

# Muhammad Abu Bakar Siddique

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☎ +1 951 406 9981 🔗 /MultifacetedNLP 📄 /citations?user=m4013Q8AAAAJ

## RESEARCH INTERESTS

My research focuses on **natural language processing**, **information retrieval**, and **scalable data science**. Specifically, I investigate **large language models** and **dialog systems** with the goal of developing personalizable, interpretable, and safe conversational AI systems. Additionally, I explore scalable data science methodologies *across disciplines*, leveraging NLP and machine learning in **collaboration with domain experts**.

## PROFESSIONAL EXPERIENCE

2021 – Present	University of Kentucky (UK)	ASSISTANT PROFESSOR
2017 – 2021	University of California, Riverside (UCR)	GRADUATE STUDENT RESEARCHER
2009 – 2017	University of Management & Technology (UMT)	LECTURER

## EDUCATION

2017 – 2021	University of California, Riverside (UCR)	PH.D. IN COMPUTER SCIENCE
2008 – 2011	Lahore University of Management Sciences (LUMS)	M.S. IN COMPUTER SCIENCE
2003 – 2008	International Islamic University (IIU) – Islamabad	B.S. IN SOFTWARE ENGINEERING

## GRANTS

NSF	Toward User-Centric Task-Oriented Dialog Systems via Zero-shot Adaptation and Personalization; Amount: \$599,898; Start Date: 9/1/2024, End Date 8/31/2027. Role: PI.	NATIONAL SCIENCE FOUNDATION
NSF	Distributed Edge Intelligence in Support of Next-Generation Applications; Amount: \$100,000; Start Date: 10/1/2024, End Date 9/30/2025. Role: Co-PI.	NATIONAL SCIENCE FOUNDATION

## CONFERENCE PUBLICATIONS

<https://www.cs.uky.edu/~siddique/#publications>

[A brief note: WWW, KDD, SIGIR, CIKM, and VLDB are among the *best computer science conferences*. For conference rankings, please refer to <https://www.guide2research.com/topconf/> or <http://www.conferencerranks.com/> ]

ICSC '25	<b>INTERPOS: Interaction Rhythm Guided Positional Morphing for Mobile App Recommender Systems</b> M.H. Maqbool, Moghis Fereidouni, Umar Farooq, A. B. Siddique, and Hassan Foroosh, 2025. "INTERPOS: Interaction Rhythm Guided Positional Morphing for Mobile App Recommender Systems". In Proceedings of the IEEE 19th International Conference on Semantic Computing (ICSC), IEEE, 2024. [Full Research Paper]
CUSTNLP4U '24	<b>Grounded Language Agent for Product Search via Intelligent Web Interactions</b> Moghis Fereidouni, Adib Mosharrof, and A. B. Siddique, 2024. "Grounded Language Agent for Product Search via Intelligent Web Interactions". In Proceedings of the 1st Workshop on Customizable NLP: Progress and Challenges in Customizing NLP for a Domain, Application, Group, or Individual (CustomNLP4U), pp. 63-75. DOI: <a href="https://doi.org/10.18653/v1/2024.customnlp4u-1.7">https://doi.org/10.18653/v1/2024.customnlp4u-1.7</a> [Workshop Paper]
ICSC '24	<b>Mapping Natural Language Intents to User Interfaces through Vision-Language Models</b> Abukadah, Halima, Moghis Fereidouni, and A. B. Siddique, 2024. "Mapping Natural Language Intents to User Interfaces through Vision-Language Models". In Proceedings of the IEEE 18th International Conference on Semantic Computing (ICSC), pp. 237-244. IEEE, 2024. DOI: <a href="https://doi.org/110.1109/ICSC59802.2024.00045">https://doi.org/110.1109/ICSC59802.2024.00045</a> [Full Research Paper]

- ACSAC '23**      **FS3: Few-Shot and Self-Supervised Framework for Efficient Intrusion Detection in Internet of Things Networks**  
Dina, A.S., Siddique, A.B. and Manivannan, D., 2023. "FS3: Few-Shot and Self-Supervised Framework for Efficient Intrusion Detection in Internet of Things Networks". In Proceedings of the 39th Annual Computer Security Applications Conference (ACSAC), December 4-8, 2023 in Austin, Texas, USA. [Full Research Paper, Acceptance Rate: 23.32%]
- SIGIR '23**      **MobileRec: A Large-Scale Dataset for Mobile Apps Recommendation**  
M.H. Maqbool, Umar Farooq, Adib Mosharrof, A.B. Siddique, and Hassan Foroosh. 2023. MobileRec: A Large-Scale Dataset for Mobile Apps Recommendation. In Proceedings of the 46th International ACM SIGIR Conference on Research and Development in Information Retrieval (SIGIR '23), July 23–27, 2023, Taipei, Taiwan. ACM, New York, NY, USA, 10 pages. DOI: <https://doi.org/10.1145/3539618.3591906> [Full Paper, Resource Track]
- WWW '23**      **Toward Open-domain Slot Filling via Self-supervised Co-training**  
Mosharrof, A., Fereidouni, M., and A.B. Siddique. 2023. Toward Open-domain Slot Filling via Self-supervised Co-training. In Proceedings of the Web Conference 2023 (WWW '23). Association for Computing Machinery, New York, NY, USA, 3279–3290. [Full Paper, Research Track, Acceptance Rate: 19.2%]
- ICSC '23**      **Robust Zero-Shot Intent Detection via Contrastive Transfer Learning**  
M.H. Maqbool, F.A. Khan, A.B. Siddique, and Hassan Foroosh, "Robust Zero-Shot Intent Detection via Contrastive Transfer Learning", 2023 IEEE 17th International Conference on Semantic Computing (ICSC), 2023. [Full Paper, Research Track]
- FLAIRS '23**      **Zero-Shot Generalizable End-to-End Task-Oriented Dialog System using Context Summarization and Domain Schema**  
Adib Mosharrof, M.H. Maqbool, and AB Siddique, "Zero-Shot Generalizable End-to-End Task-Oriented Dialog System using Context Summarization and Domain Schema," 2023, The 36th International FLAIRS Conference, May 14-17, 2023. [Full Paper, Research Track]
- BIGDATA '22**      **Proactive Prioritization of App Issues via Contrastive Learning**  
Fereidouni, M., Mosharrof, A., Farooq, A., Siddique, AB, "Proactive Prioritization of App Issues via Contrastive Learning," 2022 IEEE International Conference on Big Data (Big Data), 2022. [Full Paper, Research Track, Acceptance Rate: 19.2%]
- CIKM '22**      **Personalizing Task-oriented Dialog Systems via Zero-shot Generalizable Reward Function**  
A.B. Siddique, M.H. Maqbool, K Taywade, and Hassan Foroosh, "Personalizing Task-oriented Dialog Systems via Zero-shot Generalizable Reward Function", In Proceedings of the 31st ACM International Conference on Information and Knowledge Management (CIKM '22), October 17–21, 2022, Hybrid Conference, Atlanta, Georgia, USA. ACM, New York, NY, USA, 12 pages. [Full Research Paper, Research Track, Acceptance Rate: 27.5%]
- ICSC '22**      **Zero-label Anaphora Resolution for Off-Script User Queries in Goal-Oriented Dialog Systems**  
M.H. Maqbool, Luxun Xu, A.B. Siddique, Niloofar Montazeri, Vagelis Hristidis, and Hassan Foroosh, "Zero-label Anaphora Resolution for Off-Script User Queries in Goal-Oriented Dialog Systems", 2022 IEEE 16th International Conference on Semantic Computing (ICSC), 2022, pp. 217–224, DOI: <https://doi.org/10.1109/ICSC52841.2022.00043> [Full Paper, Research Track]
- SIGIR '21**      **Generalized Zero-shot Intent Detection via Commonsense Knowledge**  
A.B. Siddique, Fuad Jamour, Luxun Xu, and Vagelis Hristidis. 2021. Generalized Zero-shot Intent Detection via Commonsense Knowledge. In Proceedings of the 44th International ACM SIGIR Conference on Research and Development in Information Retrieval (SIGIR '21). Association for Computing Machinery, New York, NY, USA, 1925–1929. DOI: <https://doi.org/10.1145/3404835.3462985> [Short Paper, Research Track, Acceptance Rate: 27.6%]
- WWW '21**      **Linguistically-Enriched and Context-Aware Zero-shot Slot filling**  
A.B. Siddique, Fuad Jamour, and Vagelis Hristidis. 2021. Linguistically-Enriched and Context-Aware Zero-shot Slot Filling. In Proceedings of the Web Conference 2021 (WWW '21). Association for Computing Machinery, New York, NY, USA, 3279–3290. <https://doi.org/10.1145/3442381.3449870> [Full Paper, Research Track, Acceptance Rate: 20.6%]

ICSC '21	<b>Predictable and Adaptive Goal-oriented Dialog Policy Generation</b> N. Le, A.B. Siddique, F. Jamour, S. Oymak and V. Hristidis, "Predictable and Adaptive Goal-oriented Dialog Policy Generation", 2021 IEEE 15th International Conference on Semantic Computing (ICSC), 2021, pp. 40-47, DOI: <a href="https://doi.org/10.1109/ICSC50631.2021.00012">https://doi.org/10.1109/ICSC50631.2021.00012</a> [Full Paper, Research Track, Acceptance Rate: 14.9%]	BEST STUDENT PAPER
CIKM '21	<b>Beast: Scalable Exploratory Analytics on Spatio-temporal Data</b> A. Eldawy, V. Hristidis, S. Ghosh, M. Saeedan, A. Sevim, A.B. Siddique, S. Singla, G. Sivaram, T. Vu, Y. Zhang, "Beast: Scalable Exploratory Analytics on Spatio-temporal Data", In Proceedings of the 30th ACM International Conference on Information and Knowledge Management (CIKM '21), November 1–5, 2021, Virtual Event, QLD, Australia. ACM, New York, NY, USA, 12 pages. [Full Research Paper, Applied Track, Acceptance Rate: 24%]	
KDD '20	<b>Unsupervised Paraphrasing via Deep Reinforcement Learning</b> A.B. Siddique, Samet Oymak, and Vagelis Hristidis. 2020. Unsupervised Paraphrasing via Deep Reinforcement Learning. In Proceedings of the 26th ACM SIGKDD International Conference on Knowledge Discovery & Data Mining (KDD '20). Association for Computing Machinery, New York, NY, USA, 1800–1809. DOI: <a href="https://doi.org/10.1145/3394486.3403231">https://doi.org/10.1145/3394486.3403231</a> [Full Paper, Research Track, Acceptance Rate: 16.8%]	
BIGDATA '20	<b>App-Aware Response Synthesis for User Reviews</b> U. Farooq†, A.B. Siddique†, F. Jamour, Z. Zhao and V. Hristidis, "App-Aware Response Synthesis for User Reviews," 2020 IEEE International Conference on Big Data (Big Data), 2020, pp. 699-708, DOI: <a href="https://doi.org/10.1109/BigData50022.2020.9377983">https://doi.org/10.1109/BigData50022.2020.9377983</a> . (†equal contribution) [Full Paper, Research Track, Acceptance Rate: 15.5%]	
VLDB '19	<b>Comparing Synopsis Techniques for Approximate Spatial Data Analysis</b> A.B. Siddique, Ahmed Eldawy, and Vagelis Hristidis. Comparing Synopsis Techniques for Approximate Spatial Data Analysis, In Proceedings of the 45th International Conference on Very Large Data Bases (VLDB Endowment) (VLDB '19), 12(11), pages 1583 - 1596, 2019. DOI: <a href="https://doi.org/10.14778/3342263.3342635">https://doi.org/10.14778/3342263.3342635</a> [Full Paper, Research Track, Acceptance Rate: 18.9%]	
BSD '19	<b>Euler++: Improved Selectivity Estimation for Rectangular Spatial Records</b> A.B. Siddique, A. Eldawy and V. Hristidis, "Euler++: Improved Selectivity Estimation for Rectangular Spatial Records," 2019 IEEE International Conference on Big Data (Big Data), 2019, pp. 4129-4133, DOI: <a href="https://doi.org/10.1109/BigData47090.2019.9006498">https://doi.org/10.1109/BigData47090.2019.9006498</a> [Workshop Paper]	
SoCC '18	<b>Experimental evaluation of sketching techniques for big spatial data</b> A.B. Siddique, and Ahmed Eldawy. Experimental Evaluation of Sketching Techniques for Big Spatial Data, In Proceedings of the ACM Symposium on Cloud Computing (SoCC 2018), Carlsbad, CA, USA, October 11-13, October, Carlsbad, CA, pages 522. [Extended Abstract / Poster]	

## JOURNAL PUBLICATIONS

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IJSC	<b>Model-Agnostic Zero-Shot Intent Detection via Contrastive Transfer Learning</b> M.H. Maqbool, M Fereidouni, A.B. Siddique, and Hassan Foroosh, "Model-Agnostic Zero-Shot Intent Detection via Contrastive Transfer Learning", International Journal of Semantic Computing (IJSC). To appear in December 2023 (volume 15). DOI: <a href="https://doi.org/10.1142/S1793351X24410010">https://doi.org/10.1142/S1793351X24410010</a> ; [Journal Research Paper, Impact Factor: 0.8, ISSN: 1793-351X]	
IOT (ELSEVIER)	<b>A deep learning approach for intrusion detection in Internet of Things using focal loss function</b> Dina, A.S., Siddique, A.B. and Manivannan, D., 2022. "A deep learning approach for intrusion detection in Internet of Things using focal loss function". Internet of Things, Volume 22, July 2023, DOI: <a href="https://doi.org/10.1016/j.iot.2023.100699">https://doi.org/10.1016/j.iot.2023.100699</a> . [Full Research Paper, Impact Factor: 5.7]	
IEEE ACCESS	<b>Effect of Balancing Data Using Synthetic Data on the Performance of Machine Learning Classifiers for Intrusion Detection in Computer Networks</b>	

Dina, A.S., Siddique, A.B. and Manivannan, D., 2022. "Effect of Balancing Data Using Synthetic Data on the Performance of Machine Learning Classifiers for Intrusion Detection in Computer Networks". IEEE Access, 10, pp.96731-96747. [Full Research Paper, Impact Factor: 3.5]

IJSC

### Generating Predictable and Adaptive Dialog Policies in Single- and Multi-domain Goal-oriented Dialog Systems

N. Le, A.B. Siddique, F. Jamour, S. Oymak and V. Hristidis, "Generating Predictable and Adaptive Dialog Policies in Single- and Multi-domain Goal-oriented Dialog Systems", International Journal of Semantic Computing (IJSC). To appear in December 2021 (volume 15). [Journal Research Paper, Impact Score: 1.65, ISSN: 1793-351X]

## TEACHING EXPERIENCE

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[Note on the teaching experience: I have taught all these courses as an *Assistant Professor* at the University of Kentucky since 2021 and as a *Lecturer* at the University of Management & Technology (Pakistan) 2009-2017.]

2024-2025	Intermediate Topics in Database Systems	SPRING '24, SPRING '25
2023-2024	Algorithm Design	FALL '23, FALL '23
2022-2023	Special Topics in Computer Science (NLP with Deep Neural Networks)	SPRING '22, SPRING '23
2021 - 2024	Machine Learning	FALL '21, FALL '22, FALL '23, FALL '24
2015 - 2017	Advanced Web Technologies	SPRING '15, SPRING '16, SPRING '17
2015 - 2017	Big Data Programing	SPRING '15, SPRING '16, SPRING '17
2010 - 2017	Artificial Intelligence	SPRING '10, SPRING '11, SPRING '12, SPRING '15, SPRING '16, SPRING '17
2012 - 2016	Internet Applications Design and Development	FALL '12, FALL '13, FALL '14, FALL '15, FALL '16
2014 - 2016	Advanced Software Development	FALL '14, FALL '15, FALL '16
2014 - 2016	Mobile Application Development - Android	FALL '14, FALL '15, FALL '16
2013 - 2014	iPhone Applications Development	SPRING '13, SPRING '14
2013 - 2014	Web Technologies	SPRING '13, SPRING '14
2013 - 2014	Programing Fundamentals	SPRING '13, SPRING '14
2012 - 2013	Software Project Management	FALL '12, FALL '13
2012 - 2013	Testing and Quality Assurance	FALL '12, FALL '13
2010 - 2012	Object Oriented Programing	SPRING '10, SPRING '11, SPRING '12
2010 - 2012	Software Engineering	SPRING '10, SPRING '11, SPRING '12
2009 - 2011	Analysis of Algorithms	FALL '09, FALL '10, FALL '11
2009 - 2011	Data Structures and Algorithms	FALL '09, FALL '10, FALL '11
2009 - 2011	Object Oriented Design and Programing	FALL '09, FALL '10, FALL '11

## DOCTORAL STUDENTS ADVISING

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2021 -	Adib Mosharrof	PRIMARY ADVISOR
2023 -	Moghis Fereidouni	PRIMARY ADVISOR
2023 -	Muhammad Umair Haider	PRIMARY ADVISOR
2021 - 2023	Ayesha Siddiqua Dina (Graduated '23; joined Florida Polytechnic University Lakeland, FL.)	CO-ADVISOR

## AWARDS & HONORS

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2021	Graduate Fellowship worth \$7200 + Tuition fee (\$6000) awarded for dissertation year research at UC Riverside.
2021	<b>Best Student paper</b> award at IEEE International Conference on Semantic Computing (ICSC) 2021
2018 - 2020	UCR GSA Travel Grant Awards for KDD '20, EMNLP '20, Big Data '20, VLDB '19, and Big Data '19
2017 - 2018	Dean's Fellowship Award, University of California Riverside

2017 – 2021	NSF Travel Grant Awards for The WebConf 2021, ACM SoCC 2018, and ACM SIG SPATIAL 2017
2003 – 2008	University Tuition Fee Waiver for the entire undergraduate degree
2003	Gold Medal in Comprehensive National Exams among half a million students in grade 12
2003	Academic Roll of Honour for excellent performance in the annual examination

## SELECTED TALKS/GUEST LECTURES

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2025	Recommender Systems: Bridging Gaps in Data, User Behavior, and Conversations	KCS - CS, UKY
2023	<b>Keynote:</b> N-Grams to ChatGPT: A Journey Through The Evolution of Language Modeling	LCPC '23
2023	N-Grams to ChatGPT: A Journey Through The Evolution of Language Modeling	KCS - CS, UKY
2023	Toward Zero-shot Generalizable and Personalizable Task-oriented Dialog Systems	THE HOME DEPOT
2022	Personalizing Task-oriented Dialog Systems via Zero-shot Generalizable Reward Function	CIKM 2022
2022	Zero-shot Generalizable Goal-oriented Dialog Systems	UK AI MEDICINE, UKY
2022	How to crawl interactive web pages	KCS - CS, UKY
2021	Unsupervised and Zero-Shot Learning for Open-Domain Natural Language Processing	UC RIVERSIDE
2021	Zero-shot Slot Filling	UC RIVERSIDE
2021	Zero-shot Natural Language Interfaces	UNIVERSITY OF ALABAMA AT BIRMINGHAM
2021	Zero-shot Natural Language Interfaces	TEXAS STATE UNIVERSITY
2021	Zero-shot Natural Language Interfaces	UNIVERSITY OF KENTUCKY
2021	Linguistically-Enriched and Context-Aware Zero-shot Slot filling	THE WEBCONF 2021
2020	Chatbot Technologies and Challenges	UNIVERSITY OF CALIFORNIA IRVINE
2020	Unsupervised Paraphrasing via Deep Reinforcement Learning	KDD 2020
2020	App-Aware Response Synthesis for User Reviews	BIG DATA 2020
2019	Comparing Synopsis Techniques for Approximate Spatial Data Analysis	VLDB 2019
2019	Euler++: Improved Selectivity Estimation for Rectangular Spatial Records	BIG DATA 2019
2018	Experimental Evaluation of Sketching Techniques for Big Spatial Data	SoCC 2018

## SERVICE & OUTREACH

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PC	ICML '20-25, NeurIPS '21-24, ICLR '21-24, AAAI '22-25, ACL-RR '21-25, EMNLP '22-24, ACL '23-24, NAACL '24, KDD '23-24, WWW '21-24, CIKM '22-24, SIAM SDM '23, IEEE ICSC '22-25
Reviewer	ACM Transactions on the Web
SRW PC	ACL-IJCNLP '21, NAACL '21, EACL '21, ACL '20, AACL '20, ACL '19
Mentor	Diversity, Equity, and Inclusion Graduate Summit, UCR 2020
Sub-Reviewer	SIGMOD '21, SIGMOD '20, SIGMOD '19, KDD '19, ICDE '18
Volunteer	ICLR '21, ACM SIG SPATIAL '17