Shriman Keshri

MASTER'S STUDENT · PHYSICS

NISER Bhubaneswar, India, OR 752050

shriman.keshri@niser.ac.in

Skills

Programming

1. **Python:** OpneCV (Image processing), Pandas (Data analysis)
2. **C++ :** Used on many projects (Ex. AMaR, Scorpion)
3. **Haskell:** Learned to write code that can run in multiple cores. Used in building server for NIRMAL.
4. **Clojure & LISP:** have some basic understanding but still learning.

Technical

1. **Linux :** Vim, Socket Programming, Comand line interface(Shell)
2. **OS:** I've used Windows, macOS, and GNU/Linux systems (Debian-based, Arch-based, Fedora, cent-os)
3. **Drone:** Auto navigation

Development Boards

1. **Arduino, Raspberry Pi, Nvidia Jetson Nano, ESP32 :**
   Used in most of the projects. Mentored the workshops conducted RoboTech Club NISER.

Electronics

1. **Circuit design :** PCB designing. have built the power delivery system for the rover AMaR.
2. **Basic IC :**have used them LM555, LM386, MCP4901, LM3914

Fabrication

1. **3D printing:** Filament based, Stereolithography, Slicing
2. **Hardware :** Drill, grinder cutter, and many general tools.

Projects

1. **AMaR :** Autonomous Multi-utility Rover is an affordable robotic system that can substitute human interference in potentially hazardous scenarios.

   Contribution: Responsible for the Software part. **Link:** https://www.niser.ac.in/ smishra/club/rtc/amar

2. **NIRMAL :** WiFi-enabled smart hands-free sanitiser dispenser system. Sends email alert to the operator when sanitiser level in container drops below a threshold. Powered by NodeMCU.

   Contribution: Wrote the server code that connects to sanitisers and it generates a notification email when it needs to be refiled. **Link:** http://niser.ac.in/ smishra/project/nirmal

3. **Scorpion :** A small Autonomous Multiutility Rover type bot designed to adapt to a wide array of use cases. The system is Powered by Nvidea Jetson Nano and Lidar Sensor.

   Contribution: Write an API for the rover that can be accessed through a remote computer. **Link:** https://www.niser.ac.in/ smishra/club/rtc/scorpion

4. **OMR reader :**This program reads an image of OMR sheets and generates the data of its entry. It is used to check the copies of the exam conducted by For Zariya https://github.com/shrimansoft/sciquest

   Contribution: solo project. **Link:** https://github.com/shrimansoft/sciquest

5. **Exceptional point :** Under the guidance of Dr. Kush Saha in Spring of 2021

Abstract : We studied the mathematical formulation of exceptional points in a general 2×2 non-Hermitian Hamiltonian that is a function of a complex parameter.

6. **Dynamics of Newton's and Halley's Method :** Under the guidance of Dr Ritwik Mukherjee, Dr Sayantani Bhattacharyya in Fall of 2022

Abstract : We studied the Basins of convergence by Newton's and Halley's Methods on the complex quadratic polynomial. We found that the iteration converges to the root closer to the initial choice in both methods.

7. **Convergence analysis of Newton's and Secant methods and their generalisations :** Under the guidance of Dr Ritwik Mukherjee, Dr Sayantani Bhattacharyya in Spring of 2023

Abstract : We show that the order of convergence of the secant method is the golden ratio(This is not new work). We introduced a Variant of Newton's method where instead of fitting the straight line, we fit the parabola. We analysed its convergence and its order of convergence.

Machine Learning

Reinforcement Learning

1. I have audited of reinforcement learning courses on Coursera, including reading the book "Grokking Deep Reinforcement Learning" under guidance of Dr. Subhankar Mishra as well as several papers, such as "Modularity in Reinforcement Learning via Algorithmic Independence in Credit Assignment." This has allowed me to gain a thorough understanding of the field of reinforcement learning.

Education

National Institute of Science Education and Research *Bhubaneswar, Orissa*
INTEGRATED MSC, PHYSICS *July 2018 - May 2023*
- Master's Thesis Advisor: Dr Ritwik Mukherjee and Sayantani Bhattacharyya
- CGPA : 7.75

JAWAHAR NAVODAYA VIDYALAYA *Korba, Chhattisgarh*
11TH AND 12TH GRADE *June 2015 - May 2017*
- Board of Education: CBSE
- 83.6 percent

JAWAHAR NAVODAYA VIDYALAYA *Bilaspur, Chhattisgarh*
10TH GRADE *June 2010 - May 2015*
- Board of Education: CBSE
- CGPA: 8.4

Extra Curricular and Achivements

currently	**Head of Technology RoboTech Club, Dr. Subhankar Mishra's Lab**, (School of Computer Sciences, N.I.S.E.R.)
2018-23	**DISHA Scholarship**, provided by Dept. of Atomic Energy (D.A.E.).
2019	**Former Mentor of Avanti Fellows**, J.N.V. Dhenkanel-N.I.S.E.R. Chapter
2013-14	**National Cadet Corps Certificate A**, 2-year training program under Unit 7 CG BN NCC, BILASPUR, and one winter camp under camp Commandant A K Mathur.
2010-17	**Jawahar Navodaya Vidyalaya**, 7 years of completely free education from CBSE School after clearing JNVST.

Lab Courses Taken

Fall 2019	**Basic Electronics Lab**, P242	*Electronics*
Spring 2020	**Advanced Electronics Lab** , P244	*Electronics*
Fall 2018	**PROGRAMMING AND DATA STRUCTURES LAB I**, CS141	*CS*
Spring 2019	**PROGRAMMING AND DATA STRUCTURES LAB II**, CS142	*CS*
Fall 2018	**PHYSICS LABORATORY I**, P141	*Basic Physics*
Spring 2019	**PHYSICS LABORATORY II**, P142	*Basic Physics*
Fall 2019	**GENERAL PHYSICS LAB**, P241	*Basic Physics*
Spring 2020	**MODERN PHYSICS I AND OPTICS LABORATORY**, P243	*Basic Physics*
Fall 2020	**NUCLEAR PHYSICS AND INSTRUMENTATION LAB**, P341	*Advance physics*
Fall 2020	**COMPUTATIONAL PHYSICS LAB**, P342	*Computational*
Spring 2021	**MODERN PHYSICS LAB-II**, P343	*Advance physics*
Spring 2021	**SOLID STATE PHYSICS LAB-I**, P344	*Advance physics*
Fall 2021	**SOLID STATE PHYSICS LAB-II**, P441	*Advance physics*
Fall 2021	**LASER AND SPECTROSCOPY LAB**, P442	*Advance physics*

Theroy Courses Taken

Fall 2022	**THEORY OF COMPUTATION**, CS201	*CS*
Fall 2022	**DESIGN AND ANALYSIS OF ALGORITHMS**, CS301	*CS*
Spring 2023	**APPROXIMATION ALGORITHMS**, CS458	*CS*
Fall 2019	**REAL ANALYSIS**, M201	*Mathematics*
Spring 2020	**METRIC SPACES**, M204	*Mathematics*
Fall 2020	**CALCULUS OF SEVERAL VARIABLES**, M306	*Mathematics*
Fall 2021	**TOPOLOGY**, M304	*Mathematics*
Spring 2022	**GEOMETRY OF CURVES AND SURFACES**, M310	*Mathematics*
Spring 2022	**NUMERICAL ANALYSIS**, M311	*Mathematics*
Fall 2022	**NONLINEAR ANALYSIS**, M467	*Mathematics*
Spring 2023	**ALGEBRAIC TOPOLOGY**, M404	*Mathematics*