REQUEST FOR PROPOSALS (RFP)

Data Management Best Practices: Integrating Data Sources for Treatment Optimization and Efficiency (5294)

Date Posted
Friday, September 20, 2024

Due Date
Proposals must be received by 3:00 pm Mountain Time on Thursday, November 21, 2024

WRF Project Contact
Alice Jariz, PE, ajariz@waterrf.org

Project Sponsors
This project is funded by The Water Research Foundation (WRF) as part of WRF's Research Priority Program.

Project Objectives
- Review and compile case studies of tools that utilities use to combine data sets, organize and validate data, and maintain data security before carrying out treatment optimization/efficiency projects.
- Create a best practice guide for utilities wanting to integrate their datasets to prepare for Machine Learning (ML)/Artificial Intelligence (AI) based treatment optimization/efficiency projects.

Budget
Applicants may request up to $250,000 in WRF funds for this project.

Background and Project Rationale
Machine learning (ML) and artificial intelligence (AI) projects require data from multiple sources, but this data first needs to be validated and combined into a common data stream. Utilities have begun applying tools to consolidate and organize their data sets. However, a detailed analysis of available options and methodologies has not been compiled and the experiences of early adopters not captured in a single resource for shared learning. Work is needed to document case studies of utilities with experience bringing data together from sources such as Laboratory Information Management Systems (LIMS), Supervisory Control and Data Acquisition (SCADA) systems, Geographic Information Systems (GIS), Computerized Maintenance Management Systems (CMMS), and financial systems. Utilities can leverage this

data in optimization and efficiency projects that will answer important questions about their treatment processes.

The tools available for combining data sets, validating data, and maintaining security must be reviewed and documented. This should include successes and limitations of tools along with the experiences of utility staff adopting them. This will inform best practices for organizing and maintaining readily usable data for future projects, minimizing the need for extensive dataset preparation. Furthermore, the quality and reliability of datasets which vary across sources, due to differing needs and objectives, must be considered.

Research Approach

The precise research approach will be determined by the selected research team, but the following key aspects should be considered by the researchers:

- Conduct a literature review, including ML/AI work, to document the software and tools being used to organize data across multiple systems (SCADA, CMMS, financial, etc.), validate data, and maintain data security. Tools can include programming languages used to combine information from multiple databases into a single source, in addition to data development for convenient machine reading.
- Interview/survey utilities that are combining and organizing datasets across multiple platforms, validating data, and maintaining data security before carrying out treatment optimization/efficiency projects.
- Inventory and characterize the quality/reliability of typical utility data sets (SCADA/data historian, customer billing, capital assets such as service line material, LIMS, etc.) and expected level of effort to prepare the data sets for ML, AI, or reliable data mining.
- Identify which data sets might be of greatest use in the future so utilities can prioritize investments in improving data quality/reliability.
- Conduct a workshop with utilities to discuss tools and document their challenges and successes.
- Compile a best practice guide for utilities to use as a reference for successfully combining and organizing datasets across multiple sources in a way that can be used for ML/AI applications.

Expected Deliverables

Deliverables from this project include:

1. Literature review of existing methods for data collection, validation, and security
2. Case studies report based on utility interviews with a minimum of five case studies (one case study per utility interviewed)
3. Data quality and reliability review
4. Utility workshop materials and summary
5. Best practice guide based on previous research activities and deliverables
6. Utility report-out video

Communication Plan
Please review WRF's *Project Deliverable Guidelines* for information on preparing a communication plan. Conference presentations, webcasts, peer-reviewed publication submissions, and other forms of project information dissemination are typically encouraged.

Project Duration
The anticipated period of performance for this project is 24 months from the contract start date.

References and Resources
The following list includes examples of research reports, tools, and other resources that may be helpful to proposers. It is not intended to be comprehensive, nor is it a required list for consideration.

- Benjamin, J., F. Shoushtarian, P. Fiske, H. Torkzadeh, F. Shaheen, M. Dirks, and J. Roostaei. 2024. *Data Organization Matters*. J AWWA, 116: 61-66. https://doi.org/10.1002/awwa.2233

Proposal Evaluation Criteria
The following criteria will be used to evaluate proposals:

- Understanding the Problem and Responsiveness to RFP (maximum 20 points)
- Technical and Scientific Merit (maximum 30 points)
- Qualifications, Capabilities, and Management (maximum 15 points)
- Communication Plan, Deliverables, and Applicability (maximum 20 points)
- Budget and Schedule (maximum 15 points)

PROPOSAL PREPARATION INSTRUCTIONS

Proposals submitted in response to this RFP must be prepared in accordance with WRF's *Guidelines for Research Priority Program Proposals* and *Instructions for Budget Preparation*. These guidelines contain instructions for the technical aspects, financial statements, indirect costs, and administrative requirements that the applicant must follow when preparing a proposal.

Proposals that include the production of web- or software-based tools, such as websites, Excel spreadsheets, Access databases, etc., must follow the criteria outlined for web tools presented in the *Technology Deliverables Guidance*.

Eligibility to Submit Proposals
Proposals will be accepted from both U.S.-based and non-U.S.-based entities, including educational institutions, research organizations, governmental agencies, and consultants or other for-profit entities.

WRF's Board of Directors has established a *Timeliness Policy* that addresses researcher adherence to the project schedule. Researchers who are late on any ongoing WRF-sponsored studies without approved no-cost extensions are not eligible to be named participants in any proposals. Direct any questions about eligibility to the WRF project contact listed at the top of this RFP.

Administrative, Cost, and Audit Standards
WRF's research program standards for administrative, cost, and audit compliance are based upon, and comply with, Office of Management and Budget (OMB) Uniform Grants Guidance (UGG), 2 CFR Part 200 Uniform Administrative Requirements, Cost Principles, and Audit Requirements for Federal Awards, and 48 CFR 31.2 Contracts with Commercial Organizations. These standards are referenced in WRF's *Guidelines for Research Priority Program Proposals* and include specific guidelines outlining the requirements for indirect cost negotiation agreements, financial statements, and the Statement of Direct Labor, Fringe Benefits, and General Overhead. Inclusion of indirect costs must be substantiated by a negotiated agreement or appropriate Statement of Direct Labor, Fringe Benefits, and General Overhead. Well in advance of preparing the proposal, your research and financial staff should review the detailed instructions included in WRF's *Guidelines for Research Priority Program Proposals* and consult the *Instructions for Budget Preparation.*

Budget and Funding Information
The maximum funding available from WRF for this project is $250,000. The applicant must contribute additional resources equivalent to at least 33% of the project award. For example, if an applicant requests $100,000 from WRF, an additional $33,000 or more must be contributed by the applicant. Acceptable forms of applicant contribution include cost share, applicant in-kind, or third-party in-kind that comply with 2 CFR Part 200.306 cost sharing or matching. The applicant may elect to contribute more than 33% to the project, but the maximum WRF funding

available remains fixed at $250,000. Proposals that do not meet the minimum 33% of the project award will not be accepted. Consult the *Instructions for Budget Preparation* for more information and definitions of terms.

Period of Performance
It is WRF's policy to negotiate a reasonable schedule for each research project. Once this schedule is established, WRF and its sub-recipients have a contractual obligation to adhere to the agreed-upon schedule. Under WRF's *No-Cost Extension Policy*, a project schedule cannot be extended more than nine months beyond the original contracted schedule, regardless of the number of extensions granted.

Utility and Organization Participation
WRF encourages participation from water utilities and other organizations in WRF research. Participation can occur in a variety of ways, including direct participation, in-kind contributions, or in-kind services. To facilitate their participation, WRF has provided contact information, on the last page of this RFP, of utilities and other organizations that have indicated an interest in this research. Proposers are responsible for negotiating utility and organization participation in their particular proposals. The listed utilities and organizations are under no obligation to participate, and the proposer is not obligated to include them in their particular proposal.

Application Procedure and Deadline
Proposals are accepted exclusively online in PDF format, and they must be fully submitted before 3:00 pm Mountain Time on Thursday, November 21, 2024.

The online proposal system allows submission of your documents until the date and time stated in this RFP. To avoid the risk of the system closing before you press the submit button, do not wait until the last minute to complete your submission. Submit your proposal at https://forms.waterrf.org/cbruck/rfp-5294.

Questions to clarify the intent of this RFP and WRF's administrative, cost, and financial requirements may be addressed to the WRF project contact, Alice Jariz at 303.347.6111 or ajariz@waterrf.org. Questions related to proposal submittal through the online system may be addressed to Caroline Bruck at 303.347.6118 or cbruck@waterrf.org.

Utility and Organization Participants

The following utilities have indicated interest in possible participation in this research. This information is updated within 24 business hours after a utility or an interested organization submits a volunteer form, and this RFP will be re-posted with the new information. **(Depending on your settings, you may need to click refresh on your browser to load the latest file.)**

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