

Bishal Ghosh

MECHANICAL ENGINEER · ROBOTICS RESEARCHER

4th Year B.Tech, ME, Indian Institute of Technology Ropar, Rupnagar, Punjab, India - 140001

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"If you want something, you just need to reach out and grab it."

Education

B.Tech. in Mechanical Engineering

INDIAN INSTITUTE OF TECHNOLOGY ROPAR

8.42/10

Jul. 2014 - PRESENT

XII Grade, CBSE-A.I.S.S.C.E

KENDRIYA VIDYALAYA No.1 AGRA

92.2/100

2014

X Grade, CBSE-S.S.E

KENDRIYA VIDYALAYA No.1 AGRA

10.0/10.0

2012

Patents and Conferences

Stapler device with multi-tier force multiplication mechanism for binding hard materials (Indian Patent Office)

DR. P SARKAR, B GHOSH, M SARIN, A MAMATA, D P S TOMAR

Delhi, India

Dec. 2015

- Introduced multi-tier stapling mechanism, which enhances the end load using lever and gear combination.

Work Experience

Undergraduate Research Intern, ROBITA LAB(Prof. G C Nandi)

RESEARCHER FOR <OBJECT LOCALIZATION AND GRASP PLANNING>

IIIT Allahabad, India

Jan. 2018 - May. 2018

- Objective :To detect object in monocular image and plan a grasp based on intent
- Segregated object from background using super pixel segmentation
- Created solid model from point cloud using ball pivoting algorithm
- Simulated the grasping using Gazebo simulator in ROS

AdvanceTech India Pvt. Ltd

EXOSKELETON R&D INTERN

Chandigarh, India

May. 2017 - July. 2017

- Objective :To build passive upper body exoskeleton to support senior citizen
- Performed literature survey, market survey and human body data compilation
- Designing a conceptual model of exoskeleton

Undergraduate Research Intern, PAR Lab(Prof. S K Saha)

RESEARCHER FOR <AUTOMATIC GENERATION OF CAD MODEL OF SERIAL ROBOT>

IIT Delhi, India

May. 2016 - July. 2016

- Objective :To develop an application which eases the learning process of robotics.
- Created a script to automatically generate robot CAD model from DH parameters and simulate collision detection and joint Level Jogging
- Introduced way to perform workspace analysis for all custom made robots

Academic Projects

B.Tech Thesis on "Pitch Oriented Gesture Mapping and Engagement evaluation in Human Robot Interaction"

IIT Ropar

DR. ABHINAV DHALL, DR. EKTA SINGLA

- Objective :To map robot's gesture according to it's speech while modulating it and evaluate robot's performance in social context
- Identified dominant gestures from TED talks and extracted the pose values
- Created a mapping between speech and gesture. Also performed speech attenuation based on user's identity
- Performed social survey to evaluate robot's performance

Machine Learning

IIT Ropar

DR. NARAYANAN CHATAPURAM KRISHNAN

- **Movie Success Prediction** : Implemented a neural net architecture to predict success of movie based on it's gross income. Using widely available features like genre, actors, director, setting etc. We received 69% accuracy for tmdb movie dataset
- **Behavior Cloning** : Implemented a neural net model to predict steering angle based on the captured image.
- **Optical Character Recognition** : Implemented K-means clustering and principal component analysis on MNIST dataset to recognize hand written characters
- **Movie Sentiment Analysis** : Implemented decision tree on IMDB review dataset to understand the sentiment of average reviewers about the movie

Computer Vision

IIT Ropar

DR. ABHINAV DHALL

- **Face Beautification App** : Created an android application to improve the facial texture of captured image in real time. We used pure image processing approach to increase color saturation and reduce unevenness in skin tone.
- **Auto-rickshaw detection** : Using Fast R-CNN to detect auto-rickshaw in the wild.
- **Corner and edge detector** : Implemented Canny edge detector and Harris interest point detector.
- **Collage Maker** : Created an application to decide optimal arrangement of any given set of images to make an eye catching collage.

Artificial Intelligence

IIT Ropar

DR. NARAYANAN CHATAPURAM KRISHNAN

- **The Pacman Project** : Implemented reinforcement learning for the pacman agent to find out the optimal path to goal state and the state transition rewards. Implement mini-max agent to competitively play the game. Implemented BFS and DFS on the agent to understand their effect on the agent's actions
- **Sudoku Solver** : Transformed sudoku into a CSP and used miniSAT solver to find the solution to sudoku problem.
- **Coal Block Allocation** : Implemented hill-climb algorithm to maximize the revenue while allocating the coal blocks to different firms.
- **Block world planner** : Implemented A* search and goal stack planning on robotic arm in block world to move block in desired way on the table.

Heat and Mass Transfer & Fluid Mechanics

IIT Ropar

DR. SARIT KUMAR DAS, DR. HIMANSHU TYAGI, DR. RANJAN DAS, DR. PURBARUN DHAR

- **Vaccine transportation tank** : Created a mathematical model of vaccine storage tank which can be used to transport vaccines over long distance while maintaining a specified temperature range. We mathematically proved that our design was working and stable.
- **Long Jumper's Leg Motion Study** : As part of fluid mechanics course we studied the added benefit of long jumper's leg motion after takeoff. Our study concluded that rotatory motion of the legs reduces the chances of toppling before landing on the ground.

Product Design And Realization

IIT Ropar

DR. PRABIR SARKAR

- **Variable Height Grass Cutting Mechanism** : We used reverse engineering on a grass cutter and made it height adjustable using four bar linkage and paddle based lifter to adjust the height.
- **Multi-angle foldable crutch** : We made a crutch that is universally accessible and adjustable. It can be adjusted as per the need of user. We kept the BOM as low as possible to make it universally accessible.
- **New Design Of Stapler's Mechanism** : We introduced a new stapler mechanism which maximize the force multiplication using lever system in combination with gear mechanism. We applied this project for patent with temporary ID- TEMP/E-1/38067/2015-DEL.

Extracurricular Activity

ROBOCON (International Level Robotics Competition)

IIT Ropar, India

CORE MEMBER & STUDENT HEAD IN 2017

Aug. 2016 - Mar. 2017

- Formed IIT Ropar's first ever Robocon team with 17 members.
- We created a mobile robot which could perform the tasks mentioned in the event theme.

Advitiya (Tech Fest of IIT Ropar)

IIT Ropar, India

MEMBER

Mar. 2017

- Presented a performance by humanoid Nao at the inaugural function of maiden edition of Advitiya.
- Set up a stall to provide information about work going on humanoid robotics in IIT Ropar.
- Present the work of IIT Ropar's robotics lab in front of local news channel.

Workshops (Hosted during different events across India)

India

ATTENDEE

Dec. 2014 - PRESENT

- Organized and instructed at a mini workshop aimed at spreading awareness about Nao humanoid robot and it's preliminary work around at IIT Ropar
- Attended a workshop/information session on ROBOCON organised by AKGEC Gaziabad and IIT Delhi. It included information sharing session and lab tours.
- Attended a workshop on configuring touch screen to take input for robots. It was organised by Entrench Technologies at IIT Ropar
- Attended an introductory workshop on Arduino programming organised at IIT Ropar.

Athletics (Sports team of IIT ropar)

IIT Ropar, India

MEMBER

Jul. 2014 - Mar. 2016

- Participated in Summer sports camp under the swimming event category.
- Participant in discus throw event.
- Participated in inter year sports championships.

Technical Skills

Programming Language: Proficient: C#, Java, Python | **Prior experience:** SQL, C, HTML

Software Packages: MATLAB, ROS, Solidworks, Catia, Autodesk Inventor, Abacus, OpenSim

Platforms: Linux, Windows

Courses Attended

Artificial Intelligence, Machine Learning, Computer Vision, Data Structure, Introduction to C, Introduction to Robotics, Machine Element Design, Theory Of Machines, Bio-Mechanics, Control Engineering, Laboratory Phonology, Neurolinguistics, Mathematics Laboratory, Partial Differential Equations, Ordinary Differential Equations, Advanced Calculus

Scholastic Achievements

2018	Department Rank-1 , , Among 34 students in Mechanical Engineering Department	IIT Ropar
2015	Merit Scholarship , Awarded for scoring among top 7% of 120 students.	IIT Ropar
2014	97.6 Percentile , secured in JEE-Advanced 2014(among 1.5 million candidates)	
2014	Scored 100/100 , Secured a perfect score in Informatics Practices at A.I.S.S.C.E conducted by CBSE	K.V.No1 Agra
2012&13	JMO Qualified , Selected for Regionals and Nationals in Junior Mathematics Olympiad	Agra
2012	99.8 Percentile , secured in Problem Solving Assessment conducted by CBSE	K.V No1 Agra

Honors & Awards

NATIONAL

- 2014 **Letter of Appreciation**, MHRD, Government of India
- 2014 **Certificate of Excellence**, Central Board Of Secondary Education

Recommendations

Dr. Abhinav Dhall

abhinav@iitrpr.ac.in

ASSISTANT PROFESSOR, CSE DEPARTMENT

Dec. 2016 - PRESENT

Dr. Ekta Singla

ekta@iitrpr.ac.in

ASSOCIATE PROFESSOR, HOD, ME DEPARTMENT

Dec. 2010 - PRESENT

Dr. Narayanan Chatapuram Krishnan

ASSOCIATE PROFESSOR, CSE DEPARTMENT

ckn@iitrpr.ac.in

Sep. 2014 - PRESENT