Cal Poly CSC 484 "User-Centered Design" and CSC 486 "Human-Computer Interaction" Team Projects
Call for Proposals
March 2012

This document describes the context and requirements for project proposals solicited from industrial sponsors for the CSC/CPE 484 "User-Centered Design" and CSC 486 "Human-Computer Interaction" classes. The goal of this project is to give the students an opportunity to work on real-world problems under conditions that are closer to the way real industry projects are conducted than the typical class projects. The emphasis in the class, and thus for the projects, is on the consideration of user needs, and on *interaction aspects* between computer and human. The project must be chosen carefully in order to ensure that students have an intellectually substantive learning experience and are exposed to the consideration of user needs and requirements in the first place, and the actual implementation of the functionality in the "back end" only as far as it is necessary for user interaction. The project duration is one quarter, which realistically translates into ten weeks of development work. Typically CSC 486 "Human-Computer Interaction" is offered in the quarter after 484, but due to scheduling constraints, both classes are offerec concurrently in Spring 2012. From a project perspective, the main difference is that 484 will focus on more conventional interaction paradigms ("desktop" metaphor with keyboard and mouse/trackpad as main input devices), whereas the emphasis in 486 will be on alternatives such as touch-based interaction with mobile devices, or "natural user interfaces" like Microsoft's Kinect, Nintendo Wii. Depending on the availability of equipment, students may also explore topics like eye tracking, Brain-Computer Interfaces (BCI), or haptic devices.

We will probably have six or seven teams of four to six upper-level undergraduate students and some graduate students in each class. My preference is to have a set of possible projects proposed by the industrial sponsor, from which the student teams then can choose. Ideally, the projects should be from related domains, and roughly comparable in difficulty. As an alternative, I am also willing to consider having multiple teams work on the same project, and pursue alternative approaches. The industrial sponsor serves as the business customer, establishing requirements and acceptance criteria in consultation with the Cal Poly faculty. While the course includes typical academic activities such as lectures, readings, and exams, the team project is the focal point and primary outcome.

The practical experience of working on projects in teams is frequently cited by students and alumni as one of the most significant learning experience at Cal Poly, especially for projects that deal with real-world problems, and have real customers. Sponsors find value in the opportunity to work with Cal Poly faculty and students, the opportunity to explore user needs and requirements, interaction methods, and usability evaluations for problems of interest, and the opportunity to explore new technologies and methods geared towards user-centered design.

Proposals should be one to two pages and should propose a set of specific projects. Proposals should identify an executive sponsor and contact information for a primary contact person who would serve as the coordinator for the projects on the customer side. Ideally, each project should also have a technical contact person to help students with domain and problem-specific aspects. Questions and proposal submissions should be directed to Dr. Franz J. Kurfess (fkurfess@calpoly.edu).

1 Requirements

Every project must have the following characteristics:

1.1 Real World Character

The product must meet needs of real users and should be deployed for use by those real users. The problem domain must be accessible to our students. Domains that require highly specialized knowledge are undesirable. In order to establish a legitimate customer role, domains for which students are not a primary user are preferred. For example, a system that is primarily used by a human resource specialist, small business owner, or real estate buyer might be desirable.

1.2 Strong Sponsor Commitment

The industrial sponsor must agree to support the project for the Spring 2012 quarter (March 27 to June 8). Weekly customer meetings ideally should occur during the lab time for the 484 class, (Tue and Thu from 4:40 - 6:00 pm), and during general class time for 486 (Tue/Thu 9:10 - 11:00 am). If necessary, we can try to make alternative arrangements. Meetings will typically include communication with students on user needs and requirements, acceptance criteria and formal reviews of product deliverables, periodic visits to the classes, and other activities necessary to meet the "real world character" of the project. Customer meetings may occur remotely via conference call, video conference, or face-to-face. In the past, class excursions to the customer's facilities have been very well received, both by the students and by the customers, especially if it is combined with a presentation of the final outcomes of the projects.

1.3 Project Size and Scope

The projects must have sufficient substance to provide several team members major development tasks. The emphasis should be on the determination of user needs and requirements, and their translation into products that emphasize the role of the user in the interaction activities. It typically will include the development of usage scenarios, story boards, wire frames, user interface layouts, and partially functional prototypes with an emphasis on user interaction. Ideally, the "front end" developed by the students could act as a client to services provided by an existing "back end," possibly subject to some limitations (such as the use of a sand box instead of a production version.

1.4 Language/Platform

Students typically are most proficient in Java, but there are no strong requirements or preferences.

1.5 Project Completion

Completion of project must include: initial and intermediate design artefacts such as interface sketches, wire frames, interaction flow charts, and then beta-level functionality of an advanced prototype with an emphasis on user interaction aspects, compliance with style guidelines in all source code, completed inline documentation, and other internal quality standards as determined by the instructor. Project requirements will be initiated by the customer in this proposal. Complete project requirements will be developed collaboratively by the customer and the capstone students, and should include a set of nonfunctional quality attributes such as reliability, ease of use, access for users with disabilities, etc.

1.6 Customer Expectations

Industrial sponsors are expected to understand that students are not subcontractors. Projects should not be on any critical path in commercial development since students and faculty have limited skills, time, and structure available to dedicate to the project. The course is only one of many courses that students will be taking. Students and faculty will make "best efforts" in completing the project, but the primary goal is an educational experience, bounded by the constraints of the academic calendar.

1.7 Interaction Support

If not local to San Luis Obispo, the industrial sponsor must provide toll free conference call and web meeting services for the weekly meetings. The industrial sponsor must provide support for at least one face-to-face presentation near the end of each quarter.

1.8 Funding

The industrial sponsor must provide funding commensurate with the scope of the project. For projects involving a whole class of about 30 students, funding in the range of $5,000-$10,000 is anticipated; for projects involving a single team of about five students, the range is $1,000-$2,000. This depends to some degree on the nature of the project, the resources and tools required, and expenses like recruitment of participants for usability studies. Funds will typically be used to provide necessary tools/training for the students and to offset the additional faculty costs for such projects. The funding is typically provided in the form of a gift to the Computer Science Department. Arrangements can be made to cover expenses like student transportation to the sponsor's facilities through this funding, or directly by the

sponsor. We will also try to accommodate partners with limited funding opportunities such as non-profit organizations; however, there is no internal source of funding for expenses associated with such projects.

2 Other Expectations

In addition to the mandatory requirements, projects might include some of the following characteristics:

2.1 User Interface

The project will include a user interface as one of the core components. The type of interface and interaction methods may depend on the nature of the proposed projects. Of particular interest are non-conventional interfaces that do not rely on keyboard, mouse, and screen as primary interaction devices. For example, smart phones and mobile devices have been used with good success in the past, since they force students to re-think their habits in designing conventional GUIs.

2.2 Usability Evaluations

If practical, the projects should include usability evaluations. This can be done either on existing similar products, or on products or systems that use interesting and relevant interaction methods, technologies, or other aspects important for the user experience. Usability evaluations may also be conducted during various stages of the development. Ideally these evaluations should involve real users of the system or product under development. However, since this may be impractical, other students may have to serve as placeholder participants.

2.3 Intellectual Property and Non-Disclosure

It is acceptable for the customer to retain Intellectual Property rights, but it is preferred that non-disclosure agreements **not** be required. It is very desirable that students be able to talk freely about and share artifacts from the capstone course when applying for jobs.