CALL FOR AI/ML PILOT RESEARCH PROPOSALS
To: University of Iowa Faculty and Research Staff
October, 2024

THE IOWA INITIATIVE FOR
ARTIFICIAL INTELLIGENCE

The Iowa Initiative for Artificial Intelligence, with the UI's P3 funding, is seeking pilot research proposals for interdisciplinary research projects that require Artificial Intelligence/Machine Learning (AI/ML) expertise and dedicated AI/ML computational resources.

The award will provide computational expertise and resources through the Iowa Initiative for Artificial intelligence (IIAI, www.iiai.uiowa.edu) to directly support the selected research projects. Selected projects must be new projects with a substantial promise to secure extramural funding as a result of this pilot-research award.

Proposals in all University of Iowa disciplines are welcome.

New research endeavors within UI will be facilitated by integration of AI/ML into proposals for researchers ranging from AI-novice to experienced. Research proposal review panels are increasingly looking for AI/ML aspects of the proposed research that have a potential to outperform existing state-of-the-art approaches and bring new enhanced levels of performance based on previously unavailable data (and big-data) analytics.

Responsive proposals will:
- address important interdisciplinary research questions using data-driven approaches
- be based on **demonstrated** access to sufficient data to answer (or start answering) such questions
- seek AI and/or machine learning expertise as an enabling strategy
- be willing to invest effort in building a new interdisciplinary team
- commit to preparing and submitting a medium-large extramural research grant proposal based at least in part on the pilot results obtained - research projects must include realistic plans for preparing and submitting a sufficiently large extramurally funded research proposal within 12 months after receiving pilot funding
- describe the predictors or input variables (X) and the response or outcome variables (Y)
  - for example:
    - "We aim to use social media-based data from subjects (X) to predict their behavioral and lifestyle choices (Y),"
  - or
    - "We aim to use information about air-pollution sources, weather forecast, and atmospheric air flow data (X) to predict location-specific air pollution levels (Y),"
  - or
    - "We aim to use metabolomics data (X) to predict mitochondrial function and its relationship to diabetes (Y)."
  - or
    - "We aim to use image-based lung biopsy data (X) to determine sample malignancy status (Y)"
  - or
    - "We aim to combine genetic sequencing, curated variant classifications and structural biology data (X) to classify genetic variants associated with hearing loss (Y),"
  - or.
    - Proposals are not limited to predictive analysis; they can also include clustering, reinforcement learning, or any other AI-flavored data analysis techniques that align with the project's objectives and goals.
  - or

- Proposals can be based on approaches that rely on generative AI, e.g., "using generative AI, analyze a set of specific spoken and recorded texts (X) to derive characteristics of speakers' behavior, their mood, and/or other characteristics.
  - etc.
  - Note that multimodal data are welcome and input X can consist of diverse descriptors (e.g., combination of text, images, numeric data, etc.)

Awards will amount to the equivalent of $25,000 in support from the IIAI. This corresponds to about 8 months of IIAI-expert support at 10% effort and the requisite computational resources to achieve results adequate as preliminary data in a grant proposal. It will also include an expert write-up of the needed methodology for a large research proposal. The IIAI will consult with awardees to plan for longer-term collaborations that will ensure the sustainability of the project.

An internal peer-review committee will be identified to review proposals and make recommendations concerning funding of submitted proposals to IIAI leadership.

It is anticipated that up to 10 awards will be made during this round.

A brief proposal (maximum 2 pages + up to 1 page of references) must address the following:
1. Project Title
2. Investigators
3. Specific aims + Statement of research significance; should include a brief, conceptual description of the predictor or input variables (X) and the response or outcome variables (Y) or relevant variables for clustering, descriptive statistics, reinforcement learning, generative AI, or other analytical approaches.
4. Current support for the project (if any)
5. Description of available data to facilitate the proposed research – immediate data availability is required
6. Specifics on how involvement of the IIAI expertise/use of computational resources will advance the research
7. Plans to receive follow-up extramural funding

Timeline:
- 10/25/2024
  - Proposal submission (2 pages max.)
  - Email as PDF to M. Sonka (milan-sonka@uiowa.edu)
- 10/28 – 11/8/2024
  - Internal review of proposals, recommendation to IIAI leadership
- 11/11 – 11/19/2024
  - Communication with front-runner teams regarding the project aims, data availability, sizes, IRB, …
- 11/22/2024
  - Selection of projects to be funded
- 11/28/2024
  - Announcement of up to 10 projects to be funded
- 12/2/2024
  - Selected teams start working with IIAI experts
- 1/15/2025
  - Data readiness on IIAI servers must be established for a project to go forward

Additional Information:

The Big Picture

- Students (1-2) will be added to each team as its members
    - These students will be selected based on their interest in research and experience with AI/ML as determined in a formal computationally-oriented class completed during/before Fall 2024
- The PI team must agree to accept the students as team members
- Data must be available in large-enough data sizes
    - Project must be ready to share data with IIAI on Dec 2
- Data must be fully available and ready for the AI/ML research by Jan 15**, with IRB in place as/if needed**
- Submission of a large extramural grant proposal is required (such as NIH, NSF, …)
    - Grant proposal must be ready for submission by the end of October 2025
- Domain PI team will receive no funds – they will receive access to the IIAI expertise and to experienced students
- **➔ A Memorandum of Understanding will be prepared stating the above and signed prior to the formal award start**

The roles of the IIAI expert and the students

- IIAI expert will be leading the AI/ML effort
- Student researchers will be part of the research team and will work under direct supervision of the IIAI expert
    - Students will be enrolled in a formal Spring semester 5000-level class and will receive a grade and 3 s.h. credit for participation in the project.
    - The reason for student participation is to give them an opportunity to participate in a research project from its start till the end of Stage 1 – till the end of the Spring semester
- While the students will participate and will be given specific tasks, it is the IIAI expert assigned to manage the project who will be responsible for the project conduct

Project Stages and Dates

- Stage 1:
    - The goal is to obtain the first set of preliminary results addressing at least one of the stated specific aims
    - Student researchers will be involved in this stage
    - Stage 1 must be completed before the end of the Spring semester = by April 30, 2025
    - Students will summarize and present results of Stage 1 – this will conclude their involvement required to complete the course – but of course, the students will be welcome to continue contributing if they so choose
- Stage 2:
    - IIAI expert will continue working with the team to complete the project
    - IIAI expert will help to prepare the AI/ML portion of the project to be included in the to-be-submitted proposal by the end of October

Follow-up large research proposal expectations

- IIAI experts and perhaps students if so desired are expected to be included in the budget of the large extramural proposal – as appropriate
- Assessing which proposal is "large" is certainly discipline specific - but roughly means $1M or more from the NIH, $500k from the NSF, and/or correspondingly medium-high levels for other agencies.