Capstone Design Projects (Ve450/Vm450)

Call for Proposals (Ver. 2.0)

Introduction:

Approved by Shanghai Jiao Tong University, the Univ. of Michigan-Shanghai Jiao Tong Univ. Joint Institute (JI) is taking the initiative on graduation thesis reform at SJTU. The traditional single faculty guided individual thesis style has been replaced by carefully designed, well-structured capstone design courses with open-ended, team-based design projects. The main educational goal of these courses is to teach students how to approach open-ended design problems by process and how to integrate engineering knowledge for the design and manufacturing of engineering systems. Another goal of these courses is to enhance students' skills in team working, organization, and communication.

Purpose:

The purpose of this call for proposals is to solicit ideas of capstone design projects for Ve450 and Vm450 to be offered in every JI summer semester and fall semester, namely twice a year. All JI faculty members, faculty members from relevant SJTU programs, domestic or international companies, and even senior students themselves are encouraged to submit proposals. Once collected, these proposals will be reviewed by a team of JI faculty members, from which suitable proposals will be selected.

Basic Requirements for the Proposed Projects:

The ideal project should have the following characteristics:

- Innovative: Projects should be open-ended or allow for multiple solution ideas. Sponsors should provide all relevant information, but avoid imposing a solution.
- Unique: Students do well on new products, one-off manufacturing systems, or mature products where new ideas may make possible a breakthrough.
- Decomposable: The best projects can be approached in pieces.
- Physical: Paper studies only are not acceptable. Projects that contain design, analysis, as well as physical prototyping components are preferred.
- Minimal Proprietary Information: JI cannot contract to maintain security. Companies can negotiate IP and NDA agreements directly with tuition-paying undergraduate students.
- Multidisciplinary: All project teams will consist of ECE and ME students. Therefore, multi-disciplinary projects are encouraged.
- Reasonably Complex: Projects should be complex enough so that team effort is critical to make the success yet they should also be doable in one semester (13 weeks).
- Corporate Sponsor Minimal Funding Requirement:
  - Company sponsors bring to the table: minimum *17,000RMB for software-based projects and 22,000RMB for hardware-based ones (if the company is based in Shanghai)* to defray all of the project costs including equipment, necessary domestic travel, labor (TAs and instructors), final expo, and other miscellaneous expenses.
  - Depending on the nature of a project, the sponsor may decide to invest additional fund. In that case, the sponsor will be responsible for providing the additional fund.

Benefits to Stakeholders:

For Companies: You will have teams of creative and well-trained student engineers to work for you on projects you define. These students frequently find new solutions to your problems because they see these problems with fresh eyes. You will also have the access to JI faculty's expertise as well as JI and SJTU's facilities. All projects will result in a written report and a working prototype, which could be the basis for further development by your engineers. Through these projects, you also gain an intimate recruiting exposure to a large portion of our next graduating class.

For Faculty: You are encouraged to propose at least one project, which is relevant to your research interests. If your proposal is selected, you will get one or more groups of students to work with you for at least one semester. This not only benefits your research directly, but also creates a student pool from which you can recruit your future graduate students.

Proposal Format:

A capstone project proposal should include a concise title, a paragraph explaining the background or significance of the project, a paragraph on the purpose of the project, a specification of the expected project outcomes, as well as the proposed team composition. A list of relevant references should also be attached. Your proposals are usually expected to be received **two weeks** before the beginning of the coming summer or fall semester.

Although Ve450 and Vm450 are technically two separate courses for ECE and ME students respectively, most of the class activities will be the same. All project teams are expected to consist of both ECE and ME students. Therefore, all proposed projects are expected to be multidisciplinary. Depending on the specific needs of your proposed project, you are encouraged to make suggestions on the composition of the project team (how many ECE and how many ME students). For an example of the format, please refer to the following attached sample proposal.

Contact Person:

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References:

1. University of Michigan-Shanghai Jiao Tong University Joint Institute (JI): http://umji.sjtu.edu.cn/
2. JI General Brochure, Design Expo Brochures (Yr. 2010-Pre.), and other relevant documents are all downloadable from http://umji.sjtu.edu.cn/download/

JOINT INSTITUTE
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Sample Proposal: GUI Test Automation by Image Recognition

Sponsor:

- Company Sponsor: Fleming Feng (Chief Scientist) & Evelyn Yan, Intel
- Company Mentor: Guobin Chen, Intel

Background:

Collaboration between UM-SJTU Joint Institute and Intel Apac R&D center.

- OTC proactively joined this program. OTC will assign dedicate engineer as a mentor.
- Students need to discussion with mentor on the tasks and deliverables and need to work as planning until deliver the project deliverables.

Intel Open Source Technology Center (OTC)

- Under Intel Software & Service Group, System Software Division.
- A dedicated group at Intel working on open source software development.
- Famous for its contribution to Linux Kernel, Xen/KVM, as well as open source projects OTC initiated: Tizen, Yocto, etc.

GUI test is often done with manual check, as it is hard to simulate effective input and judge output at GUI-level. However, Image Recognition can provide us some opportunity to interact with GUI like human.

Purpose:

This project aims to automate GUI test by adopting some algorithms in Image Recognition.

Expected Deliverables:

- Leverage open source image recognition solution and be able to tailor it.
- Implement the tools to generate/access target image patterns and to detect target with specified patterns.
- Create framework based on the toolkits to automate GUI test.

Team: Students with the following skills are encouraged to apply:

- Basic understanding of image/pattern recognition
- Familiar with Linux developing environment
- Master C/C++ programming.

Benefit to Students

- Arm with a great company brand, “Intel”, for advancing your career.
- Learn real project development before really go outside of university and entering your career path.
- Get In-depth knowledge on Image Recognition, test, automation, etc.
- Learn Intel culture, get future Intel job opportunity if prove to be outstanding in this project.