Dr. UDAYA KUMAR REDDY K.R.

Dean-School of Engineering
Professor, Department of Computer Sci. & Engg.
Date of Joining: 01-08-2022
Teaching Experience: 27 Years
Dayananda Sagar University
Bangalore, Karnataka, India.
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EXECUTIVE SUMMARY

A dignified academic professor with an established, an in-depth knowledge in the discipline of core Computer Science; has pioneered and launched independent research culture and programs; has a good morale standing and public record; highly interested in participating in the development of new interdisciplinary programs of study; has deep commitment to teaching; excels in research; and has established a linkage with the industry.

EDUCATION

- Doctor of Philosophy (Ph.D), Computer Science & Engineering, National Institute of Technology, Tiruchirapalli.
- Master of Engineering (M.E), Computer Science & Engineering, University Visvesvaraya College of Engineering, Bangalore University.
- Bachelor of Engineering (B.E), Computer Science & Engineering, Golden Valley Institute of Technology, K.G.F. (now Dr. T. Thimmaiah Institute of Technology), Bangalore University.
- Diploma, Computer Science Engineering, Siddaganga Polytechnic, Tumkur.

ACADEMIC EXPERIENCE (27 – YEARS) / EMPLOYMENT HISTORY

- Professor & Dean-School of Engineering, Dayananda Sagar University, August 2022 to till date.
- Vice Principal, Professor & Head, Department of Information Science & Engineering, Dayananda Sagar College of Engineering, Bangalore, August 2021 to July 2022.
- Professor & Head, Artificial Intelligence & Machine Learning, B.N.M. Institute of Technology, Bangalore, June – July 2021.
- N.M.A.M. Institute of Technology, Nitte:
  - Professor & Head, Department of Computer Science & Engineering, June 2016 – May, 2021.
  - Professor, Department of Computer Science & Engineering, August 2015 – May, 2016.
- Research Assistant, Department of Computer Science & Engineering, National Institute of Technology, Tiruchirapalli, July 2007 – July 2010.
- B.N.M. Institute of Technology, Bangalore:
  - Professor, Department of Computer Science & Engineering, August 2010 – July, 2015
  - Assistant Professor, Department of Computer Science & Engineering, February 2004 – June 2007.
- Lecturer, Department of Computer Science & Engineering, Amrita Institute of Technology & Science, Bangalore, July 2003 – February 2004.
- Lecturer, Department of Computer Science & Engineering, Dr. T. Thimmiah Institute of Technology, K.G.F. (Formerly Golden Valley Institute of Technology, K.G.F), November 1998 – June 2003.

MAJOR ACHIEVEMENTS / CONTRIBUTIONS

Sl. No.	Achievements / Contributions
1.	Member of International Advisory Committee for International Conference on Computer Vision and Machine Intelligence (CVMI), organized by IIIT Allahabad, Prayagraj, INDIA.
2.	Obtained Project Grant of 18 Lakhs on “Modernization of Internet of Things & Artificial Intelligence Research Lab”, 1-70971668711-5795381, under MODROB - Aspiring Institutions 1-2981852414.
3.	Resource Person for SWAYAM course on "Quality assurance through NAAC accreditation", organized by NITTR, Chennai.
4.	Appointed for International Universities Tie-up – More active with Ritsumeikan University, Japan. Instrumental in sending 100+ students and 20+ faculty on exchange program between NMAMIT and Ritsumeikan University for 5 years. And 80+ participants visited from Ritsumeikan University, Japan to NMAMIT, Nitte.
5.	Pioneered in making a Blueprint for developing a software called “Centralized Data Capturing System (CDCS)” for the NMAM Institute of Technology, Nitte, helpful for all accreditations and rankings.
6.	Organized and involved as a Program Chair in a truly international conference on “Artificial Intelligence & Data Engineering” during May 2019. The number of research papers received are notable at NMAMIT with 600+ research papers having an acceptance rate of 20% published in AISC proceedings by Springer, Singapore.
7.	Instrumental in developing a Strategic Plan 2018-2025 of CSE department to make the Department under top-10 in Karnataka. In

	the year 2018, the Department got the Best Institution for Computer Science published by The Knowledge Review.
8.	Instrumental in making possible for Faculty research collaborations during 2017 at Ritsumeikan University, Japan in addition to Student Exchange Program. During January – March, 2020, faculty and students have been selected for research fellowship.
9.	Selected for Start-up project competition in Daegu, South Korea during 2017 sponsored by AICTE and CCIE, Daegu.
10.	Selected for Ritsumeikan University, Japan during 2016 under SAKURA exchange program to study the research avenues and academic related matter.

OTHER SERVICES

Sl. No.	Contributions
1.	Administrative Experience: Head of the Department of Information Science & Engineering, BNMIT during August 2005 to June 2007.
2.	Coordinator for PG program of Computer Science & Engineering specialization and Department NBA Coordinator at BNMIT.
3.	Serving as Board of Examiners in Visvesvaraya Technological University.
4.	Chaired sessions at various International / National conferences.
5.	Organized Technical Seminars for students under the banner of The Association of Computer Science and Information Science. Experts are invited from top rated industries and premier institutes to upgrade the knowledge of students and staff in the current scenario technology.

6.	In-charge for conducting Infosys Campus Connect foundation program for undergraduate students.

RESEARCH INTERESTS

- Algorithms
- Artificial Intelligence
- Data Mining
- Machine Learning
- Sentiment Analysis

PUBLICATIONS SECTION

PATENT PUBLISHED

1. Aravinda C.V, Lin Meng, **Udaya Kumar Reddy K R**, Amar prabhu G, "***A Demystifying Convolutional Neural Networks using GRADCAM for Prediction of Coronavirus Disease (COVID-19) on X-RAY Images***", December 2020.

BOOK CHAPTER PUBLICATIONS

1. C.V. Aravinda, Meng Lin, Udaya Kumar Reddy K R, G. Amar Prabhu, ***"A deep learning approach for the prediction of heart attacks based on data analysis",*** Pages: 1-18, **Elsevier** Publications, Feb **2022, http://elsevier-books-eproof.tnq.co.in/ECOMPS/99d00263b2b5ac15bff9fe7982da5f66/**

2. C.V. Aravinda, Meng Lin, Udaya Kumar Reddy K R, G. Amar Prabhu, ***"Deep Learning Techniques for Data Analysis Prediction in the Prevention of***

Heart Attacks", Pages: 217-240, **Wiley** Publications, Feb **2022, https://onlinelibrary.wiley.com/doi/book/10.1002/9781119792468**

RESEARCH ARTICLE PUBLICATIONS

REFREED JOURNALS

1. Krishnaraj Bhat, **Udaya Kumar Reddy K R**, Ranjan Kumar H S, Dindayal Mahto, "A novel scheme for lossless authenticated multiple secret images sharing using polynomials and extended visual cryptography", ***IET Information Security, Wiley***, DOI: 10.1049/ise2.12001, Pages 1-10, **(2020)**, **(Q2)**.
2. Aravinda C.V, Lin Meng, **Udaya Kumar Reddy K R**, Amar prabhu G, "A Complete Methodology for Kuzushiji Historical Character Recognition using Multiple Features Approach and Deep Learning Model", ***International Journal of Advanced Computer Science and Applications***, 2020-09-01, DOI: 10.14569/ijacsa.2020.0110884 Part of ISSN: 2156-5570, Part of ISSN: 2158-107X, **(Web of Science), (2020)** **(Q4)**.
3. Aravinda C.V, Lin Meng, **Udaya Kumar Reddy K R** , Amar Prabhu G, "A Demystifying convolutional neural networks using Gradcam for prediction of covid-19 on x-ray images", Data Science for COVID-19: ***Computational Perspectives, Elsevier*** ISBN-13: 978-0128245361, ISBN-10: 0128245360", **(2021)**.
4. Aravinda C.V, Lin Meng, **Uday Kumar Reddy K R**, Amar Prabhu G," Offline Signature Recognition and Verification Using ORB Key Point Matching Techniques", ***Advances in Science, Technology and Engineering Systems Journal***, 2020-07-05, journal-article, DOI: 10.25046/aj050401,

Part of ISSN: 2415-6698, Part of ISSN: 2415-6698", **(Scopus Indexed)**, **(2020)**, **(Q3)**.

5. Minu P Abraham, **Udaya Kumar Reddy K R**, "Feature Based Sentiment Analysis of Mobile Product Reviews using Machine Learning Techniques", ***International Journal of Advanced Trends in Computer Science and Engineering***, Volume 9, No.2, Pages: 2289-2296, March- April 2020, ISSN 2278-3091, DOI:10.30534/ijatcse/2020/210922020 **(2020), (Q4)**.

6. Shwetha G.K, **Udaya Kumar Reddy K R**, "Classification of Breast Cancer in Histopathology Image using Modified Ant Lion Optimizer and Capsule Network Architecture" ***International Journal of Advanced Science and Technology***, Vol. 29, No. 7, **(2020)**, pp. 4193-4207, DOI: http://dx.doi.org/10.21786/bbrc/13.13/43 **(Q4)**.

7. Shiji Abraham, Minu P Abraham, **Udaya Kumar Reddy K. R.**, Anisha P. Rodrigues, "Aspect Based Opinion Mining on Mobile Product", ***International Journal of Innovative Technology and Exploring Engineering*** (IJITEE), Blue Eyes Intelligence Engineering & Sciences Publication, March **2020**, ISSN: 2278-3075, pp. 2026-2031, DOI: 10.35940/ijitee.E3059.039520 **(Q4)**.

8. Minu P Abraham, **Udaya Kumar Reddy K R**, "A Feature Based Opinion Mining for Product Reviews using Naive Bayes and K-Nearest Neighbour Classifiers", ***International Journal of Engineering and Advanced Technology***, ISSN: 2249-8958, (Online), Volume-8 Issue-5, June **2019**, Page No.:2795-2801, **(Q4)**.

9. Lin Meng, Dr. Aravinda C.V, **Uday Kumar Reddy K R**," Ancient Asian Character Recognition for Literature Preservation and Understanding", ***Springer Nature Switzerland AG 2018 M. Ioannides et al.***

(Eds.):EuroMed 2018, LNCS 11196, pp. 741–751, October **2018**. https://doi.org/10.1007/978-3-030-01762-0_66.

10. **K. R. Udaya Kumar Reddy**, "A Survey of All-pairs shortest-paths problem and its variants", ***Acta Univ. Sap. Informatica.*** **(Scopus Indexed)**, **2016**, 8(1): 16 – 40, **(Q3)**.
11. Jalaja G., Sajitha N., and **K.R. Udaya Kumar Reddy**, "Reviewing the Pathway of Text-Mining Approaches to Gauge the Applicability in Data Analysis", ***International J. of Comp. Appl.*****,** 125(3): 0975–8887, September **2015**.
12. **Udaya Kumar Reddy K.R.**, "A few results on Wiener index of the kth power of some specific graphs", ***Journal Sci. Research and Reports***, **2015**, 5(5): 427 – 434.
13. K. Viswanathan Iyer and **Udaya Kumar Reddy K.R.**, "Weiner index of binomial tress and Fibonacci trees", ***Int'l. J. Math. Engg. with Comp.***, 1, 27 – 34, **2010**. Available at http://arxiv.org/abs/0910.4432.
14. **Udaya Kumar Reddy K.R.** and K. Viswanathan Iyer **(2009)**, "Computing Wiener index of graphs with more than one cut-vertex" ***GAMS J. Math. and Math. Biosciences***, 2, 1 – 7.
15. **Udaya Kumar Reddy K.R.** and K. Viswanathan Iyer **(2009)**, "All-pairs Shortest-paths problem for unweighted graphs in $O(n^2 \log n)$ time" ***Int'l. J. Math. and Stat. Sciences***, 1, 14 – 20.
16. **Udaya Kumar Reddy K.R.**, "Computing average distance on strongly chordal graphs", ***National J. Tech.***, 8, 26 – 35, 2009.

INTERNATIONAL CONFERENCES

1. Divya Jennifer Dsouza, **Udaya Kumar Reddy K R**, "Anomaly Detection for Big Data Using Efficient Techniques: A Review", ***Springer Lecture Series: Advances in Artificial Intelligence and Data Engineering Singapore***, August **2020**.

2. Swathi Ananda, Daichi Kitahara, Akira Hirabayashi, **K. R. Udaya Kumar Reddy**, "Automatic Fundus Image Segmentation for Diabetic Retinopathy Diagnosis by Multiple Modified U-Nets and SegNets", Asia-Pacific Signal and Information Processing Association Annual Summit and Conference (APSIPA ASC), DOI: 10.1109/APSIPAASC47483.2019.9023290, Published in ***IEEE Xplore,*** Lanzhou, China, Electronic ISSN: 2640-0103, **2019**.

3. C.V Aravinda, **K.R. Udaya Kumara Reddy,** Lin Meng, G Amar Prabhu, "South Indian Character Recognition Using Statistical Feature Extraction and Distance Classifier", **2020** International Conference on Advanced Mechatronic Systems (ICAMechS), DOI: 10.1109/ICAMechS49982.2020.9310148, Published in ***IEEE Xplore***, Vietnam, Electronic ISSN: 2325-0690.

4. C.V Aravinda, Lin Meng, **K.R. Uday Kumar Reddy**, and Amar Prabhu, "Signature Recognition and Verification Using Multiple Classifiers Combination of Hu's and HOG Features," 2019 International Conference on Advanced Mechatronic Systems, ICAMechS, DOI: 10.1109/ICAMechS.2019.8861686, Publisher ***IEEE Xplore***, 10 October **2019**.

5. Aravinda C.V, Lin Meng, and **Uday Kumar Reddy K.R**, "An approach for signature recognition using contours based technique, 2019 International Conference on Advanced Mechatronic Systems, ICAMechS, DOI: 10.1109/ICAMechS.2019.8861516, Publisher ***IEEE Xplore***. 10 October **2019**.

6. Marwa Mohiddin and **Udaya Kumar Reddy K.R.** (2018), "Edge Enhancement of Medical Images Directly in the JPEG Compressed Domain", International Conf. Emerging Trends in Engg., 2018.
7. Pranitha, Minu P. Abraham and **Udaya Kumar Reddy K.R.** (2018), "Implicit Aspect Based Sentiment Analysis", Intl Conf. Emerging Trends in Engg., 2018.
8. Meghana H.R. and **Udaya Kumar Reddy K.R.** (2015), "Detection and Prevention in WSNs using Game Theory and Fuzzy Q-Learning", National Conf. Adv. Comp. Sci. & Engg., (NCACSE – 2015), 24 – 28, Bengaluru, India.
9. **Udaya Kumar Reddy K.R.** and Ranjana S. C. (2012), "Computing Wiener index of Fibonacci weighted trees", Int'l. Conf. on Foundations of Computer Science & Tech., (FCST – 2012), 471 – 478, Chennai, India.
10. **Udaya Kumar Reddy K.R.** (2010). Computing Wiener index of (P_n \Box P_n)^2. Int'l. Conf. on Advances in Recent Tech. Comm. Comp., (ARTCom), 85 – 88, Kottayam, India.
11. **Udaya Kumar Reddy K.R.** and K. Viswanathan Iyer (2009). All-pairs shortest-paths problem for unweighted graphs in O(n^2\log{n}) time. In Proc. WASET, Int'l. Conf. Comp. Inf. Sys. Engg., 38, 488 – 494, Penang, Malaysia.
12. **Udaya Kumar Reddy K.R.** and K. Viswanathan Iyer (2009). An optimal algorithm for computing all-pairs shortest distance problem on weighted strongly chordal graphs. In Proc., Int'l. Conf. Math. Comp. Models, 241 – 247, Coimbatore, India.

RESEARCH SCHOLARS

1. **Minu P Abraham** – Completed comprehensive viva-voce towards Ph.D.
2. **Divya Jennifer** – Completed course work towards Ph.D.
3. **Shwetha G K** - Completed course work towards Ph.D.

AREAS OF SPECIALIZATION

- Algorithms
- Artificial Intelligence
- Compilers
- Data Mining
- Machine Learning
- Natural Language Processing
- Theoretical Computer Science

HONOURS / RECOGNITIONS

1. **Member of International Advisory Committee** for International Conference on Computer Vision and Machine Intelligence (CVMI), organized by IIIT Allahabad, Prayagraj, INDIA.
2. **Organizing & Program chair** for International Conference on ***"Artificial Intelligence and Data Engineering 2019 (AIDE-19)"*** during May 23-24, 2019. The publication of conference proceedings is by Springer, Singapore.
3. **Organizing & Program chair** for International Conference on ***"Artificial Intelligence and Data Engineering 2020 (AIDE-20)"*** during Dec 22-23, 2020. The publication of conference proceedings is by Springer, Singapore.

4. **Advisory Committee member** for ***"IEEE International Conference on Distributed Computing, VLSI, Electrical Circuits and Robotics*** (2021 IEEE DISCOVER)".

5. **Reviewer** for Journal of Mathematical Imaging and Vision (https://link.springer.com/journal/10851), Springer Nature.

6. **Reviewer** for SN Applied Sciences (https://www.springer.com/engineering/journal/42452), Springer.

7. **Reviewer** for International Journal of Applied Graph Theory (http://www.ijagt.com/).

8. Selected for **Start-up project competition** in Daegu, ***South Korea*** during 2017 sponsored by ***AICTE and CCIE, Daegu***.

9. Selected for ***Ritsumeikan University, Japan*** during 2016 under SAKURA exchange program to study the research avenues and academic related matter.

10. **Life Member** of ISTE (LM 50268).

11. Involved in organizing various **International and National workshops and conferences.**

12. **Editor-in-chief** for B.N.M. Institute of Technology college magazines for two academic years 2011-2012 and 2012-2013.

VISITED ABROAD

1. Selected for **Start-up project competition** in Daegu, ***South Korea*** during 2017 ***sponsored by AICTE*** and CCIE, Daegu.

2. Selected for **Ritsumeikan University, Japan** during 2016 under SAKURA exchange program to study the ***research avenues*** and academic related matter ***sponsored by JST, Japan***.
3. Presented a paper on "*All-pairs shortest-paths problem for unweighted graphs*", International Conference on Comp. Inf. Sys. Engg., ***Penang, Malaysia***, 2009.

LIST OF CONFERENCES / SEMINARS / WORKSHOPS ATTENDED

1. Participated in ***2-weeks workshop*** during December 11–24, 2019 organized by Manipal Institute of Technology, Manipal ***sponsored by AICTE***, New Delhi.
2. Participated and ***Chaired*** a session in National Conference on Emerging Trends in Computer Science and Technology, SKIT, Bangalore, October 26, 2013.
3. Participated and ***Chaired*** a session in 4th International Conference on Signal and Image Processing (ICSIP 2012), Coimbatore, December 13-15, 2012.
4. Participated and ***Chaired*** in International Conference on Advances in Recent Tech. Comm. Comp., October 2010, Kottayam.
5. Attended Research promotion ***workshop*** on "Introduction to graph and geometric algorithms", Dept. of Mathematics, National Institute of Technology, Tiruchirappalli, and School of Technology and Computer Science, TIFR, Mumbai, January 2010.
6. Participated and ***Chaired*** in International Conference on Math. and Comp. Models. December 2009, Coimbatore.
7. Participated to present the paper on "All-pairs shortest-paths problem for unweighted graphs in $O(n^2 \log n)$ time", International Conference on Comp. Inf. Sys. Engg., Penang, Malaysia, February 2009.

8. Attended ***workshop*** on Data Mining, Dept. of Computer Applications, National Institute of Technology, Tiruchirappalli, July 2009.
9. Attended ***workshop*** on Theory of Computation, Dept. of Computer Science and Engg., National Institute of Technology, Tiruchirappalli, March 2008.
10. Attended ***workshop*** on Motivation program for success, Dept. of Computer Science and Engg., National Institute of Technology, Tiruchirappalli, February 2008.
11. Undergone training in Faculty development program organized at BNM Institute of Technology, Bangalore, 2006.
12. Attended ***Indo-Australian*** International conference on IT security (IAICITS), Dept. of Computer Science and Engg., IIT Madras, January 2006.
13. Attended ***workshop*** on Reforms in the conduct of examination process, Visvesvaraya Technological University, December 2004.

FACULTY DEVELOPMENT / INVITED TALKS

1. ***Design and Analysis of Algorithms***, 30 hours Lecture, Dept. of Computer Science and Engg., Thontadarya College of Engg., Gadag, 1999.
2. ***Finite Automata and Formal Languages***, 45 hours Lecture, Dept. of Computer Science and Engg., University Visveswaraya College of Engg., Bangalore, 2004.
3. ***Compiler Design***, 30 hours Lecture, Dept. of Computer Science and Engg., Golden Valley Institute of Technology, K.G.F., 2004.
4. ***Algorithmic aspects for special graph classes***, 2 hours Lecture, Workshop on Theory of Computation, Dept. of Computer Science and Engg., National Institute of Technology, Tiruchirappalli, 2008.

5. ***Special graph classes and Graph Mining***, 1 hour Lecture, Two weeks programme on Data Mining, Dept. of Computer Applications, National Institute of Technology, Tiruchirappalli, 2009.

Teaching cum Research Statement

1 Summary

I consider teaching in engineering gives an excellent satisfaction because it is the technology that we transfer to students and the outcome of which will enable the students to compete the real engineering problems. I strongly believe that the teaching has provided me the most rewarding professional experience. I also believe that the focus of my teaching strategies make the students to think beyond the material discussed in the class, rather than just delivering the subject in a structured manner. This will help both students and myself to enhance the quality of teaching and research activities.

2 Philosophy

My teaching philosophy is to place myself into the position of the student. It is important for me to understand how students learn, and to be aware of the possible difficulties when one is confronted with the material for the first time. My goals of teaching are based on few principles such as Encouraging Active Participation, Integrating Teaching and Research and Improving Technical Writing and Presentation Skills. In summary my teaching can be of threefold: First, the student should have learned how to solve the basic problem in question with the basic techniques taught in the course. Second, the student should have gained an overview of the subjects covered by the course. Third, the student should have

gained enough methodology to be able to learn advanced topics independently if necessary.

My role as an advisor of graduate students is to teach and mentor students. The students' success after graduation will depend in part on what I know about research, teaching, and industry. I will also advise both undergraduate and graduate students to do one or more internships in industry. The internship provides a valuable first-hand experience with applying abstract concepts to real-world problems in computer science.

3 Experience

I have had an opportunity to teach various subjects under various levels. During my PhD course, I served as a Teaching Assistant for various computer science courses including undergraduate, master and PhD level courses. I started my teaching career by taking Compiler Design subject for 8th semester students at undergraduate level in the year 1998. Most of my experiences include Theoretical Computer Science core subjects. With rich experience in these subjects I have suggested quite a few improvements on the curriculum for subjects such as Design and Analysis of Algorithms, Finite Automata and Formal Languages, Compilers, Discrete Mathematics, and so forth. Also I guided few master students for their research projects, in which they proposed their own ideas and then implemented them on the real-systems.

4 Current Research

The main thrust of my research is related to the theoretical aspects of the analysis and design of algorithms. In particular, my study focused on the problems of computing distances and shortest paths in graphs which is one of the central

problems in graph algorithms. These problems can be found in standard textbook in algorithms. This has focused excursion into graphs and algorithms has taken me into fields as diverse as transportation or communication, chemical graph theory, analysing communication networks and biological applications.

This central theme can be observed in all my published works, of modelling, analysing the mathematical structure, developing algorithms, evaluating the complexity and performance. The goal of my research is to understand the interplay between the problems and graph properties, and to identify relationships that lead to efficient algorithms. In general, my research work falls under the category of Algorithmic Graph Theory.

I am also working on frontiers of Artificial Intelligence research with Big Data and Machine Learning, i.e. datasets humans can only mine by training machines and making them perform human-like tasks. The research work on this area can be observed in all my recent published works.

5 Future Research Plans

My primary research interest will remain in theory of computing in the area of design and analysis of algorithms. Other research interests will continue to work on the research problems towards applied Machine Learning and Deep Learning techniques which seems to be interesting for next few years.

Place: Bangalore, India. **Dr. Udaya Kumar Reddy K. R.**