JAMES SCOTT CARDINAL

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Accomplished data scientist with 20+ years' experience as a research analyst and project manager. Specialized in innovative data analytics for geospatial, classification, and clustering problems in the social sciences. Expert in converting complex, unstructured data into compelling narratives and effectively communicating findings to diverse stakeholders.

KEY ACHIEVEMENTS

- Pioneered GIS implementation, leading the successful integration of geographic information systems (GIS) as a standard departmental procedure and significantly reducing analysis and reporting times by up to 80%.
- Implemented advanced data analytics, minimizing subjectivity in qualitative assessments and enhancing stakeholder adoption of recommendations for informed decision-making.
- Instituted comprehensive data management and governance plans, successfully normalizing and integrating research assets for field data, collections records, and analytics.
- Authored 50+ research reports, documenting identification, analysis, and mitigation recommendations for 20+ archaeological sites eligible for the National Register of Historic Places.

PROFESSIONAL EXPERIENCE

Sr. Project Manager, Museum Scientist   **2008-Present**
Cultural Resource Survey Program, New York State Museum, Albany NY
Subject matter expert and regulatory compliance consultant on State and Federal cultural resources and heritage management. Lead projects to evaluate project risks to significant resources and recommend mitigations strategies to interagency clients.

- Derived quantitative methods for evaluating resource integrity and significance, minimizing subjectivity in resource assessments and recommendations.
- Established analytics pipelines to combine spatial and tabular data for exploratory data analysis, descriptive analytics, and statistical inference to improve data processing and streamlining analytical workflows.
- Initiated data governance pilot program for curation of in-house data archives for ongoing research priorities, improving standardization and data accessibility.

Assoc. Project Manager, Education Program Assistant   **2004-2008**
Cultural Resource Survey Program, New York State Museum, Albany NY
Devised and executed research strategies for identifying culturally significant resources, evaluating project risks, and assessing potential impacts. Provided expert recommendations on effective mitigation strategies to inter-agency and public stakeholders.

- Designed method of using spatial correlation with divisive analysis of variance for feature clustering analysis, providing robust measures for identifying significant clusters.
- Formulated spatial autocorrelation methods for determining significant resource boundaries under noisy conditions, improving objectivity and accuracy of resource identification.

Project Manager, Education Specialist   **1999-2004**
Cultural Resource Survey Program, New York State Museum, Albany NY
Orchestrated project teams and external contractors, ensuring adherence to deadlines, budgets, and professional standards during research project implementations.

- Developed GIS workflow for spatial analysis of field data (SQL, ESRI ArcView/ArcMap) using kernel density estimation (IDW, KDE) to identify artifact distribution patterns, significantly reducing analysis times.
- Integrated spatial and categorical data into a relational database model for analysis, designed prototype UI, and standardized reports using MS Access, VBA, and SQL to improve data integration and streamline reporting.

EDUCATION

Master of Science in Analytics   **2021**
Georgia Institute of Technology, Atlanta GA

- Focus on data science analytical tools and quantitative methodologies, encompassing machine learning model selection and evaluation, regression, forecasting, data mining, deterministic optimization, and stochastic process simulation.

Master of Arts in Anthropology   **2011**
University at Albany (State University of New York), Albany NY

- Concentration in archaeology, cultural resource management, quantitative methods, geographic information systems (GIS), and theory and methodology for social sciences.

AREAS OF EXPERTISE

- Data Science
- Machine Learning Algorithms
- Data Analytics
- Probability & Statistics
- Data Visualization
- Geo-Spatial Analysis
- Graph & Social Network Analytics
- Cluster & Community Detection
- Regression & Classification
- Natural Language Processing
- Project Management
- Research Design
- Quantitative Analysis
- Technical Communication
- Team Leadership

PROJECTS

Data Governance Analysis and Migration (ongoing) [GitHub Link]
Automated mapping, comparison, and migration of 2000+ databases/data sources to a centralized data management system using Python scripts (pyODBC, SQL, pandas).

Bipartite Graph Association & Spatial Community Detection (ongoing) [GitHub Link]
Conducted social and spatial network graph analysis, utilizing diverse similarity metrics and community detection methods (igraph, ggplot, tidyverse). Codebase featured in published articles on Towards Data Science.

Social Media Discourse Analysis (2021) [Report Link, .pdf]
Analyzed 15,000 tweets using NLP, social network analysis (pyTorch, nltk, SpaCy, transformers, networkx) to detect sentiment patterns, politically engaged communities, and discourse styles (e.g., deliberate, emotive, adversarial, disingenuous). Identified linguistic markers for influence and misinformation campaigns.

COVID-19 Research Abstract Topic Modeling and Query (2021) [Report Link, .pdf]
Created a searchable knowledge graph dashboard by topic modeling and network community detection from 300,000 COVID-19 research article abstracts (nltk, BERT, BERTopic, LDA, D3.js, networkx, pandas).

PUBLICATIONS

"The Behavior of Information: A Reconsideration of Social Norms." *Societies* 13(5), 2023: 111-138

"Similarity Measures and Graph Adjacency with Sets." *Towards Data Science*, October 28, 2022

"Bipartite Graphs for Archaeological Assemblage Networks." *Towards Data Science*, September 22, 2022

"Use, Purpose, and Function: Letting the Artifacts Speak." *Heritage* 3(3), 2020: 587-605

"Sets, Graphs, and Things We Can See: A Formal Combinatorial Ontology for Empirical Intra-Site Analysis." *Journal of Computer Applications in Archaeology* 2(1), 2019: 56-78

CONFERENCE PAPERS

"Objectives and Information: Mutual information, composite probabilities, and partitioning of archaeological sets." Computer Applications and Quantitative Methods in Archaeology (CAA) 48th international conference. Limassol, Cyprus (virtual). June 2021.

"Point and Line to Hyperplane: Set and Graph Theory for Parsing Systemic Contexts and Assemblages." Computer Applications and Quantitative Methods in Archaeology (CAA) 47th international conference. Kraków, Poland. April 2019.

"Matrix in the Network: Assemblage co-expression networks to unlock meaning in stratigraphic matrices." Computer Applications and Quantitative Methods in Archaeology (CAA) 46th international conference. Tübingen, Germany. March 2018.

TECHNICAL SKILLS & TOOLS

Languages: Python, R, MATLAB/Octave, SQL, VBA
Tools: Linux, LaTeX, Git/GitHub, Jupyter notebooks, MS Office, Adobe Creative Suite
Libraries: numpy, scipy, pandas, scikit-learn, nltk, SpaCy, Huggingface transformers, networkx, tidyverse, matplotlib, ggplot, igraph, PyTorch, TensorFlow, Seaborn, D3.js
Data Analysis: ESRI ArcMap, QGIS, VS Code, R Studio

CERTIFICATIONS

- Scrum Master Certified (SMC) - SCRUMstudy - Accreditation Body for Scrum and Agile
- Scrum Fundamentals Certified (SFC) - SCRUMstudy - Accreditation Body for Scrum and Agile

HONORS & AWARDS

- Executive Vice President for Research Award: 2020 Career, Research, and Innovation Development Conference (CRIDC), Georgia Institute of Technology, best graduate student poster presentation