Spandan Kumar Sahu

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Education

Jul 2015 - Jul 2020	**Dual Degree in Computer Science and Engineering, IIT Kharagpur** Current CGPA: 9.02 (5th semester ongoing)
Apr 2013 - Apr 2015	**Higher Secondary(CBSE), D.A.V Public School, Unit-8, Bhubaneswar** Overall score: 96.2% (PCM)
Apr 2013	**Matriculation(CBSE) from D.A.V Public School,Paradeep, Odisha** GPA: 10.0

Work Experience

Aug 2017 - present	**Student Researcher at IIT Kharagpur** Mined large data sets and extracted SCC graphs for a machine-learning based project Learning and Shaping Opinion Dynamics in Social Networks by Abir De and his adviser professor Sourangshu Bhattacharya in the the Department of Computer Science and Engineering.

May 2017 - Jul 2017	**Summer Intern (Software Developer) at Google Summer of Code 2017** Successfully completed open source contributions to CEPH under the project ceph-mgr: Smarter Reweight-by-Utilization.

- Devised algorithm to analyze uneven distribution of data in clusters of Object Storing Devices(OSDs).
- Compiled and improved upon a gradient descent algorithm to re-weight the OSDs for better distribution, resulting in improved time for completion and proximity to desired distribution.

Also made bug-solving contributions to CEPH which were not part of the project.

Mar 2016- *present*	**Head, Software Team, Swarm Robotics, IIT Kharagpur** Played key role in development of a framework for synchronized, distributed, intelligent multi-agent systems(with primitive robotics implementation).

- Integrated various state-of-art technologies like AprilTags (for detection of an agent with 3-dimensional pose and quaternion information), IgnitionTransport and BATMAN (for mesh-network generation and message routing, messages built using Google ProtoBuf).
- Developed a combination of PAXOS, RAFT and SHOUT algorithm to construct an hierarchy among homogeneous agents, and cause leader-election, partitioning and merging with controlled flow of information while providing a single-point control center for the user to interact with the entire system of agents.
- Constructed a SwarmSimulator that can be used to test various decentralized algorithms significant to the Swarm Robotics research project.

Also oversaw development of a unique variant of Artificial Potential Field (APF) algorithm for motion-planning and obstacle avoidance in a known terrain, with slightly sub-optimal path, but significantly faster running time complexity(compared to A*).

Nov 2016-Dec 2016	**Programmer, ThinkPedia, IIT Kharagpur** Developed token based session authentication and real-time chat messaging services using NodeJS and MongoDB for database, for the start-up ThinkPedia

Workshops & Hackathons

Dec 1 - Dec 8, 2016	**Image Processing Winter Workshop, IIT Kharagpur** Learned various aspects of Image Processing. As a part of final Problem Statements, implemented a simple paint application and an application to determine attendance via image feed from a door-camera.
Dec 8 - Dec 15, 2016	**Autonomous Robotics Winter Workshop, IIT Kharagpur** Learned various aspects of embedded circuitry for autonomous robots. As the final Problem Statement, implemented a two-wheeled self-balancing robot.
Oct 28 - Nov 3, 2016	**Microsoft Code.Fun.Do Online Hackathon, IIT Kharagpur** Designed an Android app named "HealthIt" that served as a managerial app for hospital staff, doctors and patients, keeping track of medical records on a cloud based server and creating a API to access the information.

Achievements

2017	3rd, Code-o-Soccer, Kshitij 2017
2015	AIR-421 (JEE Advance), AIR-679 (JEE Mains), AIR-10 (NISER)
2014	KVPY Fellowship Awardee
2011	Gold Medalist, Junior Maths Olympiad
2010	NTSE Scholarship Awardee

Computer Skills

Core	C, C++, Python, Java, Shell
Web & Mobile	Javascript, HTML, CSS, XML, Android Studio
Image Processing	CGAL(Beginner Level), OpenCV
Embedded	SPIM/MIPS, Verilog, Arduino IDE, BeagleBone, RaspberryPi Assembly Level programming, ROS
VCS	git, hg (mercurial)
Documentation	MS-Office, Markdown, ReStructured Text
Other Skills	Algorithm design, Artificial Intelligence(Beginner Level) Machine Learning, Data Analysis, Genetic Algorithms

Activities

Oct 2015 - Mar 2016	**Associate Spring Fest Memeber, Spring Fest 2016, IIT Kharagpur** Organizing team member of one of the largest social-cultural fest in India. Handled participants hospitality and conducted several events during Spring Fest 2016.
Aug 2015 - Mar 2016	**Memeber, Communique, IIT Kharagpur** Organized different events to help improve soft-skills of IIT Kharagpur's student community.
Jul 2015 - Mar 2017	**Cadet, National Cadet Corps (EME), IIT Kharagpur** As a cadet, actively participated in various training events and social activities.