Agni Keyoor Purani

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Education

Indian Institute of Technology Kharagpur — West Bengal, India
Integrated MSc. in Physics (Minor in Mathematics), GPA: 9.47/10.00 — 2019–2024(Expected)

Central Board of Secondary Education — India
All India Senior School Certificate Examination (Class 12), Score: 96% — 2019

Central Board of Secondary Education — India
All India Secondary School Examination (Class 10), CGPA: 10.00/10.00 — 2017

Certifications

Qiskit Global Summer School — IBM Quantum
Certificate of Excellence — August 2020

Deep Learning Specialization — deeplearnig.ai, Coursera
Consists of 5 courses which included CNNs, GAN, etc. — August 2020

Skills

- **Programming Languages:** FORTRAN 90, C, C++ (STL, OpenCV, Geant4), ROOT CERN, Octave, HTML, CSS, Arduino, LaTeX, Python (OpenCV, pandas, NumPy, SciPy, scikit-learn, flask, Matplotlib, Qiskit), OpenMPI (C++ and FORTRAN).
- **Applications and Tools:** MATLAB Simulink, SolidWorks, LTSpice, ROS, SQL, HTcondor.

Projects

- **Symmetry Methods in Physics** (Ongoing)
  Group Theory to simplify physics problems under Prof. Ananda Dasgupta, IISER Kolkata through NIUS program.
  - Finite group theory and Lie groups are studied.
  - Application of finite group theory on 2 small problems in physics (Molecular vibrations and selection rules).
- **Design Study of Scintillating Crystals as Electromagnetic Detectors using** Geant4 (2021)
  A small project under Prof. Kajari Mazumdar, TIFR Mumbai.
  - The dimensions and material of a scintillating crystal was analyzed with respect to the energy deposited in it.
  - Higher energy deposition percentage is favourable but the crystal size cannot be too big due to the effort required to make them.

  - Some techniques were discussed on how to detect particles by cleverly using the discrete size of crystals.

- **Theoretical Understanding Of Kármán Vortex Street** (2021)
  A mini-project done as a part of fluid mechanics course (PH20101)
  - Attempt was made to study and get a theoretical relationship of frequency of vortex shedding for a cylinder
  - First flow was found around the cylinder.
  - Point of separation was found.
  - Method to find the point of instability and frequency of was given.

- **Modified Linear Tangent Guidance** (2020)
  A mini-project done as a part of classical mechanics course (PH20001).
  - Found out the guidance equation of a rocket from a curved Earth.
  - Used techniques of Pontryagin's minimum principle and perturbation to get the guidance equations.
  - Used numerical techniques to simulate the guidance law in action.

- **Website for Aerial Robotics Kharagpur** (2020)
  Made a static webpage for aerial robotics kharagpur.

- **Super Resolution** (2020)
  Implementation of SRCNN using SSIM Loss to generate super resolution images.
  - SRCNN was used as the base.
  - Structural similarity Index (SSIM) was used as cost function.
  - Was done is YCbCr colour scheme.

- **ScamCanner** (2020)
  A program that takes an image and outputs a scanned like image.
  - SURF to detect features after processing so that text is not detected as a feature.
  - Uses logistic regression to classify as edges.
  - Find bounding quadrilateral and transform.
  - Local Adaptive thresholding to make it readable.

- **Russian Text Detector** (2020)
  A ROS program that takes video feed and identifies a matching Russian string using TessaractOCR.

- **Kalman Filter Implementation** (2020)
  A python script that implements Kalman filter to remove false positives and add missing data from a csv file.

Languages

- **English:** Excellent proficiency
- **Hindi:** High proficiency
- **Gujarati:** Moderate proficiency
- **German:** A1-level proficiency
- **French:** A1-level proficiency

Scholarships and Academic Awards

- NIUS Physics Camp 17.1, HBCSE (TIFR), India 2020–2021
- Inspire Fellowship, Dept. of Science & Technology, Govt. of India 2020–Current
- JEE Advanced, National Rank 5877 (among about 173,000 registered) 2019
- JEE Main, National Rank 3020 (among about 1.15 MN. registered) 2019

Extracurricular Activities

- Software Team Member, Aerial Robotics Kharagpur, IIT Kharagpur) 2020–Current
  Using deep learning, computer vision and other methods to achieve special tasks with the Drones. Also designed the website for the lab.
- Member, TeamKART, IIT Kharagpur 2019–2020
  Design and Development of new formula style cars Solidworks and worked on electronics for data acquisition.
- CTO (Part Time), Naturecraft Fashions Pvt. Ltd. 2018–Current
  Developing and maintaining E-commerce platform for the company.
- Nexus Competition held during Kshitij (Annual Technomanagement fest of IIT Kharagpur) 2020
  Awarded First place for the event. It was mainly a computer vision problem where a bot has to recognize shapes, colour and custom barcodes and take decisions accordingly.
- Inter Hall Ad Design Competition, IIT Kharagpur 2019–2020
  Awarded Second place for the topic of creating a movement for saving the environment.
- Volunteer & Unit Leader at National Service Scheme 2019–2021
  Led a unit of 40 volunteers and won the best volunteer award in the unit for the camp in December 2019.
- PowerPoint Presentation Competition, Sahodaya, Kerala, India 2017–2018
  Awarded First Prize at District level, where we had to create a presentation in one hour and present it based on the material provided.