Some Sample Project Topics

Sample Project Topics

Transforming Drainage Project

http://transformingdrainage.org/

Project Title: Reservoir Planning Tool for Water Quality and Irrigation Benefits

Project Background and Motivation: The goal is to develop a web-based tool for calculating the needed size of an irrigation reservoir that will store water during wet periods for use during dry periods. These reservoirs will be part of a system to provide a sustainable food supply under future climate conditions. Users would select a location in the U.S. from a map interface, and/or upload a file with daily flow data for 10 or more years through a web interface that needs to be developed. The output should be provided to the user through a series of charts.

Project Deliverables: The web interface should provide a means to select a location, perhaps using Leaflet, as well as a way to upload large input files. Algorithms for the simulations will be provided to the student team, described in the document at https://engineering.purdue.edu/watersheds/projects/ReservoirPlanningTool.pdf

Javascript has been recommended as the best development language for this, so that both the web interface and modeling could be done together, but the decision could be up to the students. Output charts should be interactive and graphically pleasing, perhaps using Google Charts. This is a funded project so licenses can be purchased if needed. Simple and elegant software is important because we plan to add to the program in coming years as our algorithms improve.

Project Stakeholders: Jane Frankenberger, Professor, is the Principle Investigator for the Transforming Drainage Project, and will oversee the project along with Larry Theller, GIS Specialist, and Ben Reinhart, Project Manager. The tool will be used across the Midwest to plan possible water storage.

Purdue Autism Cluster

Project Title: Heart rate deceleration analysis software to help researchers in autism, speech, and nutritional studies

Project Background and Motivation: A unique experimental technique on heart rate deceleration analysis has been used in identifying early risk factors for autism in infants along with concurrent behavioral attention data. The same technique has been adopted in the research areas of speech (i.e., analyzing how infants process language) and analysis of drug response to nutritional supplements. Despite the fact that this is a well-established technique with multiple applications, there is no software to help researchers perform this analysis in an efficient way. Today, if a researcher needs to use this technique for her/his study, she/he needs to get it implemented by a programmer in a customized way that caters to their requirements or needs to do manual analysis of the data recorded in an excel spread sheet, which is time-consuming and prone to error. Some researchers also do this through SAS software, which requires SAS expertise.
If there was a generic software product that implements the heart rate deceleration analysis algorithm (which will be provided) along with a user friendly UI that helps researchers perform their analysis with customized options, it will help accelerate the research in the aforementioned fields and will make a unique clinical impact in multiple research fields. Also, the software engineering team will get the opportunity to experience the complete software development life-cycle by working closely with real world stake holders.

**Project Objectives and Deliverables:** A software product that provides the following features:
1. Preprocessing of heart rate data combined with other data streams used for the study (e.g., behavioral attention data).
2. Implementation of the heart rate deceleration analysis algorithm.
3. User friendly UI to help researchers to customize their analysis.
4. Provide both graphical and numeric output (e.g., a CSV file that specifies the algorithm output for each heart beat) to facilitate further analyses.

Details of the algorithm, user inputs, and the formats of the graphs will be provided.

**Project Stakeholder:** Bridgette L. Tonnsen, Ph.D. Assistant Professor of Psychological Sciences, Purdue University, btonnsen@purdue.edu

### Purdue Sports Performance

**Project Title:** Health & Wellness Questionnaire App

**Project Description:** A daily health & wellness questionnaire application for Purdue student athletes. The application would be both iPhone and Android user friendly. The possibility of multiple questionnaires would be filled out on the application daily and all data stored, saved, and accessible via excel or another platform to be analyzed. The app would have the ability to send information out as notifications/reminders to individual student athletes or full teams. Below are examples of current technology already in use:

https://coachmeplus.com
https://coachmeplus.com/portfolio-posts/canisius-college-case-study

**Project Owner:** Christopher Giacchino, Sports Performance Associate, Purdue University, 781-854-6317, cgiacchi@purdue.edu

### Knowledge Engineering Laboratories

**Project Title:** The Unit Modeler Technology

**Project Description:** Purdue University has partnered with Knowledge Engineering Laboratories (Ke Labs) to make the Unit Modeler Technology available for student projects. The Unit Modeler Intelligent Software Development Environment (ISDE) is a comprehensive technology for building smart, feature rich, enterprise-ready applications. The Unit Modeler ISDE has the unique ability to work with complex information in a very natural and easy way. You can do more in less time and do not need a programming background to get started.

**Project Owner:** Knowledge Engineering Laboratories (Ke Labs). [Click here for details.]
Nielsen's Research Methods Center of Excellence

Digitization of Retail Establishment Surveys

Completed Projects and Projects in Progress

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