Arya Pratap Singh

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Career Objective: Integrating Artificial Intelligence with every possible field of science, for serving the society and contributing to the scientific community.

Academic Record:

- Post-Graduation Diploma (PGD) in Remote Sensing & GIS from Indian Institute of Remote Sensing (IIRS) – Indian Space Research Organization (ISRO), Dehradun with specialization in Spatial Data Science
  Academic duration: 2021-2022
  CGPA: 8.20/10.00

- Bachelor of Technology (B.Tech.) in Computer Science from Acropolis Institute of Technology and Research (AITR), Indore affiliated to Rajiv Gandhi Proudyogiki Vishwavidyalaya (RGPV).
  Academic duration: 2017-2021
  CGPA: 7.40/10.00

- Senior Secondary School Certificate (10+2) from Silver Bells School, Gwalior affiliated to Central Board of Secondary Education with 60.8% in the year 2016.

- High School Certificate (10th) from Little Angels High School, Gwalior affiliated to Central Board of Secondary Education with 7.0 CGPA in the year 2014.

IT/ Core Skills: Python, C++, C, R, Machine Learning, Deep Learning, Parallel Computing, Supercomputing, TensorFlow, Scikit-Learn, Astropy, Matplotlib, Hyperspectral, Multispectral, SAR.

Softwares/Tools: Spyder, Jupyter Notebook, Google Colab, QGIS, ArcGIS Pro, ArcGIS, ERDAS Imagine, ENVI, SNAP, Leica Photogrammetry Suite, MS-Office Suite, Planetary Imaging Pre- Processing (PIPP), Registax, Autostakkert.

Research Experience:

- Title: ***Identification of altered minerals (Carbonates and Serpentines) on Mars using Machine Learning.***
  Supervisor: Dr. Mamta Chauhan, Scientist - 'SD', IIRS - ISRO
  Description: Identification of Carbonates and Serpentines on Mars using Deep Learning algorithms, SVM, Random Forest, XGBoost, and their comparative analysis on the basis of accuracy achieved by each algorithm.
  Organization: **Final Project Work in PGD, Remote Sensing & GIS, 2022, IIRS - ISRO, Dehradun (Completed)**

- Title: ***Identification of potential sites for groundwater recharge using Rainwater Harvesting techniques in Bhilwara district of Rajasthan using Python.***
  Description: Integration of multiple parameters that are responsible for rainwater collection in the ground (soil, lulc, slope, runoff potential, aquifer and drainage density). Further AHP was applied for finding suitable sites.
  Organization: Independent Project, July 2022 (Completed)

- Title: ***Analysis and Prediction of Solar Flares from X-ray Solar Monitor (XSM), Chandrayaan -2 data (lc and pha) using Machine Learning in Python.***
  Description: Time Series Analysis of solar flares for their prediction using the light curve (lc) data, and identification of spectral characters using Spectrum file (pha).
  Organization: Independent Project, 2022 (Ongoing)

- Title: ***Development of Parallel Computing Architecture in Python for Hyperspectral Image Pre-Processing.***
  Description: Parallelizing tasks such as Spectral Smoothing, Continuum Removal using Multithreading and Multiprocessing in Python which resulted in **2500** times faster processing speed than traditional softwares.
  Organization: Project Work in PGD, Remote Sensing & GIS, 2022, IIRS - ISRO, Dehradun

- Title: ***Detection of potential sites on the Moon for surface water - ice using temperature and reflectance measurements.***
  Description: Detection of surface water-ice on Moon using temperature (DIVINER, LRO) and normal albedo (LOLA, LRO) in python. Deduced correlation between the two, and visualized the sudden peak changes through matplotlib which indicated potential water-ice sites.
  Organization: Project Work in PGD, Remote Sensing & GIS, 2022, IIRS - ISRO, Dehradun

➢ Title: ***Detection of Lava Tubes on the Moon using CNN.***
Description: Binary CNN Classifier was trained and a sliding kernel of a specific size was rolled over the image pyramids (pyrUp & pyrDown - OpenCV) created to detect the object. Training dataset of lava tubes was manually prepared.
Organization: Project Work in PGD, Remote Sensing & GIS, 2022, IIRS - ISRO, Dehradun

➢ Title: ***Site Suitability Analysis for prospective lunar colonies.***
Description: Identification of suitable sites on the lunar poles for prospective colonization using topographic and surface characteristics.
Organization: Individual project, 2021

➢ Title: ***Air quality mapping and analysis of Delhi region using GIS tools.***
Description: Change in pollutants (Particulate Matter, Ozone(O_3), Nitrogen dioxide (NO_2), Sulphur dioxide (SO_2), Carbon Monoxide (CO)) were visualized for pre, during and post COVID in Delhi region using QGIS and ArcGIS, and hotspots were detected where systematically, air purifiers can be installed.
Organization: Project Work in PGD, Remote Sensing & GIS, 2021, IIRS - ISRO, Dehradun

Publications/Conferences:

➢ Published paper titled **Machine learning-based approach on PRISMA data for mapping Nidar ophiolites in Ladakh, India** in the peer reviewed journal **Current Science, Volume 125, Issue 8, 2023.**
Singh, Arya Pratap; Chauhan, Mamta; Sur, Koyel; Srivastava, Ananya; Chauhan, Prakash; Sharma, Richa U.

➢ Published paper titled **Lithological Mapping of Nidar Ophiolite Complex, Ladakh using High-Resolution Data and Machine learning technique,** in the peer reviewed journal **Advances in Space Research, Science Direct.**
Singh, Arya Pratap; Chauhan, Mamta; Sur, Koyel; Srivastava, Ananya; Chauhan, Prakash; Sharma, Richa U.

➢ Presented Oral paper titled, "**Machine Learning based approach to remove noise from VIRTIS data and its utilization for detection of sites of active volcanism on Venus**", at **Venus Science Conference 2022** organized by Physical Research Laboratory, Ahmedabad, in September 2022.

➢ Presented Poster titled, "**Site Suitability Analysis for prospective lunar colonies using various DEM derivatives and lava tubes identified using Machine learning**" at **53rd Lunar and Planetary Science Conference** under Planetary Exploration Activities category, organized by Lunar and Planetary Institute and NASA Johnson Space Center**,** in March 2022.

➢ Presented Poster titled, "**Site Suitability analysis for prospective landing sites near lunar poles**" at **3rd Indian Planetary Science Conference**, organized by Physical Research Laboratory, Ahmedabad, in May 2022.

Experience/Training/Internship:

➤ Organization   : KaleidEO – A Satsure Subsidiary
  Description   : **Leading** the edge computing division at KaleidEO. Leading the team for collaboration with various space agencies around the globe. Implementing high performance computing algorithms. Creating end to end data stack for processing satellite data from L0 to L4 (post processed).
  Presenting the work executed both nationally and internationally.
  Leaded the end-to-end data processing team for our successful aerial testing, testing India's highest optical resolution payload ever built (16cm).

  Duration   : **Current** (Joined – 01st Oct 2023)
  Role   : Sr. Machine Learning Engineer

➤ Organization   : KaleidEO – A Satsure Subsidiary
  Description   : Working on ML/AI based edge processing algorithms for the planned space mission named "Argus" as the core member of the team, applying parallel computing / supercomputing approaches on those algorithms to optimize them.
  Optimizing the algorithms on the hardware level, making computations faster up to 100 times, resulting in less time complexity.
  Collaborating with space agencies globally, leading the team. Demonstrated India's first edge computing execution in space, **becoming the first Indian for the same.**
  Duration   : 01st Jan – 1st Oct 2023
  Role   : Machine Learning Engineer

➤ Organization   : Satsure
Description   : Working on ML/AI based satellite remote sensing algorithms using Multispectral data to solve real business use cases. Partially working on the satellite edge computing algorithms for practical use cases and integrating them with real time data from the satellite.
Duration   : 05th Sep 2022 – 31st Dec 2022
Role   : Jr. Machine Learning Engineer

➤ Organization   : 2C Secondary Cities, Department of US Government
Description   : Worked on Open Street Maps for the betterment of Human Society
Duration   : 4 months
Role   : Volunteer, Trainer

➤ Organization   : Walkover Web Solutions
Description   : API testing through Postman
Duration   : 3 months
Role   : Technical Support Engineer

Achievements/Awards/Honors:

➢ Became the **first Indian** in the **history of Indian space ecosystem** for demonstrating successful edge computing in space. Created algorithms which are **80 times faster** than any known techniques and **reduced** the data volume by **99%** leading to faster downlinking without data loss.

➢ **Best paper presentation award** at Venus Science Conference 2022 organized by Physical Research Laboratory, Ahmedabad, in September 2022.

➢ Achieved **All India Rank – 3** in **Geo-Innovation Challenge** on **Geospatial Science and Technology in Hyperspectral Image Analysis and Applications** organized by **National Geospatial Program**, **Department of Science and Technology (DST)**, **Government of India** in collaboration with BVM Engineering & ISTAR College.

➢ Titled as the "**Most Active Youth of Gwalior "** by the Municipal Corporation of Gwalior for organizing events and solving various social problems through the N.G.O, **Beautiful Tomorrow.**

➢ Earned **Gold Medal** at the University's **Classical Music Nodals Competition** organized by RGPV, Indore.

➢ Achieved **1st position** at the **Intercollege Debate Competition** organized by AITR, Indore.

➢ Crowned as **Swaranjali - Indore** in 2019 on achieving **1st position** at the music competition - Swaranjali organized by AITR, Indore.

➢ Achieved **1st position** at **Apna Manch (Open Mic)** organized by AITR, Indore.

➢ Achieved **1st position** at **Inter College Music Competition (Beatbox)** organized by SDPS College, Indore.

Leadership/Teamwork Experience:

➢ **Leading** the edge computing division at KaleidEO. Taking end to end ownership for collaborations with various space organizations around the globe with successful executions till date.

➢ **Founder** of the N.G.O **Beautiful Tomorrow**, which aims to bring sustainable changes in the environment, provides free education to the needy, resources to calamity-stricken people etc.

➢ **Founder** of Gwalior's 1st Astronomy Club, **GWALIOR ASTRONOMY CLUB**, which aims to provide free education in terms of astronomical observation through telescope, and optical astronomical data processing, conducting workshops and organizing quizzes.

➢ **Former Head** of the **Music club** of Acropolis Institute of Technology and Research from 2019 to 2021.

➢ **Campus Director** at RGPV for **Hult Prize Foundation** affiliated to the **United Nations** in 2020 and 2021.

Hobbies/Interests: Astronomical Observations through my telescope, playing guitar, Chess, Basketball, composing music, identifying real world problems, Astrology, Theology, Reading Vedic Texts, Meditation.

Strengths: Leadership qualities, Adaptable nature, Quick Learner, Confident, Multi-tasker, Active Visionary, Problem Solving ability, Ability to work in challenging situations, Fearless.

Additional Skills:

➢ **Languages:** English (Full professional proficiency), Hindi (Full proficiency) and Sanskrit (Elementary Proficiency).

➢ **Sports**: State-level Chess player, District-level Basketball player, District-level Badminton player.

Declaration:

I would take this opportunity to thank you for going through my resume and would request you to consider me for the area suitable to my caliber in your prestigious organization. The information provided above is up-to-date and correct to the best of my knowledge.

Place: Bangalore

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