



Raj Mukta Sundaram, Ph.D

Geospatial Data Scientist,
Location Intelligence Expert

Education

Ph.D. 1999
M.Tech 1991
IIT Roorkee, India

Fellowship

Senior Research Fellowship
Council of Scientific and Industrial Research
(CSIR), Govt. of India

Technical Highlights

Spatial Data Handling

FME Workbench
ArcGIS Enterprise Versioning
Vector & Raster datasets
Real-time Mobility data
NetCDF, JSON, XML

GIS Analysis

Transportation network analysis
Utility Network Analysis
Multi-dimensional data analysis
Multi-Spectral Image analytics
Radar image analysis
Location-intelligence
Market research analysis

Programming

Python, ArcPy
REST API, WMS/WFS
PL/SQL Coding
Linux / Batch scripting

Database

Oracle Spatial
MS SQL Server
PostgreSQL
MySQL

GIS Applications

ArcGIS Online
ArcGIS Experience Builder
ArcGIS Pro, QGIS/GRASS

Professional Summary

Adept at leveraging spatial technologies for curating and analyzing datasets to transform business processes. Some of the major skills from current and past experiences are:

Business Transformation

- **Advisor** to developing CityGML, Enterprise GIS Data models for smart city applications.
- **Geospatial Data Governance:** Technical expert for formulating geospatial policies, roadmap and guidelines, developing enterprise GIS data models for Smart City applications.
- **Technical expert:** Acted as principal geospatial expert for assessing existing infrastructure (roads & sewer) and buildings data sets and spearheading the re-engineering of data models.
 - **Led analyst** for transforming of infrastructure geospatial data for resilience and high performance.
 - **Developed** Multi-modal Transport Network Data for planning and optimizing public transport systems.
 - **Transformed** road network data from conventional 2D to 4.5 Dimensional dataset.
 - **Implemented Linear Referencing** and dynamic segmentation for assets and events management.
- **Business Solution Architect:** Performed Critical-analysis of engineering business processes and **Conceptualized, designed and developed applications** for the entire spectrum core business processes.

Business Solutions

- **Advanced Image Analytics:** Processed MultiSpectral Sentinel images to detect potentially water abusing farms through multi-temporal analytics.
- Conceptualized solution to **re-route fuel truck paths**, avoiding access to tunnels.
- **Drone/LiDAR Analytics:** Developed Python script for innovative data processing pipeline to extract infrastructure assets, change detection, BoQ assessment, including:
 - Provided strategic support during **FIFA World Cup 2024** to engineers for flood risk mitigation using LiDAR data analysis.
- **Groundwater Voxel modeling:** Transformed daily groundwater fluctuations data in text format, through ArcGIS Voxel modeling to gain better insights into patterns and predictive analysis.

Academic Work

- **PhD & MS Supervisor:** Advised student from University of Portsmouth, on leveraging spatial analytics for heritage conservation in Bahrain.
- **Market Research Analysis:** Performed spatial analytics to determine locations for new stores and identify underperforming stores, leveraging trade zone cannibalization, 3D visibility assessment, and location-allocation analysis for ideal store placement.

Application Development

- Customize ArcGIS Experience Builder using SDK
- Adept at application development leveraging Python, PL/SQL, NodeJS, Angular JS, Php.
- **Cloud infrastructure:** Adept at AWS Lambda and API Gateway development and configuration.

CURRENT ENGAGEMENT

Geospatial Data Scientist

Aug-2023 - Till Date

Consultant

- Advisor for LiDAR survey and analytics to support expansion of energy infrastructure.
- Designed **Enterprise GIS Data Model** and **Data Governance** Framework for the development of Smart City in Middle East, leading assessment of existing spatial datasets, conducting comprehensive gap analysis, and designing a fit-for-purpose enterprise GIS data model to support smart city initiatives.
- Performed **Big Data analytics** by developing data processing pipeline to perform **spatial analysis of mobility data** for location based insights into peoples movements, temporal patterns around hotspots.
- Performed **multispectral and radar image analytics** for water abuse detection.
- Conducted **knowledge sharing** and training sessions on fundamentals and advanced applications of spatial technologies, analytics, satellite images, processing and interpretations.

Technology Awareness



AWS Lambda, EC2, RDS
API Gateway, Route 53



Apache, IIS,
Linux, Windows, MacOS



Oracle, MSSQL, MySQL,
PostgreSQL



Power BI, Tableau,
MS Teams



FME Desktop, Server
ArcGIS Enterprise/Online
GeoServer,
ERDAS
AutoCAD

Conference & Awards

Presented

Best GIS Organization award
in State of Qatar, 2022.

Best GIS Organization award
in State of Qatar, 2019.

E-content award, 2005 for
www.bahrainexplorer.com.

Best Map Award, 1997,
GIS Conference, Doha, Qatar.

Certification

FME Advanced
IBM Data Science
ESRI Spatial Data Science

Recommendations on LinkedIn

<https://www.linkedin.com/in/raj-mukta-sundaram-4906a61a/>

EMPLOYMENT HISTORY

Geospatial Innovation - Team Lead

2020 - July-2023

Public Works Authority, Qatar

- **Developed Geostatistical workflow to extract road assets from LiDAR data** automatically.
- **Expedited** sewer design process for preventing flooding hazard around FIFA Stadiums using LiDAR / Drone data processing and hydrological modeling.
- **Transformed** enterprise-GIS to multi-dimensional data structure; Linear Referencing system for efficient roads assets management.
- Developed **first e-governmental** street occupancy permit system, in 2007, to expedite review processing by utility agencies and minimize traffic disruptions.
- **Enhanced** project performance through ArcGIS Portal Dashboards.
- Transformed daily groundwater fluctuation using 3D Voxel modeling.
- **Advised** management of using - LiDAR and Drone surveying for:
 - Sewer network monitoring and capacity planning
 - Treated sewer alignment for irrigation supply to increase green cover.
 - Roads Assets Inspections, monitoring and anomaly detections
- **Mentoring** technical professionals on applications of geospatial technologies.
- **Enhanced project closure process by over 500%** by digitalizing document submission, review and approval through web-based end-to-end solution.
- **Reduced house connection manual process by 90%** by eliminating manual data entry, field verification and approvals using web-based solution.
- **Designed multi-modal Transportation Network** for Qatar.
- **Mentoring** technical professionals, and new recruits.
- Developed **VIP route planing** solution using ArcGIS Portal and Mobile apps ; empowering decision makers for efficient crew management & traffic monitoring.

GIS Analyst

2000 - 2006

Information & eGovernment Authority (formerly: Bahrain Center for Studies & Research), Bahrain

- **Performed Analysis** for prospecting new Pizza hut Stores through spatial & network analysis.
- **Created** GIS based voter navigation system for the first elections in 2002.
- **Developed** Location Based Web-Service server-side code for Vodafone.
- **Technical advisor** for developing web-based petroleum facility monitoring and decision making leveraging ArcIMS technology.

GIS Technologist

1996 - 2000

Center for GIS / Kahramaa, Qatar

- **Developed desktop application to manage** water networks GIS data.
- **Automated** data entry, topological checks and quality assurance using AML programming.
- **Performed** database tuning, administration and maintenance.
- Created AutoLISP and ArcInfo routines for importing CAD data into GIS databases.

PhD Advisor

2005 - 2009

University of Portsmouth, UK

- Advised PhD student to revive and revitalize historical quarters of Bahrain to attract tourism. Developed spatial database for the study area, generated analytical maps and performed critical analysis to unveil obliterated historical facts due to urbanization. Resulting work lead to restoring old bazar and several historical buildings which are now contesting for UNESCO heritage site.

Dr. Raj Mukta Sundaram

Email: rsundaram68@gmail.com