SCHOOL *of* ENGINEERING

Center for Emerging Energy Technologies

November 19, 2018

The Center for Emerging Energy Technologies is offering a graduate or undergraduate position to work in the project "Development of pilot M&V system for production", whose PI and Co-PI are Professor Andrea Mammoli (ME, CEET director) and Manel Martínez-Ramón (ECE, CEET associate director).

The project seeks to extend the capabilities of the building energy management tools of the portal of the New Mexico Public School Facilities Authority to make it accessible for the general public. The portal will have three purposes: maintenance staff alerts for potential equipment issues, in particular those that translate into energy loss, education in energy production sustainable usage and energy data analytics for school students and teachers, and data storage, representation and download features for the research community to use it.

The center is seeking for a student who has the skillset to tackle this complex goal in a finite timespan, with the expectation of obtaining results in one year. We will achieve these objectives by the execution of the following tasks:

Task 1: Review of the existing system.
Task 2: Stakeholder's feedback thorugh a set of meetings coordinated with stakeholders, including teachers (and possibly advanced students interested in energy), technical personnel (maintenance etc.) and researchers that have either interacted with the current portal or that are potential future users.
Task 3: We will collect data of about 20 schools and we will implement a fully automated IoT based system for temporary data acquisition that can be placed in these schools and read over the internet. We will attempt to categorize the schools into subtypes. Using machine learning techniques, we will set up automatic categorization techniques based on profile clustering, and compare the heuristic categorization to the automatic one.
Task 4: Migrate to a virtual server.
Task 5: Fault detection and forecast. For the fault detection, we will introduce artificial faults at various premises and see if they are flagged by the system. The forecasting will be related to the power load, and the web will show a comparison between the forecast and the actual values.
Task 6: Educational tools: Exposure of students to data analytics is interesting because of the present importance of knowing about classical techniques as linear filtering, statistical analysis, classical regression as well as advanced topics as machine learning for knowledge discovery.

The personnel involved will be Prof. Manel Martinez-Ramon, who will supervise the data analysis and machine learning components, Prof. Andrea Mammoli, who will supervise the building energy and mechanical system analysis.

Suitable candidates must show experience in Machine Learning as well as web applications development skills. Good Python programming skills and database management experience are also required. Candidates with experience with microcontrollers as Arduino or similar or boards like Raspberry PI or similar will be taken in special consideration.

Candidates should submit a brief resume and a transcript to manel@unm.edu or mammoli@unm.edu before Monday November 26, 2018.

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