

CURRICULUM VITAE

PERSONAL INFORMATION

Name: Dr. Shubhangi K. Gawali

Qualification: Ph.D.

Nationality: Indian

Gender: Female

Date of Birth: 20th July 1980

Residential and Correspondence address:

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PROFESSIONAL INFORMATION

Current Employer: BITS PILANI K.K. BIRLA Goa campus, Goa, India

Designation: Assistant Professor since May 2018, Dept. of Computer Science

Teaching Experience: Teaching since Aug 2003 (18.1 years on May 2021)

Research Area: Real-Time Systems

Title of the Thesis: "Design of Energy Efficient Schedulers for Multicore Hard Real Time Systems"

Publications: 02 (International Journal), 01 (International Conference)

Project Sponsored by BITS and SRCDD under RIG and Faculty Interim scheme

Title: Design of a dynamic recommender system to make the resource access control protocols in hard real-time system energy efficient.

CAREER OBJECTIVE

Seeking a position to utilize my skills and abilities in an institution that offers challenges and professional growth while being resourceful, innovation and flexible.

PROFESSIONAL CAREER IN CHRONOLOGICAL ORDER

Employer	Position held	Date of Joining	Date of Leaving	Duration
K.C. CoE., Mumbai	Lecturer	1 st Aug 2003	10 th Jan 2004	5 months
D. J. Sanghvi CoE, Mumbai	Lecturer	6 th Jan 2004	30 th June 2004	6 months
D. J. Sanghvi CoE, Mumbai	Lecturer	28 th Jul 2004	30 th July 2010	6 years
BITS Pilani K.K. Birla Goa campus	Lecturer	2 nd Aug 2010	17 th July 2017	7 years
BITS Pilani K.K. Birla Goa campus	Visiting Faculty	25 th Jul 2017	15 th May 2018	10 months
BITS Pilani K.K. Birla Goa campus	Assistant Professor	16 th May 2018	till date	-

ACADEMIC DETAILS

Degree	Institute	University Place	Specialization	Period
Ph.D.	BITS Pilani Goa campus	BITS Pilani, Pilani	Real Time Systems	Aug 2011- Mar 2018
MTech	MPSTME	NMIMS, Mumbai	Computer Engg.	June 2006- April 2008
B.E.	S.S.Jondhale CoE	Mumbai	Computer Engg.	June 1997- Dec 2002
HSSC	S.H.Jondhale college	Maharashtra	Science	June 1996- June 1997
SSC	Manjunatha Vidhyala	Maharashtra	All	June 1994- June 1995

Areas of Interest

Systems area that includes Operating system (Non-real time, Real-time systems, Multicore/ Multiprocessor system, Distributed operating system), Database systems (Conventional system, Object-Oriented Databases, Distributed Databases).

Publications with titles of articles, names of journals and dates

1. "DPS: A Dynamic Procrastination Scheduler for Multi-core/Multi-processor Hard Real Time Systems", Shubhangi K. Gawali, Biju K. Raveendran, 3rd International conference on Control, Decision and Information Technologies (CoDIT), MALTA, pages 286–291, IEEE, 2016.
2. "DPVFS: A Dynamic Procrastination cum DVFS Scheduler for Multicore Hard Real Time Systems", Shubhangi K. Gawali, Biju K. Raveendran, International Journal of Embedded Systems (IJES), Inderscience publication, year 2019, Vol. 11 No. 4, pages 461-471.
3. "Energy Autonomy in IoT Technologies", Shubhangi K. Gawali, Mukund K. Deshmukh, 5th International Conference on Power and Energy Systems Engineering, CPESE 2018, JAPAN, Energy Procedia, year 2019, volume No. 156, pages 222-226.

Courses (UG and PG level)

Taught-

- Real Time System
- Operating System
- Advanced Operating System
- Database System
- Advance Databases
- Computer Programming (C, C++, Java)
- Object Oriented Programming
- Computer Architecture

Interest-

- Management of Information Systems and Technology
- Advance Operating system
- Distributed databases

Proficiency in programming languages and software development, analytical tools

- C, C++, Java, Verilog, LaTeX
- VxWorks, QNX, Cheddar
- Oracle 9i Structured Query Language, PL/SQL, UML
- Visual Basic 6.0.

List of UG thesis supervised

1. Steganography under the area of data security and communication networks: to hide the important message into an image for security purpose.
2. Summarization under the area of data mining to design a tool for generating the summary of given paragraph for quickly understanding the theme of the paragraph.
3. Real Time Multiprocessor scheduling algorithms.
4. Implementation and Analysis of Various CPU based Scheduling Policies in a Java Based Simulator
5. Optimization of Congestion Control: TCP/IP and Implementation in Java.
6. Development of course management tool using PHP.
7. Query Optimization by making two query trees and estimating the cost.
8. Mining sequential patterns using position coded pre-order linked Web Access Pattern Tree.
9. Recommended Systems using Collaborative Filtering and Classification Algorithms in Data Mining.
10. Implementation of Decision Trees in Data Mining.
11. Design implementation of reducing redundancies in a Search Engine.
12. Parking: A Solution using Android to the problem of finding parking spots.
13. Comparison of DVS Algorithms for Periodic Tasks.
14. Experimental study and implementation of EDF Scheduling Comparative study of EDF and RM Scheduling Policy on Multiprocessor Platform.
15. Analysis of Dynamic Voltage Scaling/ Dynamic Frequency Scaling Scheduling algorithms for periodic Real time tasks.

16. Bin packing algorithms in multiprocessor scheduling.

Practical Projects Undertook during under-graduation and post-graduation

1. Prepared Automation software for EDP (Electronic Data Processing) Department of Indian Airlines, Santacruz branch, Mumbai. Project developed in VB as Front End and Oracle as Back End. This software has automated entries and details about equipment and communication lines used by Indian Airlines and its agents. It also maintains transactions about products purchased and sold by EDP department through various agents.
2. Project in Web Usage Mining as a part M.Tech curricula. This project is to analyze web server logs and form the association rules for next web page to be visited by the user.

Important Conferences / Seminars attended

Sr.No	Year	Conference/Seminar attended	Title of paper presented (if any)
1	2018	5th International Conference on Power and Energy Systems Engineering, CPESE 2018 at Nagoya University, JAPAN.	"Energy Autonomy in IoT Technologies"
2	2016	IEEE 3rd International conference on Control Decision and Information Technologies (CoDIT) at MALTA.	"DPS: An energy efficient dynamic procrastination scheduler for multicore/ multiprocessor hard real time system"
3	2007	National Conference on Information & Communication Technology (NCICT 2007) at D. J. Sanghvi College of Engineering, Mumbai.	"Improving Query Performance in Data Warehouse"
4	2007	37th ISTE National Annual Convention 2007 at Manipal Institute of Technology, Manipal.	Paper presentation on Main theme "Excellence in Technical Education through Innovation" and under sub-theme "IT in Education"
5	2007	Attended AAYAM 2007 conference on Next-Generation Web designing and Service Level Architecture at IIT Mumbai for 3 days.	
6	2006	National Conference on Information & Communication Technology (NCICT 2006) at D. J. Sanghvi College of Engineering, Mumbai.	"Design of a tool to generate association rule for web usage mining"
7	2004	34'th Annual Convention & National-Seminar at Netaji Subhas Institute of technology at New Delhi	

Important Training/ Workshops attended

Sr.No.	Year	Training/ Workshops attended	Duration
1	2013	Workshop on Android OS on Beagle Board in May 2013 conducted by Padre Concaicao College of Engineering, Verna.	One week
2	2012	Workshop on VxWorks in Aug 2012 conducted by EEE Dept. from BITS Pilani Goa Campus.	One week
3	2008	ISTE approved STTP on Advanced Computing Techniques at DJSCOE, Mumbai from 7 th to 18 th January 2008	Two weeks
4	2006	Attended ISTE organized Short term training program on "Faculty Development Program" at DJSCOE, Mumbai from 2 nd Jan 2006 to 6 th Jan 2006	One week
5	2005	Attended ISTE approved STTP on Wireless Technologies and Networking at DJSCOE Mumbai from 5 th to 16 th Dec 2005	Two weeks

Other information

- Secured GATE Score 327 in the year 2006.
- Successfully completed Distance Education PG-level Course IT640-Modern Information Systems from IIT Bombay KRESIT from Jan 2004 to May 2004.
- Successfully completed a course on Oracle 9i from NIIT-Mumbai

Professional mission in consonance with the goals of the Institute in terms of teaching, course development, research involvement and institutional development

In today's ever evolving and rapidly developing educational scenario of technical education in India and in particular Computer engineering stream, it is very necessary for teaching fraternity to be updated and also to perceive future requirements of students. I am very keen to pursue my quest of knowledge in research field of computer engineering. This not only will keep me abreast with exhaustive knowledge but also useful to provide pragmatic, practical and theoretical requirements of my students. Many seminars and paper presentations which I made in past has inducted ever increasing passion to perform better and more effectively and at the larger platform. I am very eager to share my knowledge with my students and increase their interests in paper presentations and seminars. In recent past, I have developed content for my entire practical labs for different subjects and study materials for theory subjects. Also I prepared Online examinations for term exams. I have extended my teaching and assessing the students beyond classroom by teaching the work integrated learning programs (WILP) courses to establish relationship between educational institutes and industry. Moodle as a learning management system has greatly helped in discussing queries, doubts and sharing knowledge. I would be very happy to develop this new platform of knowledge sharing. I wish to do research in my interested area under the guidance of experts in the institute from all campuses and outside institute of equal repute working in same area and contribute my work to the society. Finally, I feel teaching and learning process is ever evolving, continuous and moves hand in hand. I am keenly interested in continuous and effective professional up gradation which will help me in training bright minds and making them more eager for new ideas, techniques and methods.

My fascination towards systems domain, especially Operating systems and Database systems motivated me to work towards doctoral studies. While exploring these domains, I came across the time critical systems which are critical from the perspective of human life, data and safety. This fascinated me to take up real-time systems as my research area. Real-time research community addresses various issues like resource constraint and time constraint scheduling with active and passive resources like processor, I/O, memory, synchronization among multiple concurrent threads or processes by maintaining tighter upper bound on WCET, criticality driven systems with hard, soft and firm deadlines etc. For highly reliable battery operated real-time systems like automotive, avionics, space vehicles, lunar rover etc. the real-time design objective is not only to meet temporal constraint but also schedulability analysis, handling the overload, energy consumption etc. Advancement in technology motivated the real-time system to move from single core to multi-core and multi-processor system. This adds opportunist to have a complex real-time system with additional challenges. Some of the major challenges include energy optimization, load balancing and resource utilization, especially with local and remote resources. This provides an option to build fault-tolerant system. This developed an interest in me to address some of these issues. With the advancement in technology, the speed of computing increased exponentially and so has the energy requirement. Such increased energy consumptions in real-time systems cause economic, ecological and technical problems leading to fatal effects. I took 'energy optimization while scheduling tasks in real-time systems with multiple cores' as the topic of my research.

My research addressed some of these challenges by providing energy efficient techniques for scheduling periodic tasks having hard deadlines on a multi-core system. I am working on real-world problems in the area of Internet of Things (IoT) and time-critical systems with the mixed workload having hard, soft and non-real time jobs together. Getting all these jobs executed with reduced energy consumption within acceptable QoS is a challenge. It is also challenging to take I/O (both preemptable and non-preemptable) into consideration for IoT systems having multi-core/ multiprocessor nodes. I plan to take up the issues like I/O, memory and energy of multi-core/multiprocessor /distributed IoT systems. My current research uses two primary methods of energy saving: Procrastination and Voltage/Frequency Scaling. I would like to explore more energy saving techniques like energy harvesting. There is a huge scope of applying these techniques in distributed systems like IoT. I am looking forward to extend my research work in this area. My main focus would be on collaborating with automotive industry and understanding their need for my research area.

I plan to develop the distributed automotive application, for instance, to manage the engine performance in terms of power and criticality. The framework designed in this research will help new researchers and industries to use these benchmark suites for experimentations.

I am always interested in sharing my knowledge and experience with the peers, undergraduate (UG), postgraduate (PG) students and research scholars. With these students, I wish to form the systems research group or enhance the existing systems group along with senior faculty member for further research and development. With this systems group, I wish to continue my research by submitting project proposals to the government funding agencies like Dept. of Science and Technology (DST) through Early Career Research Award (ECRA) scheme and industries. I also plan to apply for competitive projects like those provided under Women Scientist (WoS) schemes A and B offered by DST. I would like to be the Principal Investigator of external sponsored R&D, consultancy projects. I also seek collaborative projects across institutions of National/International repute. During my research, I had the privilege to present and publish my work in Scopus indexed conferences and journals like international IEEE conferences: CoDIT – Control, Decision and Information Technologies and IJES - International Journal of Embedded Systems, Inderscience Publications. Some of my works are under review in different stages in reputed journals like ACM TECS – Transactions on Embedded Computing Systems and ECRTS conference. ECRTS is one of the top conferences in real-time systems area. In future, I am targeting to publish my work in journals like IJES, IJET, TECS and Conferences like ECRTS, RTAS, WATERS, RTSOPS, OSPERT in the core area of Real-time systems those are indexed in SCI/SCI Expanded/Scopus. I also plan to organize conferences and workshops in the systems area which would help in exchanging ideas and expands the network for collaborative projects. The funding generated through sponsored projects, conferences and workshops would help me to build the infrastructure for Real-time systems Lab that can be introduced to UG and PG students as an elective to generate their research interest in systems area.

TEACHING PLAN

Teaching Systems related courses always fascinated me. I would like to continue teaching courses like Operating System (OS), Advanced OS (AOS), Distributed Systems (DS), Database systems, and Distributed databases for both UG as well as PG level at technical institutes of National/International repute. I would like to introduce advanced elective courses in the area of Real-time and Embedded systems like the Internet of Things (IoT), Real Time Operating Systems (RTOS) with an emphasis on time criticality, Fault-Tolerant Computing (FTC) etc. I would like to design online course contents including lecture videos, lab experiments, tutorials, assignments with worked out problems etc. for some selected courses. As a faculty in BITS, I got an opportunity to conduct computer programming course through MOOC (massive open online course). In BITS, I handled the Work Integrated Learning Program (WILP) through Webex. I would like to offer my expertise in conducting the courses remotely and making it interactive; handling the queries/doubts through forums, conducting online quizzes, viva-voce and giving online feedback through Webex. I would be interested in designing/redesigning curriculum for postgraduate and undergraduate programs emphasizing systems domain which include course structuring, syllabus designing, lab assignments and formulating the weight of evaluation components etc. I am keenly interested in writing book chapters on energy efficient scheduling for Real-Time Systems and IoT with CPU and I/O bound tasks.

I wish to design the labs and study material for some of the selected courses. The infrastructure for the proposed elective courses would be designed through the funding of sponsored projects. I would like to introduce Real Time Operating Systems like VxWorks, QNX and μ COS into these courses which will help the students to understand and design system side and application side programs for these environments. I would also like to use my experience of conducting lab exams through Moodle based Learning Management System (LMS) and Autolab. I also have the experience of managing and sharing the course material, evaluation components, maintaining student's attendance through Moodle.

I wish to establish collaboration with reputed institutes across India and abroad. I intend to organize and conduct conferences/workshops in the area of Real-Time Systems to share the innovative ideas. With my professional network, I wish to organize as well as deliver guest lectures/ keynote speeches/ invited talks/ presentations in the organization and reputed conferences/workshops. I would also like to mentor new faculty members and researchers in establishing their initial career plans.

Administrative Responsibilities

I would like to take up administrative responsibilities like Faculty In-charge of admission process, online course registration, examination duties, convocation process, time table, student activities, department webpage, course development, LMS management, preparing online lecture video assets, department head and other institutional activities like mission planning and NAAC accreditation process.

References

	Referee 1	Referee 2	Referee 3
Name	Prof. B. M. Deshpande	Prof. M. K. Deshmukh	Prof. Neena Goveas
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