

# Nabarun Pal

Software Developer | Open Source Enthusiast | Systems Enthusiast

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Indian Institute of Technology Roorkee, Uttarakhand



## Education

- Pursuing** | 8.451, Top 5 in class, Bachelor of Technology, Final Year | Metallurgical and Materials Engineering with Minors in Computer Science, Indian Institute of Technology, Roorkee
- 2014** | 89.0, AISSCE | Central Board of Secondary Education, Lawrence and Mayo Public School, Kota
- 2012** | 10.0, AISSE | Central Board of Secondary Education, Sri Krishna Mission School, Agartala

## Internships

- May 2017** | Software Development Engineer, Rorodata Technologies, Hyderabad
- July 2017**
- > Built a universal data science platform for enabling the data scientists to deploy and scale ML applications
  - > Systemized cloud based automatic data extraction and storage from IoT devices reducing development time by 80
  - > Delivered microservices architecture for running, storing and logging scheduled jobs by users
  - > Co-authored firefly - an open source function-as-a-service framework which is used as the backend for various platforms
  - > Presented my internship projects at PyData Delhi 2017, PyCon India 2017 and FOSSASIA Summit 2018
- Python Git AWS Bootstrap Raspberry Pi
- May 2016** | Full Stack Engineer, Gurupriyam Innovations, Bengaluru
- July 2016**
- > Innovated experiential products using Leap Motion Controller and various web APIs like Twitter Stream API
  - > Built personalized software interface for a Smart Mirror module which provides relevant information to users
  - > Designed a productivity enhancement device for offices to track employee sitting time and remind them of stroll breaks
  - > Developed IoT based Water Saving Automatic Irrigation System controller using 555 timer and ESP8266
- Python Twitter API NodeJS ESP8266

## Projects

- July 2017** | Predictive Modelling of Bake Hardening in Minimal Carbon Steels | Dept. of Metallurgical and Materials Engineering, IIT Roorkee
- April 2018**
- > Developing a General Purpose Predictive Model for predicting material properties
  - > Mined experimental data points by reading through numerous papers from journals and conferences
  - > Input parameters are composition and macroscopic process parameters like Temperature and Production method of the material
  - > Highly useful in automobile industry as material testing takes a lot of time and economic inputs
- Python Scikit-learn Matplotlib Pandas
- October 2017** | Soldier Support Systems | Inter IIT Technical Meet 2018, IIT Madras
- January 2018**
- > Designed a localization system for real time position estimation of soldiers in a battlefield
  - > Developed a Raspberry Pi based Heads Up Display for displaying the information collected from other users
  - > Integrated the Health Monitoring, Localization subsystems with the Raspberry Pi based latch on device on each soldier
  - > 4th position at 6th Inter IIT Tech Meet Madras 2018 out of 23 participating teams from other IIT's
- Python PyQt ZigBee Raspberry Pi
- January 2017** | Forecasting Household Electricity Prediction and Comparison of Various Models | Dept. of Electrical Engineering, IIT Roorkee
- May 2017**
- > Formed a time series forecasting model using electricity consumption dataset to forecast household electricity usage
  - > Compared different models such as Support Vector Machines, Extreme Learning Machines, and Neural Networks
  - > The model helped to predict electrical energy demand in power grids to optimize global energy generation and storage
- Python Keras Tensorflow Matplotlib libsvm

Aug 2016 March 2017	<b>Asobi : The Landing Disc   Team Robocon IITR, IIT Roorkee</b> <ul style="list-style-type: none"> <li>&gt; Executed Frisbee Throwing Robot with two throwing mechanisms solving the problem statement of ABU Robocon 2017</li> <li>&gt; Spearheaded software systems for the whole robot including sensor units, computer vision and navigation modules</li> <li>&gt; Delivered navigational algorithms for mechatronic wheeled robots for precise odometry using Optical Flow Sensors</li> <li>&gt; Designed Python and C++ libraries to get data from generic USB Joysticks and DualShock 3 controllers using any Linux based system or Arduino</li> </ul> Python C++ OpenCV Arduino Raspberry Pi
Aug 2016 March 2017	<b>Swarm Robotics   Models and Robotics Section, IIT Roorkee</b> <ul style="list-style-type: none"> <li>&gt; Delivered 4 micro robots which could perform synchronous tasks like geometrical formations and coordinated motion</li> <li>&gt; Designed system for communication of robot coordinates from localizer module to robots using client server model</li> <li>&gt; Developed image processing algorithm for detection micro robots on the movement plane</li> </ul> Python OpenCV ESP8266
January 2017 March 2017	<b>Indoor Localization   Inter IIT Technical Meet 2017, IIT Kanpur</b> <ul style="list-style-type: none"> <li>&gt; Fabricated an Autonomous robot which can localize itself based on WiFi signals</li> <li>&gt; Developed an algorithm to calculate robot movement parameters from WiFi Received Signal Strength</li> <li>&gt; Gathered data using two Edimax WiFi modules through Unix commands running as root</li> <li>&gt; 5th position at 5th Inter IIT Tech Meet Kanpur 2017 out of 18 participating teams from other IIT's</li> </ul> Python Raspberry Pi
August 2015 March 2016	<b>Chai Yo : Clean Energy Recharging the World   Team Robocon IITR, IIT Roorkee</b> <ul style="list-style-type: none"> <li>&gt; Delivered a manual robot and an autonomous robot fulfilling the problem statement of ABU Robocon 2016</li> <li>&gt; Designed multi-layered PCB's to support Arduino, Raspberry Pi and other robot systems</li> <li>&gt; Developed autonomous navigation algorithms for control of robots using data from rotary encoders and distance sensors</li> <li>&gt; Designed a voltage indicator circuit to prevent under-voltage of Li-Po batteries</li> </ul> Eagle Embedded C Arduino Raspberry Pi
January 2016 March 2016	<b>NAINA   Models and Robotics Section, IIT Roorkee</b> <ul style="list-style-type: none"> <li>&gt; Made a Virtual Reality application in which the user held a torch drawing in air with the path visualized on a phone</li> <li>&gt; Implemented a Flask server which acted as an intermediate node for processing, storage and communication</li> <li>&gt; Used Computer Vision algorithms to measure depth and position of torch through two cameras</li> </ul> Python Flask
January 2015 March 2015	<b>Self Balancing Robot   Models and Robotics Section, IIT Roorkee</b> <ul style="list-style-type: none"> <li>&gt; Fabricated and developed robot which balanced on two wheels</li> <li>&gt; Gathered feedback from a 6-axis Inertial Measurement Unit comprising Accelerometer and Gyroscope</li> <li>&gt; Implemented Kalman filters and PID control on Arduino Uno and processed output was sent to DC Motors</li> </ul> Embedded C Arduino
January 2015 March 2015	<b>Robominton : Badminton Playing Robots   Team Robocon IITR, IIT Roorkee</b> <ul style="list-style-type: none"> <li>&gt; Fabricated differential wheeled manual robot having pick, place and throw mechanisms as a learning project</li> <li>&gt; Designed wireless serial uploader module via Bluetooth to upload algorithm code from PC to Arduino</li> </ul> Embedded C Arduino

## Minor Projects

- > **SuggestBot** | 24-hour hackathon project in Microsoft code.fun.do for students to recommend courses and books based on seniors feedback
- > **Parallelizing A\* Search Algorithm for Heuristics Based Puzzle Solving** | Operating Systems mini-project enabling better understanding of multi-threading and multi-processing in Python and JAVA
- > **Activity Survey** | Built a timing based survey software for a Doctoral project which involved taking in decisive input from users and noting the timing of the response

## Achievements

- > 1st Position out of 30 colleges in Robosapiens, Cognizance 2017
- > Best Aesthetic Robot in ABU Robocon 2016 India Leg
- > 2nd Position out of 45 colleges in Robosapiens, Cognizance 2015
- > Awarded the distinction of Dedicated Proficiency Holder for distinguished social service in NSS for the year 2014-2015
- > Recipient of Merit-cum-Means Scholarship for 4 consecutive years for outstanding academic achievement

## ⚡ Positions of Responsibility

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- August 2017** | **Undergraduate Teaching Assistant, Dept. of Mathematics | IIT Roorkee**  
**Present**
- › Taught a class of 85 undergraduate freshers Introductory Mathematics
  - › Helped the students in getting their doubts resolved
  - › Conducted special sessions before examinations for guidance
- July 2017** | **Overall Coordinator for Software Systems, Models and Robotics Section | IIT Roorkee**  
**Present**
- › Responsible for mentoring the software design of each project idea displayed in Srishti 2018
  - › Spearheaded the overhaul of the organizational structure of the group
  - › Coordinated with the Departments and Centers of Excellence for Collaborative Projects encompassing their domain and robotics
- April 2016** | **Joint Secretary, Models and Robotics Section | IIT Roorkee**  
**May 2017**
- › Responsible for maintaining a team of 133 proficiency holders of the section
  - › Ideating for project ideas in Srishti, the annual exhibition of the Hobbies Club held in the Spring semester every year
  - › Conducting and speaking on open lectures on robotics for all students in the campus
  - › Managed software systems at Team Robocon IIT Roorkee which represents the college at ABU Robocon
- April 2016** | **Web Development Head, IIT HeartBeat | IIT Roorkee**  
**May 2017**
- › Responsible for the Web Activities of the magazine and managed a team of 15 members
  - › Rolled out the magazine website using Jekyll following a static site generation architecture
- Aug 2016** | **Mentor, Student Mentorship Programme | IIT Roorkee**  
**Present**
- › Mentored a group of 7 freshers in AY 2016-2017; 6 freshers in AY 2017-2018
  - › Provided them guidance in terms of academics, extra-curricular's and life skills
- March 2016** | **Coordinator, Robosapiens, Cognizance | IIT Roorkee**
- › Organised the largest center-stage robotic event Robosapiens which was completed in 3 days with great success
  - › Brought in a participation of 54 teams comprising about 250 members and managing the event and teams successfully
- August 2014** | **Executive, National Service Scheme | IIT Roorkee**  
**May 2015**
- › Involved in the Event Management and Promotions Cell where I managed and promoted the various activities of NSS
  - › Successfully organized 2 Blood Donation Camps where approx. 1000 units of blood was collected in each event
  - › Initiated Cloth and Newspaper Collection Drives 2 times in each semester

## 📖 Skills

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- Programming Languages :** Python, C++, JavaScript(ES5, ES6), HTML, CSS, SQL, LaTeX  
**Databases :** PostgreSQL, MySql, MongoDB  
**Web Services :** Heroku, Amazon Web Services, Google Cloud Platform  
**Software Packages :** Git, Vim, Docker, Fabric, Supervisor, nginx, Sentry, Flask, Arduino IDE, GNU/Linux, Eagle  
**Additional Courses :** Udacity Mobile Web Specialist (Pursuing),

## 🗣️ Languages

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- English ● ● ● ● ●  
Bengali ● ● ● ● ●  
Hindi ● ● ● ● ●

## 👥 References

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**Dr. Sourav Das, Assistant Professor**

- 📄 Dept. of Metallurgical and Materials Engineering
- 📄 Indian Institute of Technology, Roorkee
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**Dr. Ananth Krishnamoorthy, Founder and Director**

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