Jayachandra Ravi

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Research Scientist (GIS and Remote Sensing)

Professional Summary:

- 5 years Full-Time Doctoral Researcher at Nirma University (Thesis Finished), **Doctoral Researcher** in Geomatics (Remote Sensing of crops) (June 2018 - Jan 2024), Civil Engineering Dept.
  Institution: Institute of Technology, Nirma University, Ahmedabad, Gujarat, India
  Note: The PhD thesis is under consideration by supervisors and submitted to them by student. Rules allow to pursue job opportunities if thesis is submitted by the student. Alternately, if thesis is still not concluded, student is free to pursue job opportunities by converting into part-time.
- 1 year experience as Research Fellow at CEPT University, **Research Assistant** in Hyperspectral Remote Sensing of Urban (June 2017 – June 2018)
  Institution: CEPT University, Ahmedabad, Gujarat, India

General Description:

- Enjoy contemplating and creating new ideas or approaches to a variety of problems
- Prefer working with people or on products and services making a difference in people's lives
- Like to find solutions to help people grow and develop
- Need meaning or purpose in their work and desire to align with the institutiion's mission or values
- Experience, expertise in Mapping applications, GIS and Remote Sensing through Research activities and I am constantly looking to stay ahead in learning curve.
- Creative in solving problems and finding solutions to difficult challenges.

Motivation:

I have followed interdisciplinary approach to research studies throughout my career. I believe I do have a high spatial intelligence quotient and aptitude in geomatics/geographical science, the proof of which is 100 % marks record in national examination in social studies / geography in final year of high school. Also another evidence of aptitude in this subject is my best performance in studio and thesis during my masters in Geomatics. I have achieved country level rank of 230 in national examination in Graduate Aptitude test for Engineering. My academic background and hands-on experience in remote sensing and geospatial analysis position me well to contribute in this field.

Objective:

To conduct independent research in projects with occasional training, research meeting, dissemination activities.

To continually develop my skills and abilities to create or help create impact in my field through research.

To work on research study inception, methodology, research article manuscript writing.

To achieve remarkable research outputs and research grants.

Skills

• Spatial Analysis Techniques • Advance Remote Sensing • GIS-Customization and Code Design • GIS for Governance • GeoSpatial Modelling • Quantitative, Statistical and Analytical Tools • Digital Photogrammetry and

Terrain Modeling • Hyperspectral Remote Sensing • Crop Bio-geophysical variable retrievals • Machine Learning and Pattern Recognition theory and algorithms • Crop productivity assessment and stress detection using spectroscopy • Scientific methodology development from Remote Sensing • GIS Processing automation • Land use Land cover Dynamics and Prediction • GIS Softwares: ESRI ArcGIS Suite, QGIS, ENVI, Erdas, etc • ESRI products(Example: Web App Builder) • Algorithm development, Libraries and programming in MATLAB and Python environment • Digital Image Analysis and Processing • Web GIS and Database Server Architecture • Web Map Services, Visualization • 3D GIS and Visualization Studio • UI development (Web Applications using Django, leaflet; desktop native apps) • Front End web technologies (HTML, CSS, Javascript, Webpages like Forms) • Backend Database development – PostGIS, Postgres databases and Arcgis databases • Environmental Modelling • Cartography, Surveying, Data Management and Geo-Visualisation • Basics Water Resources Engineering • Earth Sciences basics • Basics in Civil and Environmental Engineering • Research Design and Methods • SQL

Education

PhD in Geomatics

Nirma University, Ahmedabad (Thesis submission)
Doctoral of Philosophy, Geomatics
Jun 2018 - Jan 2024 (Anticipated)
Geomatics Branch in Civil Engineering Department in Institute of Technology, Nirma University

Master of Technology in Geomatics (77.5%)

Centre for Environmental Planning and Technology (CEPT) University, Ahmedabad
Master's degree, Geomatics
Jun 2015 - May 2017 (2 years)
Geomatics Department in Faculty of Technology at CEPT University.

Bachelor of Technology in CE Engineering (71.7%)

C.M.R Technical Campus, JNTU Hyderabad, Hyderabad
2009 – 2014 (4 Years)

Intermediate (Class XI and XII) (84.5%)

Sri Chaitanya Junior College, Kukatpally, Hyderabad
Maths, Physics, Chemistry (MPC) Stream
2007 – 2009 (2 Years)

Primary, Secondary and Higher Secondary Schooling (Till Class X- 92.4%)

D.A.V Public school, Kukatpally, Hyderabad
1995 - 2007

Research Experience:

- As Doctoral Researcher at Nirma University, Doctoral Researcher in Remote Sensing Applications**,** worked on use of GIS programming of optical remote sensing data of Agriculture datasets with special emphasis on Hyperspectral data. Multiplatform, Multi-Resolution, Multi-Temporal datasets of Remote Sensing experimental datasets were used for analysis in Python and MATLAB for Geospatial retrieval of crop biophysical, biochemical, photosynthetic parameter retrieval using Machine Learning.
  Note: Data was collected using scientific instruments like Spectroradiometer, Leaf Photosynthesis and Gas exchange System and Methodology protocol was developed for processing of data. This helped in retrievals of biogeophysical variables at various resolutions of images. The photosynthetic process based indicators were used in the context of crop stress. Good publications are possible on data collected already before it can be adapted to crops in new study areas if they can be linked with EO products.

- As Junior Research Fellow at CEPT University, developed experience of geospatial programming of remote sensing data in python with special emphasis of Digital Image Classification. Analysis involved calculation of metrics of area under specific roof type using high resolution hyperspectral imagery
  Note: Experience of linking the socio-economic/demographic information from Census database to the spatial retrieval of LULC from high resolution satellite image.

  Editorial Assistance to Associate Editor to review 270 + articles in *Journal of Indian Society of Remote Sensing* related to Land use Land cover analysis, Land Surface temperature, Land ecology, Ecological services valuation.

Achievements:

- Developed Methodology and Python, MATLAB Codes for geospatial image data processing of Airborne Hyperspectral data of lands for quantification of variables using Hybrid Physical Model inversion with aid of machine learning.
- Developed Methodology and Python,MATLAB Codes for scientific processing scientific datasets retrieved various Instruments for analysis of photosynthesis parameters.
- Runner-up in 'MAPP YOUR WAY' ESRI Development competition of GIS web application named 'Recyclon' on solid waste management. Application uses ESRI Web App builder.
- Written original dataset format conversion codes in python (example: HDF5 to Geotiff format; Link: https://github.com/jayachandraravi/H5_to_geotiff_conversion.git)
- Conversion of multiple Libraries from Linux to Windows installation python packages.
- Development of scripts for Automation of tasks, framework of methodology process chains of GIS, Remote Sensing solutions.

Research Authorship and Presentation

My works:

(1) Published article in 'Advances in space research' Journal titled "*Retrieval of Crop Biophysical-Biochemical Variables from Airborne AVIRIS-NG data using Hybrid Inversion of PROSAIL-D*." (by Jayachandra Ravi, Rahul Nigam, Bimal. K. Bhattacharya, Devansh Desai, Parul Patel on Precision Agricultural Crop retrievals: biophysical, biochemical image retrievals from airborne hyperspectral remote sensing data.

(2) Presented in ISRS-ISG Symposium "*Sun Induced Fluorescence (SIF) as stress indicator in Wheat crop and its relation with key photosynthetic parameters*" with help of Space Applications Centre(ISRO) ,Anand Agricultural University and National Institute of Abiotic Stress Management by Jayachandra Ravi, Rahul Nigam, Vinay Hegde, Jagdish Rane, Devansh Desai, Bimal K. Bhattacharya, Parul R. Patel

(3) Presented a poster at ISRS-ISG Symposium on "*Hyperspectral Image classification and un-mixing of classes from AVIRISNG image*" by Jayachandra Ravi and Prof. Anjana Vyas.

(4) Communicated Journal article submitted to 'Computers and Electronics in Agriculture' journal with title "*Hybrid Supervised Machine Learning Approach for a Spectral Index based Pest Infestation Detection*" (Authors: Jayachandra Ravi, Dr.Rahul Nigam, Radhakrushna Senapati, Dr. Mahapatra, Dr. Bimal K. Bhattachary, Dr. Parul Patel) with collaboration of ISRO and National Rice Research Institute.

(5) Presented Conference paper for NS-ARS21 - National Symposium on Advances in Remote Sensing: Trends, Challenges and opportunities for development titled "*Preliminary assessment on retrieval of Sun-Induced Fluorescence using SCOPE model from ground observations"* (Authors: Dr. Rahul Nigam, Jayachandra Ravi, Dr.BK Bhattacharya, Devansh Desai, Dr. Parul Patel).

(6) IEEE INGARSS Publication titled "*Effect of Diurnal and Angular Thermal infrared measurements on field-scale evapotranspiration*" in IEEE INGARSS. (Authors: Dr.Rahul Nigam, Devansh Desai, Dr.BK Bhattacharya, Jayachandra Ravi, Dr. Parul Patel).

(7) Communicated Journal Article titled "Study of Water Stress Induced effects on Chlorophyll Fluorescence Spectra in Wheat Crop using FLUSPECT-CX Radiative Transfer Model" by Jayachandra Ravi, Rahul Nigam, Vinay Hegde, Jagdish Rane, Bimal. K. Bhattacharya, Parul Patel.

(8) Other upcoming publications include Crop Fluorescence, photosynthesis parameters retrieval under conditions of stress and from different remote sensing datasets.

Other Interests:

(1) Crop acreage, health, flood/Inundation, Crop disease, Yield estimation/forecasting, drone, Weather and other environmental parameters

Memberships in professional associations:

Life member of Indian Society of Remote Sensing (ISRS), Indian Society of Geomatics (ISG)

Honors & Awards

- **Certificate of Merit and Academic Excellence - Central Board of Secondary Education**
  Jul 2007
  Recognized as one of 0.1 percent India's most successful candidates in Board Exams
- **All India Rank of 230 in prestigious GATE (Graduate Aptitude Test in Engineering)** - Indian Institute of Technology, Kharagpur
  Mar 2022
- **All India Rank 4 in KIIT Engineering Entrance Exam** - KIIIT
  Apr 2014
- **Award of Best Performance in Studio Work in Master's Program**- CEPT University
  Jan 2017
- **Best Thesis Award in Master's Program** - CEPT University
  Jan 2018
  Awarded for Best Thesis in Masters degree

References:

Prof. Anjana Vyas (Ex. Dean FT, Ex. Program Chair Geomatics, CEPT University, Ahmedabad)
Relationship: Professor, Mentor and Guide for Master's Thesis and continues to be a motivator
Email: anjanavyas@yahoo.com Mobile: +91-9825522844

Dr. Bimal Bhattacharya (Group Director, EPSA, Space Applications Center, ISRO, Ahmedabad)
Relationship: Mentor and Research Advisory Committee member
Email: bimal.vegetation@gmail.com Mobile: +91-9427521076

Dr. Rahul Nigam (Senior Scientist, EPSA, Space Applications Center, ISRO, Ahmedabad)
Relationship: External Guide, Mentor and Research Advisory Committee member
Email: rahul.agmet@gmail.com Mobile:+91-7984410983

Dr.Shiv Mohan (Retd. Senior Scientist, Physical Research Laboratory, Ahmedabad)
Relationship: Mentor and Research Advisory Committee member
Email: shivmohan.isro@gmail.com Mobile: +91-9712128524

Dr.Parul Patel (Professor, Nirma University, Ahmedabad)
Relationship: Research Supervisor, Nirma University
Email: parul.patel@nirmauni.ac.in Mobile: +91-7573969657

Strengths: Deep sense of empathy and understanding, emotional intelligence, patience, long-term goal, perseverance, problem solving, ethical discipline.

Motivation:

I have followed interdisciplinary approach to research studies throughout my career. I believe I do have a high spatial intelligence quotient, the proof of which is 100 % marks record in national examination in social studies / geography in final year of high school. Also another evidence of aptitude in this subject is my best performance in studio and thesis during my masters in Geomatics. I have achieved country level rank of 230 in national examination

in Graduate Aptitude test for Engineering. My academic background and hands-on experience in remote sensing and geospatial analysis position me well to contribute in this field.