Shabana K M

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RESEARCH INTERESTS

Artificial Intelligence in Education, Machine Learning, Educational Data Mining

EDUCATION

Indian Institute of Technology Palakkad *July 2019 - May 2025*
Doctor of Philosophy *CGPA: 10/10*
Supervisor: Dr. Chandrashekar Lakshminarayanan (IIT Madras)
[Thesis]: *Mastering a curriculum through adaptive sequencing: AI based Models and Algorithms*

National Institute of Technology Calicut *July 2011 - June 2013*
Master of Technology, Computer Science and Engineering *CGPA: 9.73/10*
Gold Medalist

Amrita Vishwa Vidyapeetham *July 2007 - May 2011*
Bachelor of Technology, Computer Science and Engineering *CGPA: 9.8/10*
Silver Medalist

EXPERIENCE

Flytxt, Trivandrum June 2013 - December 2016
Research and Development Engineer

· Worked on projects related to customer segmentation in telecom domain and developed novel machine learning based algorithms for performing automatic intelligent grouping of subscribers. Designed interesting visualizations for leveraging value out of large structured/ unstructured data sources, which were later added to the visualization dashboard of the company's product. Presented our work in international conferences and filed patents.

PUBLICATIONS

- **Shabana, K. M.**, Lakshminarayanan, C., & Anil, J. K. (2022). CurriculumTutor: An Adaptive Algorithm for Mastering a Curriculum. In International Conference on Artificial Intelligence in Education (pp. 319-331). Cham: Springer International Publishing. [Paper] ***Won the best paper award at AIED 2022***
- **Shabana, K. M.**, & Lakshminarayanan, C. (2023). Unsupervised Concept Tagging of Mathematical Questions from Student Explanations. In International Conference on Artificial Intelligence in Education (pp. 627-638). Cham: Springer Nature Switzerland. [Paper]
- **Shabana, K. M.**, & Lakshminarayanan, C. OPT-CSEQ: Personalised sequencing of educational content using reinforcement learning. *Under review*
- **Shabana, K. M.**, Nazeer, K. A., Pradhan, M., & Palakal, M. (2015). A computational method for drug repositioning using publicly available gene expression data. BMC bioinformatics, 16(17), S5. [Paper] ***Won the best paper award at IEEE 4th International Conference on Computational Advances in Bio and Medical Sciences (ICCABS 2014)***
- **Shabana, K. M.**, & Wilson, J. (2015, May). A novel method for automatic discovery, annotation and interactive visualization of prominent clusters in mobile subscriber datasets. In 2015 IEEE 9th International Conference on Research Challenges in Information Science (RCIS) (pp. 127-132). IEEE. [Paper]
- **Shabana, K. M.**, Wilson, J., & Chaudhury, S. (2016, August). A multi-view non-parametric clustering approach to mobile subscriber segmentation. In 2016 IEEE 18th Conference on Business Informatics (CBI) (Vol. 1, pp. 173-181). IEEE. [Paper]

HONORS AND AWARDS

- Recipient of the prestigious Prime Minister's Research Fellowship (PMRF)
- Euraxess Science Slam India 2024 Finalist (Top 4)
- Second prize in the engineering sciences category of Saransh 2023 organized by Indian National Young Academy of Science (INYAS)
- Best Poster Award in the department of CSE at the Institute Research Scholars Day 2022 at IIT Palakkad
- Part of the team that finished second in the Data Challenge held as a part of CODS-COMAD 2024
- First prize winner in the First Teaching Challenge on introductory programming organized by iSIGCSE
- Winner of the TACT Grand Challenge at CTiS2022, 4th conference on Computational Thinking in Schools, organized by ACM India
- Second prize in Compute 2021 teaching challenge organized by iSIGCSE
- Software Design National Finalist at Microsoft Imagine Cup 2009
- Collaboration Award at Flytxt for demonstrating good team work towards achieving the company's objectives
- All India Rank 272 out of 136027 students in the Computer Science and Information Technology paper of the Graduate Aptitude Test in Engineering (GATE 2011)
- Ada Lovelace best outgoing girl student award for the year 2010 in Amrita School of Engineering, Kollam

PATENT

- Systems and methods for management of multi-perspective customer segments (US Patent 10,936,620, 2021) ***(First inventor)***

TEACHING EXPERIENCE

Internzone - Introduction to Machine Learning August 2021 - February 2022
IEEE Kerala Section

· Conducted weekly one-hour online sessions on basic machine learning algorithms for third and final year undergraduate engineering students from various colleges in Kerala. Designed and delivered the course content as well as prepared weekly quizzes and programming assignments. [Slides] [Recordings]

Introduction to Python programming and LaTeX March 2022 - May 2023
Government Polytechnic College, Palakkad

· Conducted weekly 1-2 hour hands-on sessions on python programming and LaTeX for final year Diploma students of the Computer Hardware Engineering department

TEACHING ASSISTANTSHIP

- *Artificial Intelligence Laboratory (2020, 2021), Data Structures and Algorithms Laboratory (2020)* and *Introduction to Artificial Intelligence (2023)*: Conducted weekly lab sessions and evaluated student submissions.
- *Game Theory and Mechanism Design (2022)*: Evaluated assignments and exam scripts.
- *Technical Writing (2023)*: Prepared the lesson plan, course materials and assignments for the sessions on Introduction to LaTeX and Beamer for first year post-graduate students in the department of CSE. Also conducted the sessions and evaluated assignments.
- *Introduction to Artificial Intelligence (2024)*: As the Head TA for the course, coordinated a team of 7 TAs in evaluating the submissions made by around 75 undergraduate students for 6 lab assignments. Also prepared the lab assignment on 'Decision Trees'.

SERVICE

- Chaired the session *Curriculum and Instruction* at the 23^{rd} International Conference on Artificial Intelligence in Education (AIED 2022)
- Chief coordinator of the Computer Science and Engineering (CSE) Research Symposium 2023, IIT Palakkad
- Department coordinator of the Institute Research Scholars Day 2022, IIT Palakkad

PROJECTS

Understanding the Indian labour market: A data-centric approach
In this project, we used the Aspiring Minds's Employability Outcomes 2015 (AMEO 2015) dataset to identify the significant factors that influence the salary and jobs offered to engineers graduating from India. Predictive modelling of salary was performed using different machine learning techniques on the data set that included both employee profiles and their employment outcomes. Decision tree analysis, feature analysis, correlation analysis and t-test were performed to identify the significant factors that influenced the annual salary offered to a candidate. Visualizations generated based on employee salary, designation and job city revealed interesting insights.*[ACM IKDD CoDS Data Challenge 2016]*

Karshik
Karshik is a small scale, service administering project. The objective of this project is to make vital statistics about crops pertaining to a certain topology, geographic location and climatic conditions available to farmers in India, so as to equip them with information for producing better yields. *[Microsoft Imagine Cup 2010]*

REFERENCES

Dr. Chandrashekar Lakshminarayanan
Assistant Professor, Department of Data Science and AI
Indian Institute of Technology Madras
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Dr. Lakshmi Narasimhan Theagarajan
Assistant Professor, Department of Electrical Engineering
Indian Institute of Technology Madras
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Dr. Abdul Nazeer K A
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National Institute of Technology Calicut
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