360, AI Explainability 360 and AI Factsheets. During a career spanning over 30 years, she has collaborated extensively with partners in academia and has mentored many doctoral students and early career researchers. Rachel received her doctorate in cognitive psychology from the University of Cambridge, UK in 1991 and a Bachelor of Science in psychology with mathematics and computer science from University of London in 1986. As a Project Lead at Apple Computer's Advanced Technology Group, working with Apple Classrooms of Tomorrow, she developed and field-tested some of the earliest examples of on-line, media-rich, collaborative learning environments.

Rachel K. E. Bellamy, Ph.D.

Updated February 12, 2021

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Current Position	Chair , Exploratory Computer Science Council IBM Research, T.J. Watson Research Center	
Honors	Senior Member , Association for Computing Machinery Principal Researcher , IBM	
Education	University of Cambridge , UK Ph.D. in Applied Psychology Dissertation: <i>Planning Support Environments: A Psychological Investigation in the Context of Programming.</i>	1987 - 1991
	London University , UK Bachelor of Science <i>Psychology with Mathematics and Computer Science.</i>	1982 - 1985
Employment	Chair, Exploratory Computer Science Council IBM Research, T.J. Watson Research Center	2010 - now
	IBM Research, T.J. Watson Research Center Manager and Principal Researcher <i>Human-AI Collaboration Group</i>	2010 - 2018
	Apple Computer Research Laboratories Senior Scientist and Project Leader <i>Apple Classrooms of Tomorrow</i>	1993-1998
	IBM Research, T.J. Watson Research Center <i>Post-Doctoral Research Fellow (Display-Based Learning, Psychology of Programming)</i>	1992-1993
	Teachers College, Columbia University <i>Research Associate (Display-Based Learning)</i>	1991-1992
	IBM Research, T.J. Watson Research Center <i>Pre-Doctoral Intern (Psychological Design Rationale, Psychology of Programming).</i>	1988-1990
	MRC, Applied Psychology Unit, Cambridge, UK. Research Officer <i>User Models, Psychology of Programming.</i>	1985-1987

Recent Talks

Keynote, Fair AI in Practice, PROMISE 2020
Invited Talk, Fair AI in Practice, Code Freeze 2019
Invited Lecturer, HCI, Beijing Normal University, 2018

Selected Service

Reviewer for Government Grant Agencies 2020

Member of working group for IEEE 2019-2020
Recommended Practice for Assessing the Impact
of Autonomous & Intelligent Systems on Human Well-Being.

Steering Committee member, Partnership for AI 2019-now
ABOUT ML (Annotation and Benchmarking on
Understanding and Transparency of Machine
Learning Lifecycles)

Chair of the ACM SIGCHI Student Travel Grant board 2017 & 2018

Reviewer for Numerous Conferences and Journals
including: Human Computer Interaction, IEEE Software,
International Journal of Man-Machine Studies, ACM CHI,
DIS, IJCAI, ICSE, AAAI, IEEE Intelligent Systems,
Transactions on Human-Robot Interaction.

Program Committee Member, including: CHI, DIS,
IJCAI (senior member), ICSE (demos), AAAI, UAI.

Chair PPIG 2010, Psychology of Programming Interest Group.
Lawrance, Joey, Bellamy, Rachel (eds.) Proceedings of
the 22nd Annual Workshop of the Psychology
of Programming Interest Group PPIG 2010.

Chair, CHI'97 Late-Breaking Results and Informal Presentations

Societies

ACM, IEEE

Videos

Lens: A Community Intranet, with Slick, W. and Woolsey, K., 1997, Apple
Computer, Inc.

Teacher Talk, with Slick, W. and Woolsey, K., 1995, Apple Computer, Inc.

Cloud Forest Classroom, with Fallon, M., Grant, W., Cooper, E., and Kerns,
C., 1993, Apple Computer, Inc.

Media Fusion, with Abbe, J., Grant, W., Cooper, E., and Kerns, C., 1993, Apple
Computer, Inc.

The Global Desktop of the Future, with Kellogg, W. and Van Deusen, M.,
1993, IBM Research

Publications

- Arya, Vijay et al. (2021). “AI Explainability 360 Toolkit”. In: *8th ACM IKDD CODS And 26th COMAD*. CODS COMAD 2021. Bangalore, India: Association for Computing Machinery, pp. 376–379.
- Ghai, Bhavya, Q. Vera Liao, Yunfeng Zhang, Rachel K. E. Bellamy, and Klaus Mueller (Jan. 2021). “Explainable Active Learning (XAL): Toward AI Explanations As Interfaces For Machine Teachers”. In: *Proc. ACM Hum.-Comput. Interact.* 4.CSCW3.
- Arya, Vijay, Rachel K. E. Bellamy, Pin-Yu Chen, Amit Dhurandhar, Michael Hind, Samuel C Hoffman, Stephanie Houde, Q Vera Liao, Ronny Luss, Aleksandra Mojsilović, et al. (2020a). “AI Explainability 360: An Extensible Toolkit For Understanding Data And Machine Learning Models”. In: *Journal of Machine Learning Research* 21.130, pp. 1–6.
- Arya, Vijay et al. (2020b). “AI Explainability 360: Hands-On Tutorial”. In: *Proceedings Of The 2020 Conference On Fairness, Accountability, And Transparency*. FAT* ’20. Barcelona, Spain: Association for Computing Machinery, p. 696.
- Kuttal, S. K., J. Myers, S. Gurka, D. Magar, D. Piorkowski, and R. Bellamy (Aug. 2020). “Towards Designing Conversational Agents For Pair Programming: Accounting For Creativity Strategies And Conversational Styles”. In: *2020 IEEE Symposium On Visual Languages And Human-Centric Computing (VL/HCC)*, pp. 1–11.
- Liao, Q. Vera, Moninder Singh, Yunfeng Zhang, and Rachel K.E. Bellamy (2020). “Introduction To Explainable AI”. In: *Extended Abstracts Of The 2020 CHI Conference On Human Factors In Computing Systems*. CHI EA ’20. Honolulu, HI, USA: Association for Computing Machinery, pp. 1–4.
- Robe, P., S. Kaur Kuttal, Y. Zhang, and R. Bellamy (Aug. 2020). “Can Machine Learning Facilitate Remote Pair Programming? Challenges, Insights Implications”. In: *2020 IEEE Symposium On Visual Languages And Human-Centric Computing (VL/HCC)*, pp. 1–11.
- Zhang, Yunfeng, Rachel Bellamy, and Kush Varshney (2020). “Joint Optimization Of AI Fairness And Utility: A Human-Centered Approach”. In: *Proceedings Of The AAAI/ACM Conference On AI, Ethics, And Society*. AIES ’20. New York, NY, USA: Association for Computing Machinery, pp. 400–406.
- Zhang, Yunfeng, Rachel K. E. Bellamy, Moninder Singh, and Q. Vera Liao (2020). “Introduction To AI Fairness”. In: *Extended Abstracts Of The 2020 CHI Conference On Human Factors In Computing Systems*. CHI EA ’20. Honolulu, HI, USA: Association for Computing Machinery, pp. 1–4.
- Zhang, Yunfeng, Q. Vera Liao, and Rachel K. E. Bellamy (2020). “Effect Of Confidence And Explanation On Accuracy And Trust Calibration In AI-Assisted Decision Making”. In: *Proceedings Of The 2020 Conference On Fairness, Accountability, And Transparency*. FAT* ’20. Barcelona, Spain: Association for Computing Machinery, pp. 295–305.
- Arnold, M., R. K. E. Bellamy, M. Hind, S. Houde, S. Mehta, A. Mojsilović, R. Nair, K. N. Ramamurthy, A. Olteanu, D. Piorkowski, D. Reimer, J. Richards, J. Tsay, and K. R. Varshney (July 2019). “FactSheets: Increasing Trust In AI Services Through Supplier’s Declarations Of Conformity”. In: *IBM Journal of Research and Development* 63.4/5, 6:1–6:13.
- Arya, Vijay, Rachel K. E. Bellamy, Pin-Yu Chen, Amit Dhurandhar, Michael Hind, Samuel C Hoffman, Stephanie Houde, Q Vera Liao, Ronny Luss, Aleksandra Mojsilović, et al. (2019). “One Explanation Does Not Fit All: A Toolkit And Taxonomy Of Ai Explainability Techniques”. In: *arXiv preprint arXiv:1909.03012*.

- Bellamy, R. K. E. et al. (July 2019a). "AI Fairness 360: An Extensible Toolkit For Detecting And Mitigating Algorithmic Bias". In: *IBM Journal of Research and Development* 63.4/5, 4:1–4:15.
- Bellamy, R. K. E. et al. (July 2019b). "Think Your Artificial Intelligence Software Is Fair? Think Again". In: *IEEE Software* 36.4, pp. 76–80.
- Chakraborti, Tathagata, Kshitij P Fadnis, Kartik Talamadupula, Mishal Dholakia, Biplav Srivastava, Jeffrey O Kephart, and Rachel K. E. Bellamy (2019). "Planning And Visualization For A Smart Meeting Room Assistant". In: *AI Communications* 32.1, pp. 91–99.
- Dodge, Jonathan, Q. Vera Liao, Yunfeng Zhang, Rachel K. E. Bellamy, and Casey Dugan (2019). "Explaining Models: An Empirical Study Of How Explanations Impact Fairness Judgment". In: *Proceedings Of The 24th International Conference On Intelligent User Interfaces*. IUI '19. Marina del Ray, California: Association for Computing Machinery, pp. 275–285.
- Lee, Eunjin, James Ashford, Malgorzata Turalska, Liam Turner, Vera Liao, Rachel Bellamy, Geeth de Mel, and Roger Whitaker (2019). *An Exploratory Analysis Of Suspicious Reddit User Accounts Based On Sentiment And Interactions*.
- Mallinar, Neil, Abhishek Shah, Rajendra Ugrani, Ayush Gupta, Manikandan Gurusankar, Tin Kam Ho, Q. Vera Liao, Yunfeng Zhang, Rachel K.E. Bellamy, Robert Yates, Chris Desmarais, and Blake McGregor (July 2019). "Bootstrapping Conversational Agents With Weak Supervision". In: *Proceedings of the AAAI Conference on Artificial Intelligence* 33.01, pp. 9528–9533.
- Oduor, Erick, Carolyn Pang, Charles Wachira, Rachel K. E. Bellamy, Timothy Nyota, Sekou L. Remy, Aisha Walcott-Bryant, Wycliffe Omwanda, and Julius Mbeya (2019). "Exploring Rural Community Practices In HIV Management For The Design Of Technology For Hypertensive Patients Living With HIV". In: *Proceedings Of The 2019 On Designing Interactive Systems Conference*. DIS '19. San Diego, CA, USA: Association for Computing Machinery, pp. 1595–1606.
- Bellamy, Rachel, Gualtiero Colombo, Soheil Eshghi, Geeth De Mel, Cheryl Giammanco, Rhodri Morris, David G. Rand, Liam D. Turner, Roger M. Whitaker, and Grace-Rose Williams (Apr. 2018). "A Computational Framework For Modelling Inter-Group Behaviour Using Psychological Theory". In: *Next-Generation Analyst VI*. Vol. 10653. Society of Photo-Optical Instrumentation Engineers (SPIE) Conference Series, 106530G.
- Chakraborti, Tathagata, Kshitij P. Fadnis, Kartik Talamadupula, Mishal Dholakia, Biplav Srivastava, Jeffrey O. Kephart, and Rachel K. E. Bellamy (July 2018). "Visualizations For An Explainable Planning Agent". In: *Proceedings Of The Twenty-Seventh International Joint Conference On Artificial Intelligence, IJCAI-18*. International Joint Conferences on Artificial Intelligence Organization, pp. 5820–5822.
- Ellis, Jason, Biplav Srivastava, Rachel K. E. Bellamy, and Andy Aaron (2018). *Water Advisor - A Data-Driven, Multi-Modal, Contextual Assistant To Help With Water Usage Decisions*.
- Shamekhi, Ameneh, Q. Vera Liao, Dakuo Wang, Rachel K. E. Bellamy, and Thomas Erickson (2018). "Face Value? Exploring The Effects Of Embodiment For A Group Facilitation Agent". In: *Proceedings Of The 2018 CHI Conference On Human Factors In Computing Systems*. New York, NY, USA: Association for Computing Machinery, pp. 1–13.
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- Stein, Sebastian, Soheil Eshghi, Setareh Maghsudi, Leandros Tassiulas, Rachel K. E. Bellamy, and Nicholas Jennings (Aug. 2017b). “Heuristic Algorithms For Influence Maximization In Partially Observable Social Networks”. In: *Proceedings Of The 3rd International Workshop On Social Influence Analysis (SocInf 2017): In Conjunction With The Twenty-Sixth International Joint Conference On Artificial Intelligence, Melbourne, Australia, August 19, 2017*. Vol. 1893, pp. 20–32.
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- Farrell, Robert G, Jonathan Lenchner, Jeffrey O Kephjart, Alan M Webb, Michael J Muller, Thomas D Erikson, David O Melville, Rachel K. E. Bellamy, Daniel M Gruen, Jonathan H Connell, et al. (2016). “Symbiotic Cognitive Computing”. In: *AI Magazine* 37.3, pp. 81–93.
- Hill, C., R. Bellamy, T. Erickson, and M. Burnett (Sept. 2016). “Trials And Tribulations Of Developers Of Intelligent Systems: A Field Study”. In: *2016 IEEE Symposium On Visual Languages And Human-Centric Computing (VL/HCC)*, pp. 162–170.
- Ashoori, Maryam, Rachel K.E. Bellamy, and Justin D. Weisz (2015). “Creating The Mood: Design For A Cognitive Meeting Room”. In: *Proceedings Of The 33rd Annual ACM Conference Extended Abstracts On Human Factors In Computing Systems*. CHI EA '15. Seoul, Republic of Korea: Association for Computing Machinery, pp. 2001–2006.
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- Zhang, Yunfeng, Rachel K.E. Bellamy, and Wendy A. Kellogg (2015). “Designing Information For Remediating Cognitive Biases In Decision-Making”. In: *Proceedings Of The 33rd Annual ACM Conference On Human Factors In Computing Systems*. New York, NY, USA: Association for Computing Machinery, pp. 2211–2220.
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- Martino, Jacquelyn, Rachel K. E. Bellamy, Paul Matchen, Harold L. Ossher, John T. Richards, and Cal Swart (2013). "Sketching Data: Lessons Learned From A Formative User Evaluation". In: *ACM SIGGRAPH 2013 Mobile*. SIGGRAPH '13. Anaheim, California: Association for Computing Machinery.
- Piorkowski, David J., Scott D. Fleming, Irwin Kwan, Margaret M. Burnett, Christopher Scaffidi, Rachel K.E. Bellamy, and Joshua Jordahl (2013). "The Whats and Hows of Programmers' Foraging Diets". In: *Proceedings of the SIGCHI Conference on Human Factors in Computing Systems*. New York, NY, USA: Association for Computing Machinery, pp. 3063–3072.
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- Martino, Jacquelyn, Paul Matchen, Harold Ossher, Rachel Bellamy, and Cal Swart (2012). "SketchGraph: Gestural Data Input For Mobile Tablet Devices". In: *ACM SIGGRAPH 2012 Posters*. SIGGRAPH '12. Los Angeles, California: Association for Computing Machinery.
- Piorkowski, David, Scott Fleming, Christopher Scaffidi, Christopher Bogart, Margaret Burnett, Bonnie John, Rachel Bellamy, and Calvin Swart (2012). "Reactive Information Foraging: An Empirical Investigation of Theory-Based Recommender Systems for Programmers". In: *Proceedings of the SIGCHI Conference on Human Factors in Computing Systems*. CHI '12. Austin, Texas, USA: Association for Computing Machinery, pp. 1471–1480.
- Swearngin, Amanda, Myra Cohen, Bonnie John, and Rachel Bellamy (2012). "Easing the Generation of Predictive Human Performance Models from Legacy Systems". In: *Proceedings of the SIGCHI Conference on Human Factors in Computing Systems*. CHI '12. Austin, Texas, USA: Association for Computing Machinery, pp. 2489–2498.
- Thomas, J. C., J. Diament, J. Martino, and R. K. E. Bellamy (Sept. 2012). "Using The Physics Of Notations To Analyze A Visual Representation Of Business Decision Modeling". In: *2012 IEEE Symposium On Visual Languages And Human-Centric Computing (VL/HCC)*, pp. 41–44.
- Trewin, Shari, Bonnie John, John Richards, David Sloan, Vicki Hanson, Rachel Bellamy, John Thomas, and Calvin Swart (2012). "Age-Specific Predictive Models of Human Performance". In: *CHI '12 Extended Abstracts on Human Factors in Computing Systems*. CHI EA '12. Austin, Texas, USA: Association for Computing Machinery, pp. 2267–2272.
- Bellamy, R., M. Desmond, J. Martino, P. Matchen, H. Ossher, J. Richards, and C. Swart (May 2011). "Sketching Tools For Ideation: NIER Track". In: *2011 33rd International Conference On Software Engineering (ICSE)*, pp. 808–811.
- Bellamy, Rachel, Bonnie John, and Sandra Kogan (2011). "Deploying CogTool: Integrating Quantitative Usability Assessment into Real-World Software Development". In: *Proceedings of the 33rd International*

- Conference on Software Engineering*. ICSE '11. Waikiki, Honolulu, HI, USA: Association for Computing Machinery, pp. 691–700.
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- Piorkowski, D., S. D. Fleming, C. Scaffidi, L. John, C. Bogart, B. E. John, M. Burnett, and R. Bellamy (2011). “Modeling Programmer Navigation: A Head-To-Head Empirical Evaluation Of Predictive Models”. In: *2011 IEEE Symposium On Visual Languages And Human-Centric Computing (VL/HCC)*, pp. 109–116.
- Trewin, Shari, John Richards, Rachel Bellamy, Bonnie E. John, Cal Swart, and David Sloan (2011). “”Extending Predictive Models Of Exploratory Behavior To Broader Populations””. In: *”Universal Access In Human-Computer Interaction. Design For All And EInclusion”*. Ed. by Constantine Stephanidis. Berlin, Heidelberg: Springer Berlin Heidelberg, pp. 149–158.
- Bellamy, Rachel, Bonnie John, John Richards, and John Thomas (2010). “Using CogTool to Model Programming Tasks”. In: *Evaluation and Usability of Programming Languages and Tools*. PLATEAU '10. Reno, Nevada: Association for Computing Machinery.
- Dagenais, Barthélémy, Harold Ossher, Rachel K. E. Bellamy, Martin P. Robillard, and Jacqueline P. de Vries (2010). “Moving Into A New Software Project Landscape”. In: *Proceedings Of The 32nd ACM/IEEE International Conference On Software Engineering - Volume 1*. New York, NY, USA: Association for Computing Machinery, pp. 275–284.
- Lawrance, Joseph, Margaret Burnett, Rachel Bellamy, Christopher Bogart, and Calvin Swart (2010). “Reactive Information Foraging for Evolving Goals”. In: *Proceedings of the SIGCHI Conference on Human Factors in Computing Systems*. New York, NY, USA: Association for Computing Machinery, pp. 25–34.
- Ossher, Harold, Rachel Bellamy, Ian Simmonds, David Amid, Ateret Anaby-Tavor, Matthew Callery, Michael Desmond, Jacqueline de Vries, Amit Fisher, and Sophia Krasikov (2010a). “Flexible Modeling Tools for Pre-Requirements Analysis: Conceptual Architecture and Research Challenges”. In: *Proceedings of the ACM International Conference on Object Oriented Programming Systems Languages and Applications*. OOPSLA '10. Reno, Tahoe, Nevada, USA: Association for Computing Machinery, pp. 848–864.
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- Trewin, Shari, Rachel Bellamy, John Thomas, Jonathan Brezin, John Richards, Cal Swart, and Bonnie E. John (2010a). “Designing For Auditory Web Access: Accessibility And Cellphone Users”. In: *Proceedings Of The 2010 International Cross Disciplinary Conference On Web Accessibility (W4A)*. W4A '10. Raleigh, North Carolina: Association for Computing Machinery.
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- Trewin, Shari, John Richards, Rachel Bellamy, Bonnie E. John, John Thomas, Cal Swart, and Jonathan Brezin (2010c). “Toward Modeling Auditory Information Seeking Strategies On The Web”. In: *CHI '10 Extended Abstracts On Human Factors In Computing Systems*. CHI EA '10. Atlanta, Georgia, USA: Association for Computing Machinery, pp. 3973–3978.

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- Dagenais, B., H. Ossher, R. K. E. Bellamy, M. P. Robillard, and J. P. de Vries (May 2009). "A Qualitative Study On Project Landscapes". In: *2009 ICSE Workshop On Cooperative And Human Aspects On Software Engineering*, pp. 32–35.
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- Danis, Catalina, John Thomas, John Richards, Jonathan Brezin, Cal Swart, Christine Halverson, Rachel Bellamy, and Peter Malkin (2008). "Towards Applying Complexity Metrics To Measure Programmer Productivity In High Performance Computing". In: *Proceedings Of The 2008 International Conference On Software Engineering (ICSE), Workshop On SE For Computational Science And Engineering, Leipzig, Germany*.
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- Lawrance, Joseph, Rachel Bellamy, Margaret Burnett, and Kyle Rector (2008). "Using Information Scent to Model the Dynamic Foraging Behavior of Programmers in Maintenance Tasks". In: *Proceedings of the SIGCHI Conference on Human Factors in Computing Systems*. CHI '08. Florence, Italy: Association for Computing Machinery, pp. 1323–1332.
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