

ACL 2023

**The 61st Annual Meeting of the Association for  
Computational Linguistics: Industry Track**

**Proceedings of the Industry Track**

July 10-12, 2023

©2023 Association for Computational Linguistics

Order copies of this and other ACL proceedings from:

Association for Computational Linguistics (ACL)  
209 N. Eighth Street  
Stroudsburg, PA 18360  
USA  
Tel: +1-570-476-8006  
Fax: +1-570-476-0860  
[acl@aclweb.org](mailto:acl@aclweb.org)

ISBN 978-1-959429-68-5

# Program Committee

## Chairs

Beata Beigman Klebanov, Educational Testing Service  
Sunayana Sitaram, Microsoft Research India  
Jason D Williams, Apple

## Program Committee

Alex Acero, Apple  
George Acquaah-mensah, Massachusetts College of Pharmacy and Health Sciences  
Sachin Agarwal, Apple  
Alan Akbik, Humboldt-Universität zu Berlin  
Ai Ti Aw, Institute for Infocomm Research  
Amar Prakash Azad, IBM AI Research  
Srinivas Bangalore, Interactions Corp  
Vinayshekhar Bannihatti Kumar, AWS AI  
Kfir Bar, College of Management Academic Studies  
Roy Bar-haim, IBM Research  
Fazl Barez, The University of Edinburgh  
Nikoletta Basiou, Amazon  
Tilman Becker, DFKI  
Lee Becker, Pearson  
Steven Bedrick, Oregon Health  
& Science University  
Shruti Bhargava, Apple  
Kasturi Bhattacharjee, AWS AI, Amazon  
Dan Bikel, Meta  
Yonatan Bisk, Carnegie Mellon University  
Anupam Biswas, National Institute of Technology Silchar  
Su Lin Blodgett, Microsoft Research  
Danushka Bollegala, University of Liverpool/Amazon  
Trung Bui, Adobe Research  
Aoife Cahill, Dataminr  
Sarah Campbell, Amazon Alexa AI  
Thiago Castro Ferreira, Federal University of Minas Gerais  
Srinivas Chappidi, Apple  
Vishrav Chaudhary, Microsoft  
Sourish Chaudhuri, Google Inc  
Ciprian Chelba, Google  
John Chen, Interactions LLC  
Luoxin Chen, Amazon Alexa AI  
Lei Chen, Rakuten  
Jiangning Chen, Meta  
Jianpeng Cheng, Apple  
Justin Chiu, Rakuten USA  
Eunah Cho, Amazon, Alexa AI  
Jaegul Choo, KAIST  
Monojit Choudhury, Microsoft

Poornima Chozhiyath Raman, Roku  
Paul Crook, Meta  
Heriberto Cuayahuitl, University of Lincoln  
Deborah Dahl, Conversational Technologies  
Robert Daland, Apple Inc  
Sandipan Dandapat, Microsoft India  
Marina Danilevsky, IBM Research  
Aswarth Abhilash Dara, Amazon  
Tirthankar Dasgupta, Tata Consultancy Services Ltd.  
Budhaditya Deb, Microsoft Corporation  
Tejas Dhamecha, IBM Research - India  
Dan Dickinson, American Family Insurance  
Rahul Divekar, Educational Testing Service  
Li Dong, Amazon.com  
Shuyan Dong, Meta  
Pablo Duboue, Textualization Software Ltd.  
Matthew Dunn, Cohere AI  
Ritam Dutt, Carnegie Mellon University  
Matthias Eck, Twitter  
Lilach Eden, IBM Research  
Wassim El-hajj, American University of Beirut  
Aparna Elangovan, The University of Melbourne  
David Elson, Google  
Sugyeong Eo, Korea University  
Keelan Evanini, Kasisto  
Tarec Fares, Bloomberg LP  
Oliver Ferschke, 3M  
Michael Flor, Educational Testing Service  
Lisheng Fu, Amazon  
Christian Fuegen, Facebook AI  
Ankur Gandhe, Amazon  
Qin Gao, Apple Inc  
Radhika Gaonkar, Microsoft Search, Assistant and Intelligence  
Jose Garrido Ramas, Amazon  
Judith Gaspers, Amazon  
Anna Lisa Gentile, IBM Research Almaden  
Ryan Georgi, KPMG  
Kallirrogi Georgila, University of Southern California Institute for Creative Technologies  
Alborz Geramifard, Facebook AI  
Diman Ghazi, IBM  
Aniruddha Ghosh, Apple UK  
Anmol Goel, IIIT Hyderabad  
Olga Golovneva, Meta  
Kalpa Gunaratna, Samsung Research America  
Tong Guo, Meituan  
Honglei Guo, Tsinghua University  
Ankush Gupta, IBM Research  
Benjamin Han, Microsoft  
Jie Hao, Amazon  
Daniel Hardt, Copenhagen Business School  
Peyman Heidari, Facebook

Enrique Henestroza Anguiano, Ask Media Group  
Sanjika Hewavitharana, eBay  
Derrick Higgins, Illinois Institute of Technology  
Lynette Hirschman, MITRE  
Andrew Hoang, Education Testing Service  
Bjorn Hoffmeister, Apple  
Dirk Hovy, Bocconi University  
Kristen Howell, LivePerson Inc.  
Ziming Huang, Tencent  
Wonseok Hwang, LBox  
Alankar Jain, Google LLC  
Hongxia Jin, Samsung Research America  
Shailza Jolly, Amazon Alexa AI  
Rosie Jones, Spotify  
Mohammad Kachuee, Amazon Alexa AI  
Anup Kalia, Dataminr  
Hidetaka Kamigaito, Nara Institute of Science and Technology  
Jun Seok Kang, Blink Health  
Omid Kashefi, ETS  
Denys Katerenchuk, Kasisto, CUNY Graduate Center  
Yannis Katsis, IBM Research - Almaden  
Yoav Katz, IBM Research AI  
Saurabh Khanwalkar, Course Hero  
Sopan Khosla, Amazon Web Services, Amazon Inc  
Byung-hak Kim, AKASA, Inc.  
Yu-seop Kim, Hallym University  
Sun Kim, Naver; NCBI/NIH  
Seokhwan Kim, Amazon Alexa AI  
Geewook Kim, NAVER  
Kunho Kim, Microsoft Corporation  
Jin-dong Kim, Database Center for Life Science  
Sanjeev Kumar, Quark.ai  
Anjishnu Kumar, Amazon Alexa  
Chee Wee Leong, Educational Testing Service  
Brian Lester, Google  
Volker Leutnant, Amazon Alexa ASR  
Yitong Li, Huawei Technology Co. Ltd  
Yunyao Li, Apple  
Tzu-hsiang Lin, Apple  
Xiaohu Liu, Amazon  
Xuye Liu, University of Waterloo  
Pengfei Liu, Centre for Perceptual and Interactive Intelligence  
Jaime Lorenzo-trueba, Amazon  
Anastassia Loukina, Grammarly Inc  
Stephanie M. Lukin, U.S. Army Research Laboratory  
Liang Ma, Dataminr  
Nitin Madnani, Educational Testing Service  
Frederic Mailhot, Dialpad, Inc  
Lorenzo Malandri, University of Milan - Bicocca  
Alex Marin, Microsoft Corporation  
Yuval Marton, University of Washington

Sandeep Mathias, Presidency University  
Spyros Matsoukas, Amazon.com  
Yuji Matsumoto, Riken Center for Advanced Intelligence Project  
Chandresh Maurya, IIT Indore  
David McDonald, Smart Information Flow Technologies (dba SIFT, LLC)  
Mahnoosh Mehrabani, Interactions LLC  
Kartik Mehta, Amazon  
Helen Meng, The Chinese University of Hong Kong  
Fabio Mercorio, University of Milano-Bicocca  
Margot Mieskes, University of Applied Sciences, Darmstadt  
Shachar Mirkin, Lawgeex  
Hemant Misra, Swiggy (BundlTechnologies)  
Isabelle Moulinier, Thomson Reuters  
Sidharth Mudgal, Google, Inc.  
Matthew Mulholland, Educational Testing Service  
Vitobha Munigala, Research Engineer, IBM Research  
Deepak Muralidharan, Apple  
Prasanna Kumar Muthukumar, BBN Technologies  
Varun Nagaraj Rao, Princeton University  
Udhyakumar Nallasamy, Apple Inc  
Jinseok Nam, Amazon  
Nobal B. Niraula, Boeing Research  
& Technology  
Navid Nobani, University of Milano-Bicocca  
Elnaz Nouri, Microsoft Research  
Mari Olsen, TELUS International AI Data Services  
Laurel Orr, Stanford  
Aishwarya Padmakumar, Amazon  
Lin Pan, Amazon  
Alexandros Papangelis, Amazon Alexa AI  
Aasish Pappu, Meta AI  
Cheoneum Park, Hyundai Motor Group  
Youngja Park, IBM T. J. Watson Research Center  
Chanjun Park, Upstage  
Dookun Park, Amazon Alexa  
Patrick Paroubek, University Paris-Saclay - CNRS - LISN  
Ioannis Partalas, Expedia Group  
Sangameshwar Patil, TRDDC, TCS Research and Innovation  
Siddharth Patwardhan, Apple  
Matthias Paulik, Apple  
Sachin Pawar, Tata Consultancy Services Ltd.  
Stephan Peitz, Apple  
Vassilis Plachouras, Facebook  
Saloni Potdar, IBM Watson, Carnegie Mellon University  
Sumanth Prabhu, NA  
Shrimai Prabhumoye, Nvidia  
Pradyot Prakash, Meta  
Radityo Eko Prasajo, Pitik.id  
Stephen Pulman, Apple Inc.  
Long Qin, Alibaba  
Elio Querze, Fidelity

Chris Quirk, Microsoft Research  
Zeynab Raeesy, Amazon  
Sai Krishna Rallabandi, Fidelity Investments  
Vikram Ramanarayanan, University of California, San Francisco  
Nitin Ramrakhiani, TCS Research  
Shihao Ran, Dataminr  
Vivek Kumar Rangarajan Sridhar, Apple Inc.  
Sudha Rao, Microsoft Research, Redmond  
Nikhil Rasiwasia, Amazon.com  
Hadas Raviv, Princeton University  
Sagnik Ray Choudhury, University of Michigan  
Brian Riordan, unaffiliated  
Kay Rottmann, Amazon Alexa AI  
Nicholas Ruiz, Interactions, LLC  
Alicia Sagae, Research Scientist  
Avneesh Saluja, Netflix  
Mark Sammons, Elemental Cognition  
Ruhi Sarikaya, Amazon  
Hassan Sawaf, aixplain, inc.  
Thomas Schaaf, 3M | M\*Modal  
Frank Schilder, Thomson Reuters  
Jonathan Schler, HIT  
Alexandra Schofield, Harvey Mudd College  
Ethan Selfridge, LivePerson  
Shubhashis Sengupta, Accenture Technology Labs  
Igor Shalyminov, Amazon AWS  
Eshwar Shamanna Girishekar, Amazon  
Mingyue Shang, Amazon  
Ashish Shenoy, Meta  
Weiyang Shi, Columbia University  
Michal Shmueli-scheuer, IBM Research  
Lei Shu, Google Research  
Stavroula Skylaki, Thomson Reuters Labs  
Saleh Soltan, Amazon Alexa  
Shuangyong Song, JD AI Research  
Mukund Sridhar, Google  
Evgeny Stepanov, VUI, Inc.  
Kevin Stowe, Educational Testing Services (ETS)  
Grant Strimel, Amazon.com  
Ming Sun, Meta AI  
Marek Suppa, Comenius University in Bratislava  
Sandesh Swamy, Amazon  
Narges Tabari, AWS AI Labs, Amazon  
Jacopo Tagliabue, NYU  
Zeeraq Talat, Simon Fraser University  
Joel Tetreault, Dataminr  
Khushboo Thaker, University of Pittsburgh  
Sudarshan R. Thitte, IBM  
John Torr, University of Edinburgh  
Giuliano Tortoreto, VUI Inc.  
Isabel Trancoso, INESC-ID / IST Univ. Lisbon

Keith Trnka, None  
Ling Tsou, Inworld AI  
Brian Ulicny, Raytheon BBN Technologies  
Morgan Ulinski, WordsEye, Inc.  
David Uthus, Google Research  
Gisela Vallejo, The University of Melbourne  
Carel Van Niekerk, Heinrich Heine University  
Martin Villalba, None  
Ngoc Phuoc An Vo, IBM Research  
Tong Wang, Amazon  
Xiaohui Wang, Bytedance AI Lab  
Han Wang, Amazon  
Yu Wang, Samsung Research America  
Yi-chia Wang, Facebook AI  
Kyle Williams, Alkymi  
Genta Winata, Bloomberg  
Kristian Woodsend, University of Edinburgh  
Kristian Woodsend, Apple  
Lingfei Wu, Pinterest  
He Xie, Amazon Alexa AI  
Deyi Xiong, Tianjin University  
Xiao Yang, Meta Platforms  
Dian Yu, Google  
Keunwoo Yu, University Of Michigan  
Kai Yu, Shanghai Jiao Tong University  
Qingkai Zeng, University of Notre Dame  
Ke Zhang, Dataminr, inc  
Xiliang Zhu, Dialpad  
Wei Zhu, East China Normal University  
Imed Zitouni, Google



## Table of Contents

<i>CWSeg: An Efficient and General Approach to Chinese Word Segmentation</i> Dedong Li, Rui Zhao and Fei Tan .....	1
<i>Knowledge is Power": Constructing Knowledge Graph of Abdominal Organs and Using Them for Automatic Radiology Report Generation</i> Kaveri Kale, Pushpak Bhattacharyya, Aditya Shetty, Milind Gune, Kush Shrivastava, Rustom Lawyer and Spriha Biswas .....	11
<i>Hunt for Buried Treasures: Extracting Unclaimed Embodiments from Patent Specifications</i> Chikara Hashimoto, Gautam Kumar, Shuichiro Hashimoto and Jun Suzuki .....	25
<i>MathPrompter: Mathematical Reasoning using Large Language Models</i> Shima Imani, Liang Du and Harsh Shrivastava .....	37
<i>Constrained Policy Optimization for Controlled Self-Learning in Conversational AI Systems</i> Mohammad Kachuee and Sungjin Lee .....	43
<i>pNLP-Mixer: an Efficient all-MLP Architecture for Language</i> Francesco Fusco, Damian Pascual, Peter Staar and Diego Antognini .....	53
<i>Extracting Text Representations for Terms and Phrases in Technical Domains</i> Francesco Fusco and Diego Antognini .....	61
<i>CocaCLIP: Exploring Distillation of Fully-Connected Knowledge Interaction Graph for Lightweight Text-Image Retrieval</i> Jiapeng Wang, Chengyu Wang, Xiaodan Wang, Jun Huang and Lianwen Jin .....	71
<i>KG-FLIP: Knowledge-guided Fashion-domain Language-Image Pre-training for E-commerce</i> Qinjin Jia, Yang Liu, Daoping Wu, Shaoyuan Xu, Huidong Liu, Jinniao Fu, Roland Vollgraf and Bryan Wang .....	81
<i>Domain-specific transformer models for query translation</i> Mandar Kulkarni, Nikesh Garera and Anusua Trivedi .....	89
<i>Label efficient semi-supervised conversational intent classification</i> Mandar Kulkarni, Kyung Kim, Nikesh Garera and Anusua Trivedi .....	96
<i>xPQA: Cross-Lingual Product Question Answering in 12 Languages</i> Xiaoyu Shen, Akari Asai, Bill Byrne and Adria De Gispert .....	103
<i>Learn over Past, Evolve for Future: Forecasting Temporal Trends for Fake News Detection</i> Beizhe Hu, Qiang Sheng, Juan Cao, Yongchun Zhu, Danding Wang, Zhengjia Wang and Zhiwei Jin .....	116
<i>AVEN-GR: Attribute Value Extraction and Normalization using product GRaphs</i> Thomas Ricatte and Donato Crisostomi .....	126
<i>GKD: A General Knowledge Distillation Framework for Large-scale Pre-trained Language Model</i> Shicheng Tan, Weng Lam Tam, Yuanchun Wang, Wenwen Gong, Shu Zhao, Peng Zhang and Jie Tang .....	134
<i>FashionKLIP: Enhancing E-Commerce Image-Text Retrieval with Fashion Multi-Modal Conceptual Knowledge Graph</i> Xiaodan Wang, Chengyu Wang, Lei Li, Zhixu Li, Ben Chen, Linbo Jin, Jun Huang, Yanghua Xiao and Ming Gao .....	149

<i>Entity Contrastive Learning in a Large-Scale Virtual Assistant System</i>	
Jonathan Rubin, Jason Crowley, George Leung, Morteza Ziyadi and Maria Minakova . . . . .	159
<i>Tab-Cleaner: Weakly Supervised Tabular Data Cleaning via Pre-training for E-commerce Catalog</i>	
Kewei Cheng, Xian Li, Zhengyang Wang, Chenwei Zhang, Binxuan Huang, Yifan Ethan Xu, Xin Luna Dong and Yizhou Sun . . . . .	172
<i>Toward More Accurate and Generalizable Evaluation Metrics for Task-Oriented Dialogs</i>	
Abishek Komma, Nagesh Panyam Chandrasekarasastry, Timothy Leffel, Anuj Goyal, Angeliki Metallinou, Spyros Matsoukas and Aram Galstyan . . . . .	186
<i>Tab-CQA: A Tabular Conversational Question Answering Dataset on Financial Reports</i>	
Chuang Liu, Junzhuo Li and Deyi Xiong . . . . .	196
<i>KoSBI: A Dataset for Mitigating Social Bias Risks Towards Safer Large Language Model Applications</i>	
Hwaran Lee, Seokhee Hong, Joonsuk Park, Takyounng Kim, Gunhee Kim and Jung-woo Ha .	208
<i>Improving Knowledge Production Efficiency With Question Answering on Conversation</i>	
Changlin Yang, Siye Liu, Sen Hu, Wangshu Zhang, Teng Xu and Jing Zheng . . . . .	225
<i>Mitigating the Burden of Redundant Datasets via Batch-Wise Unique Samples and Frequency-Aware Losses</i>	
Donato Crisostomi, Andrea Caciolai, Alessandro Pedrani, Kay Rottmann, Alessandro Manzotti, Enrico Palumbo and Davide Bernardi . . . . .	235
<i>Distilled Language Models are economically efficient for the enterprise. ...mostly.</i>	
Kristen Howell, Gwen Christian, Pavel Fomitchov, Gitit Kehat, Julianne Marzulla, Leanne Rolston, Jadin Tredup, Ilana Zimmerman, Ethan Selfridge and Joseph Bradley . . . . .	248
<i>Application-Agnostic Language Modeling for On-Device ASR</i>	
Markus Nussbaum-thom, Lyan Verwimp and Youssef Oualil . . . . .	268
<i>Building Accurate Low Latency ASR for Streaming Voice Search in E-commerce</i>	
Abhinav Goyal and Nikesh Garera . . . . .	276
<i>PLAtE: A Large-scale Dataset for List Page Web Extraction</i>	
Aidan San, Yuan Zhuang, Jan Bakus, Colin Lockard, David Ciemiewicz, Sandeep Atluri, Kevin Small, Yangfeng Ji and Heba Elfardy . . . . .	284
<i>Rapid Diffusion: Building Domain-Specific Text-to-Image Synthesizers with Fast Inference Speed</i>	
Bingyan Liu, Weifeng Lin, Zhongjie Duan, Chengyu Wang, Wu Ziheng, Zhang Zipeng, Kui Jia, Lianwen Jin, Cen Chen and Jun Huang . . . . .	295
<i>Large Scale Generative Multimodal Attribute Extraction for E-commerce Attributes</i>	
Anant Khandelwal, Happy Mittal, Shreyas Kulkarni and Deepak Gupta . . . . .	305
<i>Consistent Text Categorization using Data Augmentation in e-Commerce</i>	
Noa Avigdor, Guy Horowitz, Ariel Raviv and Stav Yanovsky Daye . . . . .	313
<i>An efficient method for Natural Language Querying on Structured Data</i>	
Hanoz Bhathena, Aviral Joshi and Prateek Singh . . . . .	322
<i>Boosting Transformers and Language Models for Clinical Prediction in Immunotherapy</i>	
Zekai Chen, Mariann Micsinai Balan and Kevin Brown . . . . .	332
<i>EvolveMT: an Ensemble MT Engine Improving Itself with Usage Only</i>	
Kamer Yüksel, Ahmet Gunduz, Mohamed Al-badrashiny and Hassan Sawaf . . . . .	341

<i>A Static Evaluation of Code Completion by Large Language Models</i>	
Hantian Ding, Varun Kumar, Yuchen Tian, Zijian Wang, Rob Kwiatkowski, Xiaopeng Li, Murali Krishna Ramanathan, Baishakhi Ray, Parminder Bhatia and Sudipta Sengupta . . . . .	347
<i>Scalable and Safe Remediation of Defective Actions in Self-Learning Conversational Systems</i>	
Sarthak Ahuja, Mohammad Kachuee, Fatemeh Sheikholeslami, Weiqing Liu and Jaeyoung Do	361
<i>MobileNMT: Enabling Translation in 15MB and 30ms</i>	
Ye Lin, Xiaohui Wang, Zhexi Zhang, Mingxuan Wang, Tong Xiao and Jingbo Zhu . . . . .	368
<i>Multi-doc Hybrid Summarization via Salient Representation Learning</i>	
Min Xiao . . . . .	379
<i>SaFER: A Robust and Efficient Framework for Fine-tuning BERT-based Classifier with Noisy Labels</i>	
Zhenting Qi, Xiaoyu Tan, Chao Qu, Yinghui Xu and Yuan Qi . . . . .	390
<i>Chemical Language Understanding Benchmark</i>	
Yunsoo Kim, Hyuk Ko, Jane Lee, Hyun Young Heo, Jinyoung Yang, Sungsoo Lee and Kyu-hwang Lee . . . . .	404
<i>HyperT5: Towards Compute-Efficient Korean Language Modeling</i>	
Dongju Park, Soonwon Ka, Kang Min Yoo, Gichang Lee and Jaewook Kang . . . . .	412
<i>Semantic Ambiguity Detection in Sentence Classification using Task-Specific Embeddings</i>	
Jong Myoung Kim, Young-jun Lee, Sangkeun Jung and Ho-jin Choi . . . . .	425
<i>Reliable and Interpretable Drift Detection in Streams of Short Texts</i>	
Ella Rabinovich, Matan Vetzler, Samuel Ackerman and Ateret Anaby Tavor . . . . .	438
<i>Sharing Encoder Representations across Languages, Domains and Tasks in Large-Scale Spoken Language Understanding</i>	
Jonathan Hueser, Judith Gaspers, Thomas Gueudre, Chandana Prakash, Jin Cao, Daniil Sorokin, Quynh Do, Nicolas Anastassacos, Tobias Falke and Turan Gojavev . . . . .	447
<i>Annotating Research Infrastructure in Scientific Papers: An NLP-driven Approach</i>	
Seyed Amin Tabatabaei, Georgios Cheirmpos, Marius Doornenbal, Alberto Zigoni, Veronique Moore and Georgios Tsatsaronis . . . . .	457
<i>Event-Centric Query Expansion in Web Search</i>	
Yanan Zhang, Weijie Cui, Yangfan Zhang, Xiaoling Bai, Zhe Zhang, Jin Ma, Xiang Chen and Tianhua Zhou . . . . .	464
<i>Transferable and Efficient: Unifying Dynamic Multi-Domain Product Categorization</i>	
Shansan Gong, Zelin Zhou, Shuo Wang, Fengjiao Chen, Xiujie Song, Xuezhi Cao, Yunsen Xian and Kenny Zhu . . . . .	476
<i>DISCOSQA: A Knowledge Base Question Answering System for Space Debris based on Program Induction</i>	
Paul Darm, Antonio Valerio Miceli Barone, Shay B. Cohen and Annalisa Riccardi . . . . .	487
<i>BADGE: Speeding Up BERT Inference after Deployment via Block-wise Bypasses and Divergence-based Early Exiting</i>	
Wei Zhu, Peng Wang, Yuan Ni, Guotong Xie and Xiaoling Wang . . . . .	500
<i>K-pop and fake facts: from texts to smart alerting for maritime security</i>	
Maxime Prieur, Souhir Gahbiche, Guillaume Gadek, Sylvain Gatepaille, Kilian Vasnier and Valerian Justine . . . . .	510

<i>Evaluating Embedding APIs for Information Retrieval</i>	
Ehsan Kamaloo, Xinyu Zhang, Odunayo Ogundepo, Nandan Thakur, David Alfonso-hermelo, Mehdi Rezagholizadeh and Jimmy Lin .....	518
<i>Domain-Agnostic Neural Architecture for Class Incremental Continual Learning in Document Processing Platform</i>	
Mateusz Wójcik, Witold Kościukiewicz, Mateusz Baran, Tomasz Kajdanowicz and Adam Gonzalez .....	527
<i>Regression-Free Model Updates for Spoken Language Understanding</i>	
Andrea Caciolai, Verena Weber, Tobias Falke, Alessandro Pedrani and Davide Bernardi .....	538
<i>Reducing cohort bias in natural language understanding systems with targeted self-training scheme</i>	
Dieu-thu Le, Gabriela Hernandez, Bei Chen and Melanie Bradford .....	552
<i>Content Moderation for Evolving Policies using Binary Question Answering</i>	
Sankha Subhra Mullick, Mohan Bhamhani, Suhit Sinha, Akshat Mathur, Somya Gupta and Jidnya Shah .....	561
<i>Weighted Contrastive Learning With False Negative Control to Help Long-tailed Product Classification</i>	
Tianqi Wang, Lei Chen, Xiaodan Zhu, Younghun Lee and Jing Gao .....	574
<i>Towards Building a Robust Toxicity Predictor</i>	
Dmitriy Beshpalov, Sourav Bhabesh, Yi Xiang, Liutong Zhou and Yanjun Qi .....	581
<i>AI Coach Assist: An Automated Approach for Call Recommendation in Contact Centers for Agent Coaching</i>	
Md Tahmid Rahman Laskar, Cheng Chen, Xue-yong Fu, Mahsa Azizi, Shashi Bhushan and Simon Corston-oliver .....	599
<i>Unified Contextual Query Rewriting</i>	
Yingxue Zhou, Jie Hao, Mukund Rungta, Yang Liu, Eunah Cho, Xing Fan, Yanbin Lu, Vishal Vasudevan, Kellen Gillespie and Zeynab Raeesy .....	608
<i>Context-Aware Query Rewriting for Improving Users' Search Experience on E-commerce Websites</i>	
Simiao Zuo, Qingyu Yin, Haoming Jiang, Shaohui Xi, Bing Yin, Chao Zhang and Tuo Zhao .....	616
<i>Federated Learning of Gboard Language Models with Differential Privacy</i>	
Zheng Xu, Yanxiang Zhang, Galen Andrew, Christopher Choquette, Peter Kairouz, Brendan McMahan, Jesse Rosenstock and Yuanbo Zhang .....	629
<i>RadLing: Towards Efficient Radiology Report Understanding</i>	
Rikhiya Ghosh, Oladimeji Farri, Sanjeev Kumar Karn, Manuela Danu, Ramya Vunikili and Larisa Micu .....	640
<i>Predicting Customer Satisfaction with Soft Labels for Ordinal Classification</i>	
Etienne Manderscheid and Matthias Lee .....	652
<i>Accurate Training of Web-based Question Answering Systems with Feedback from Ranked Users</i>	
Liang Wang, Ivano Lauriola and Alessandro Moschitti .....	660
<i>SPM: A Split-Parsing Method for Joint Multi-Intent Detection and Slot Filling</i>	
Sheng Jiang, Su Zhu, Ruisheng Cao, Qingliang Miao and Kai Yu .....	668
<i>NAG-NER: a Unified Non-Autoregressive Generation Framework for Various NER Tasks</i>	
Xinpeng Zhang, Ming Tan, Jingfan Zhang and Wei Zhu .....	676

<i>Search Query Spell Correction with Weak Supervision in E-commerce</i> Vishal Kakkar, Chinmay Sharma, Madhura Pande and Surender Kumar . . . . .	687
<i>Let's not Quote out of Context": Unified Vision-Language Pretraining for Context Assisted Image Captioning</i> Abisek Rajakumar Kalarani, Pushpak Bhattacharyya, Niyati Chhaya and Sumit Shekhar . . . . .	695
<i>What, When, and How to Ground: Designing User Persona-Aware Conversational Agents for Engaging Dialogue</i> Deuksin Kwon, Sunwoo Lee, Ki Hyun Kim, Seojin Lee, Taeyoon Kim and Eric Davis . . . . .	707
<i>CUPID: Curriculum Learning Based Real-Time Prediction using Distillation</i> Arindam Bhattacharya, Ankith Ms, Ankit Gandhi, Vijay Huddar, Atul Saroop and Rahul Bhagat . . . . .	720
<i>Answering Unanswered Questions through Semantic Reformulations in Spoken QA</i> Pedro Faustini, Zhiyu Chen, Besnik Fetahu, Oleg Rokhlenko and Shervin Malmasi . . . . .	729
<i>Exploring Zero and Few-shot Techniques for Intent Classification</i> Soham Parikh, Mitul Tiwari, Prashil Tumbade and Quaizar Vohra . . . . .	744
<i>Referring to Screen Texts with Voice Assistants</i> Shruti Bhargava, Anand Dhoot, Ing-marie Jonsson, Hoang Long Nguyen, Alkesh Patel, Hong Yu and Vincent Renkens . . . . .	752
<i>Generate-then-Retrieve: Intent-Aware FAQ Retrieval in Product Search</i> Zhiyu Chen, Jason Choi, Besnik Fetahu, Oleg Rokhlenko and Shervin Malmasi . . . . .	763
<i>KAFA: Rethinking Image Ad Understanding with Knowledge-Augmented Feature Adaptation of Vision-Language Models</i> Zhiwei Jia, Pradyumna Narayana, Arjun Akula, Garima Pruthi, Hao Su, Sugato Basu and Varun Jampani . . . . .	772
<i>Weakly supervised hierarchical multi-task classification of customer questions</i> Jitenkumar Rana, Promod Yenigalla, Chetan Aggarwal, Sandeep Sricharan Mukku, Manan Soni and Rashmi Patange . . . . .	786
<i>Automated Digitization of Unstructured Medical Prescriptions</i> Megha Sharma, Tushar Vatsal, Srujana Merugu and Aruna Rajan . . . . .	794