CURRICULUM VITAE

Name : Dr. B B V L Deepak

Designation : Asst. Professor

Department : Department of Industrial Design

Name of Institution : National Institute of Technology, Rourkela

Email : bbv@nitrkl.ac.in; deepak.bbvl@gmail.com

Phone : 0661 246 – 2855(o), +91- 8984180965 (m)

Academic Qualifications (Graduation & onwards include GATE/NET)

Name of the examination/Degree	Subjects	Area of specialization	Name of Institute/ University	Year of passing	Percentage/ Grade
B.Tech.	Mechanical Engineering	Mechanical Engineering	J.N.T.University, Hyderabad	2004-2008	76.56/ First class with distinction
M.Tech. (With GATE)	Mechanical Engineering	Machine Design & Analysis	N.I.T. Rourkela	2008-2010	9.23 (CGPA) / 10 (Grade) / Excellent grade
Ph.D. (With GATE)	Mechanical Engineering	Robotics & Automation	N.I.T. Rourkela	2010 Oct. – 2015 Apr.	

Details of the Ph.D. Work:

Title: Design and Development of an Automated Mobile Manipulator for Industrial Applications

Guide: Dr. Dayal R. Parhi

Institute: National Institute of Technology, Rourkela

Number of Publications on Ph.D. work: 16 (journal & conference publications)

Brief Description of Ph.D. Work:

The objectives of this research work are to address novel methodologies such as modified particle swarm optimisation and artificial immune system to control mobile manipulator. The main challenge in these applications is that the robots with less prior knowledge about the environment while performing their jobs. The aim of the research work is to increase significantly the robot's mobility and manipulability functionalities while increasing its reliability and reducing its complexity and cost. The objective of the current investigation is to develop a new paradigm for the design of hybrid manipulators in order to solve foremost existing problems and overcome barriers for of mobile platforms in unfamiliar terrain applications. The idea of the design paradigm is the interchangeability of the locomotion and manipulation functions, which benefits the robot's overall operation and function.

Employment History

Period (Year)	Name of the Post as applicable	Area of specialization	Name of Institute/ University/	Number of Publications
Oct.2010- Dec.2011	Senior Research Fellow	Robotics & Automation	National Institute of Technology - Rourkela	6
Dec.2011 - Present	Asst. Professor	Robotics & Automation	National Institute of Technology - Rourkela	26

Subjects Taught

UG level – Theory

- Mechanisms and Machines
- Material Science
- Ergonomics in Design
- Industrial Robotics
- Instrumentation and Control
- Robotics and Automation
- Industrial Automation
- Computer-Aided Manufacturing

UG level – Practical

- Design Workshop - II
- Creative Automation Laboratory
- Ergonomics Simulation Laboratory
- Analysis and Simulation Laboratory
- Software Laboratory
- Industrial Design Project
- Seminar & Technical Writing

PG level – Theory

- Analysis and Design of Mechanical Systems
- Mechatronics and Mems
- CNC Systems and Programming

PG level – Practical

- Software Laboratory
- Design Practice
- Seminar & Technical Writing

Significant Projects Handled

- Design & Development of a cost effective Human powered vehicle system
- Design & Development of an Unmanned Arial System for surveillance application.
- Development of an intelligent path follower for NIT-Rourkela road map
- Development of a Posture Alert Device for the postural optimization of the Human Upper Limb

Awards & Fellowships:

- Achieved 1784 National level rank in GATE 2008 and eligible for AICTE aid.
- Received a scholarship of Rs. 2 Lakh from Rourkela Steel Plant to develop a hybrid human powered vehicle and presented it in the international Human Power Vehicle Challenge which was held at Florida (USA) in April, 2014.
- Received a scholarship of Rs. 3 Lakh from NTPC & Bhushan Steel as a financial assistance towards the travel expenses to participate in the international Human Power Vehicle Challenge which was held at Florida (USA) in April, 2014.
- Stood 1ST position in "CAD Venture" held during 6th – 9th February 2009 at NIT Rourkela in National level.
- Stood 1ST position in "MATH-O-MODEL" held during 9th – 11th October 2009 at NIT Rourkela in National level.
- Selected for Senior Research Fellowship at NIT Rourkela for the project "control of multiple mobile agents using adaptive neuro fuzzy inference system (ANFIS)"
- Acted as session chair for IEEE international conference on Control, Automation, Robotics and Embedded System held at IIITDM, Jabalpur during December 16-18, 2013.

List of Publications during the Last 5 Years

(A) PUBLISHED PAPERS

Published in International Journals:

1. **BBVL Deepak**, D R Parhi and B M V A Raju, Advance particle swarm optimization based navigational controller for mobile robot, Arabian Journal for Science and Engineering, Volume 39, no. 8, 2014, pp 6477-6487.
2. B.B. Biswal, **B.B. Deepak** and Y. Rao, Optimization of robotic assembly sequences using immune based technique, Journal of Manufacturing Technology Management, Vol. 24 No. 3, 2013, pp. 384396.
3. Elias Eliot, **B.B.V.L. Deepak**, D.R. Parhi, J. Srinivas, Design & kinematic analysis of an articulated robotic manipulator, International Journal of Mechanical and Industrial Engineering, Vol-3, Iss-1, 2013, pp. 105-108.
4. **B. B. V. L. Deepak** and Dayal Parhi, Intelligent adaptive immune-based motion planner of a mobile robot in cluttered environment, Intelligent Service Robotics, Vol. 6, No. 3, 2013, pp. 155-162. 5.
5. D.R Parhi and **BBVL Deepak**, "Path Generation of a Differential Mobile Robot using Particle Swarm Optimization", International Journal of Artificial Intelligence and Computational Research, Vol.4 No.1, pp: 7-11, 2012.
6. **BBVL Deepak** and Dayal R. Parhi, PSO Based Path Planner of an Autonomous Mobile Robot, Central European Journal of Computer Science, Vol. 2, No.2, pp. 152-168, 2012
7. Shubhasri K., D.R. Parhi, **BBVL Deepak**, Fuzzy-Neuro based Navigational Strategy for Mobile Robot, International Journal of Scientific & Engineering Research, Vol.3, No.6, pp. 1-6, 2012.
8. **BBVL Deepak**, Dayal R. Parhi and and Anand Amrit, Inverse Kinematic Models for Mobile Manipulators, Caspian Journal of Applied Sciences Research, Vol. 1, No.13, pp. 151-158, 2012.
9. D.R. Parhi, **BBVL Deepak**, D. Nayak and and A. Amrit, Forward and Inverse Kinematic Models for an Articulated Robotic Manipulator, International Journal of Artificial Intelligence and Computational Research, Vol.4 No.2, pp: 103-109, 2012.
10. **BBVL Deepak** and Dayal R Parhi, "Kinematic Model of Wheeled Mobile Robots", International Journal of Recent Trends in Engineering & Technology, Vol. 05, No. 04, pp.5-10, 2011
11. D.R Parhi and **BBVL Deepak**, "Kinematic Model of Three Wheeled Mobile Robot", Journal of Mechanical Engineering Research, Vol. 3, No.9, pp. 307-318, 2011.
12. D.R Parhi and **BBVL Deepak**, "Sugeno Fuzzy Based Navigational Controller of an Intelligent Mobile Robot", International Journal of Applied Artificial Intelligence in Engineering System, Vol. 3, No.2, pp. 103-108, 2011.
13. D.R Parhi, JC Mohanta, **BBVL Deepak** and S K Patel, "Analysis of Hybrid Genetic Technique for Navigation of Intelligent Autonomous Mobile Robots", International Journal of Applied Artificial Intelligence in Engineering System, Vol. 02, No. 02, pp 133-136, 2010.
14. D.R Parhi, JK Pothal and **BBVL Deepak**, "Navigation of Mobile Robots using Fuzzy-Ant Optimization Technique", International Journal of Applied Artificial Intelligence In Engineering System, pp 111117, 2010.

Papers Accepted For Publication

15. **BBVL Deepak** and D R Parhi, Control of an Automated Mobile Manipulator Using Artificial Immune System, journal of experimental and theoretical artificial intelligence, Taylor & Francis Publications.

Book Chapters Published:

1. Parhi, D. R., **Deepak, B. B. V. L**., Mohana, J., Ruppa, R., & Nayak, M. (2012). Immunised Navigational Controller for Mobile Robot Navigation. In Soft Computing Techniques in Vision Science (pp. 171-182). Springer Berlin Heidelberg.
2. Kumar, P. P., & **Deepak, B. B. V. L.** (2015). Design and Ergonomic Evaluation of Multipurpose Student's Bed. In ICoRD'15–Research into Design Across Boundaries Volume 1 (pp. 421-430). Springer India.

(C)Published in International Conferences:

1. **BBVL Deepak**, Dayal R Parhi, and J R Ruppa, "Immunised Navigational Controller for Mobile Robot Navigation", Proceedings of International Conference on Artificial Intelligence and Soft Computing (ICAISC 2011),Bhubaneswar, pages. 259-264.
2. J R Ruppa, DR Parhi and **BBVL Deepak**, "Ant Colony Optimization Algorithm for the Travelling Salesman Problem", Proceedings of International Conference on Artificial Intelligence and Soft Computing (ICAISC 2011), Bhubaneswar, pages. 282-285.
3. Kalpana S, **BBVL Deepak**, and Dayal R Parhi, "PSO Based Motion Planner of an Intelligent Mobile Robot", Advances in Modeling, Optimization and Computing (AMOC - 2011), IIT-Roorkee, pp. 187191.
4. Elias E., **B.B.V.L. Deepak**, D.R. Parhi, and J. Srinivas, Design & Kinematic Analysis of an Articulated Robotic Manipulator, Proceedings of International Conference on Mechanical and Industrial Engineering (ICMIE-2012), Goa, pp. 261-264.
5. **BBVL Deepak**, Dayal R Parhi, and Subhasri K. "Innate immune based path planner of an Autonomous Mobile Robot", International Conference on Modelling, Optimisation and Computing (ICMOC – 2012). NI University, ELSEVIER Procedia Engineering 38(2012), pp. 2663 – 2671.
6. **BBVL** Deepak**,** Dayal R Parhi and Devidutta N., Development of Forward and Inverse Kinematic Models for 5-Axis Articulated Manipulator, Proceedings of 4th International and 25th All India Manufacturing Technology, Design and Research (AIMTDR) Conference, jadavpur university, 2012, pp.102-106.
7. **Deepak, B.B.V.L.** and Parhi, D.R. Target seeking behaviour of an intelligent mobile robot using advanced particle swarm optimization, IEEE sponsored 2013 International Conference on Control, Automation, Robotics and Embedded Systems, DOI: 10.1109/CARE.2013.6733749, Pp: 1- 6.
8. M V A Raju Bahubalendruni, B B Biswal, and **B B V L Deepak**, Study of Optimization of Composite Structures with respect to Industrial Applications, IEEE sponsored 8th International Conference on Intelligent Systems and Control, Coimbatore. 01/2014.
9. Biranchi Narayan Panda, Bibhuti Bhusan Biswal and **B B V L Deepak**, Integrated AHP and fuzzy TOPSIS Approach for the Selection of a Rapid Prototyping Process under Multi-Criteria Perspective, 5th International & 26th All India Manufacturing Technology, Design and Research Conference (AIMTDR 2014) December 12th –14th, 2014, IIT Guwahati, pp. 246-1 to 246-6.
10. Kumar, P. P., & **Deepak, B. B. V. L.** (2015). Design and Ergonomic Evaluation of Multipurpose Student's Bed. In proceeding of International Conference on Research into Design (ICoRD'15), IISc. Bangalore, 12-14 January, 2015.

Published in National Conferences:

1. **BBVL Deepak**, N Kavi and H Bendu, "Design and Analysis of a Swing Jaw Plate of a Single Toggle Jaw Crusher", Proceedings of National Conference on Recent Advances in Fluid & Solid Mechanics (RAF&SM-2010). NIT-Rourkela, pp. 55-63.
2. **BBVL Deepak**, Alok K J and D R Parhi, "Mobile Robot Obstacle Avoidance using Particle Swarm Optimization", Proceedings of National Conference on Emerging Trends in Computing and Information Technology (NCETCIT-2011). RKGITW, Ghaziabad, pp. 40-44.
3. **BBVL Deepak**, Alok K J and D R Parhi, "Path Planning of an Autonomous Mobile Robot using Artificial Immune System", Proceedings of National Conference on Emerging Trends in Computing and Information Technology (NCETCIT-2011). RKGITW, Ghaziabad, pp. 45-48.
4. **BBVL Deepak**, A. Amrit, N. Kumar and D R Parhi, "Development of Forward Kinematic Model for an Articulated Robotic Manipulator", Proceedings of 3rd National Conference on Recent Advances in Manufacturing (RAM 2012), SVNIT, Surat, pp. 86-90.
5. **BBVL** Deepak, A. Amrit, N. Kumar and D R Parhi, "Path Generation of a Differential Mobile Robot using Fuzzy Inference System", Proceedings of 3rd National Conference on Recent Advances in Manufacturing (RAM 2012), SVNIT, Surat, pp. 86-90.

Sponsored projects:

S.No.	Title of the project	Total cost (INR)	Agency	Present status	Role (PI/CI)
1	Vision guided robotic assembly system	35,00,000	DST	Submitted the revised version of the proposal	CI

Brief description of the project

The primary objective of the work is to develop a vision system for a robotic assembly cell that can perform the desired tasks such as object identification through feature extraction/ pattern matching, locating the object in a 3-D space, locating the points for stable grasping and navigating the manipulator through the desired trajectories.

S.No.	Title of the project	Total cost (INR)	Agency	Present status	Role (PI/CI)
2	Laser Sensor Based Welding Robot System for Producing Quality Welded Joints.	49,85,000	BRNS	Submitted the revised version of the proposal	CI

Brief description of the project

This project work aims at developing a laser sensor guided robotic welding system to produce uniform weld joints. To achieve this, current investigation starts at finding the geometry of weld seam using laser sensor technology. The laser sensor picks up the joint dimensions in 3D and these dimensions are used to estimating the welding process parameters as well as creating the trajectory and speed profile of the robot.

S.No.	Title of the project	Total cost (INR)	Agency	Present status	Role (PI/CI)
2	Optimization of Material Utilization in FDM Process using CAD Automation	8,91,135	DRDO	Submitted	CI

Brief description of the project

This project work aims at developing a laser sensor guided robotic welding system to produce uniform weld joints. To achieve this, current investigation starts at finding the geometry of weld seam using laser sensor technology. The laser sensor picks up the joint dimensions in 3D and these dimensions are used to estimating the welding process parameters as well as creating the trajectory and speed profile of the robot.