2021년 SW중심대학 (온라인) 해외교육프로그램 참가자 모집

부산대학교 소프트웨어교육센터에서는 SW중심대학 사업의 일환으로, 2021년 해외교육프로그램 참가 희망자를 모집합니다. 관심 있는 학생들의 많은 참여 바랍니다.

□ **대상**
  ○ **정보컴퓨터공학부(연계, 복수, 부전공 포함), SW연계전공 학부생 3~4학년**
   - 하계방학 7주간, 미국 현지시간을 고려하여 본 프로그램에 집중할 수 참여 가능자에 한함
   - 교육일정동안 재학생 신분이어야 참가 가능함 (휴학생 참여 불가)

□ **참가 신청**
  ○ 1차 : 구글 폼 https://forms.gle/d4Ppkgb3dvdbxLw9A **(~5월12일 16시까지)**
   - 참여하고자 하는 학생은 반드시 신청바라며, 응답한 사람만 본 프로그램에 최종 참여 가능합니다.
  ○ 2차 : 별도 신청서
   - 1차 신청자에 한하여 이메일로 별도 추가 서류 요청 예정

□ **온라인 해외교육프로그램 계획**
  ○ 2021년 퍼듀대학교 프로그램 개요

대학	프로그램명	프로그램 기간	주요 내용	비고
미국, 퍼듀대학교	**2021 Purdue AI Summer Program**	07.05~ 08.20 (7주)	❑ **캡스톤 디자인 프로젝트** - 현지기업 및 퍼듀대 학생이 참여하는 공동 프로젝트 - 퍼듀대 1명, 한국학생 4~5명 등 총 5~6명으로 팀 구성 - 과제별 기업체 멘토 및 퍼듀대 지도교수 자문 ❑ **IT Workshop/Seminar** - 최신 기술, 기업가 정신, 전공이론 등 퍼듀대 및 산업체 전문가 초청 세미나 ❑ **SW전공자를 위한 영어교육**	일부 실시간 온라인 진행

※ 구체적 일정 및 계획은 추후 업데이트 예정

○ 캡스톤 디자인 프로젝트 리스트 예시

1. Agricultural Internet of Things
2. UAV ground detection and tracking system
3. Control System Deployment for the Waggle Stack Sensor Project
   (Argonne National Laboratory)
4. Site Development for Briggs Dynamics

※ 프로젝트 상세내용은 [별첨 1] 참조(업데이트 예정)

○ 프로그램 성과

❑ 전공 분야 실제적 역량 향상
❑ 첨단 프로그램 개발을 위한 기술 및 자신감 습득
❑ 해외 IT기업 현직 전문가 및 퍼듀대 교수의 멘토링 기회
❑ 한-미 학생 협력 프로젝트 참여를 통한 문화 및 지식 교류
❑ SW개발을 위한 영어 등 커뮤니케이션 스킬 향상
❑ 퍼듀대학교 인증 교육프로그램 수료증

□ 선발기준 및 우대사항
  ○ 영어 회화 가능자 또는 공인영어성적 우수자 우대
  ○ 프로젝트 경험자 및 다수자 우대
  ○ 2020년 SW중심대학 마일스톤 장학생 우대

□ 참가자 의무 사항
  ○ 참가자는 전체 프로그램 계획 및 일정을 모두 이수하여야 한다.
  ○ 참가자는 주관기관이 요청하는 자료제출 및 평가 등에 성실히 응하여야 한다.

□ 문의처
  ○ 소프트웨어교육센터 강지혜 연구원(051-510-3624 /jihyek@pusan.ac.kr)
 ○ 소프트웨어교육센터 육동철 교수(051-510-3533 /net607@pusan.ac.kr)

Projects List

1. Agricultural Internet of Things

Background: Agricultural IoT is one of the most promising and potentially important areas of the IoT market. It is also an excellent method to study the IoT ecosystem while making important contributions to a field of research that is critical to the world, that of food and raw materials production. Purdue's CIT Department has had several successful projects in this area, and there are numerous companies and organizations in Central Indiana (such as WHIN) putting large amount of resources into Ag IoT systems.

Overall Project: The plan is to extend our already designed, implemented and tested agriculture sensor and radio network into several different areas to build a "Farm of the Future", where a farmer can monitor and track many of the aspects of Indiana agriculture, that may be spread over a vast geographic area, from any location via a smartphone application. Emphasis will be placed on the user interface and analytics that can quickly update the farmer on specific information that he needs to manage any of the diverse systems he may have in place. Note: this is not a theoretical exercise, as we will completely build out and implement this infrastructure at an Indiana farm, south or Lafayette.
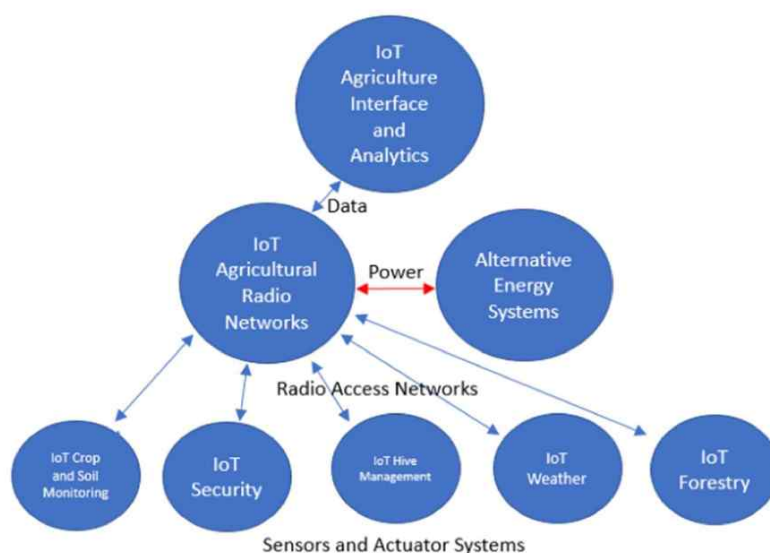
Each of the following is a specific project, from a particular specific sector/topic that will need a project team:

1. Soil conditions: The mainstay of farming, being able to get important information

about moisture, temperature, pH, and other factors over a large geographic area is critical to successful yields.

2. Weather information: As important as soil conditions, knowing the weather outlook
can make or break a year's crop.

3. Alternative energy: Many areas of agricultural land in Indiana does not have access to
electrical power. An alternate power supply consisting of monitored solar, wind and generator power will be implemented and evaluated.

4. Radio Networks: There are numerous LPWAN networks that we will continue to implement and evaluate. One interesting area of research that will be addressed is using
the amateur radio (HAM) frequencies as a no-cost network backbone.

5. Other specific IoT segments to be integrated into an overall Ag IoT system:
   a. Security: Monitoring resources and residences.
   b. "IoT of Bees": A recent area of interest that is receiving a lot of attention due to pathogens and other problems is the monitoring of Bee Hives. Without bees to pollinate plants, many crops could not be grown.
   c. Forestry: The timber industry brings about number of specific challenges, especially in the areas of sensor life and radio propagation.
   d. Human detection and area density.

Project Sponsor: Bowline LLC and several other pending agricultural and technology companies.

2. UAV ground detection and tracking system

Develop software to fly over a group of moving, mobile objects using a small class one UAV and detract and potentially track objects on the ground. This application is desired for agriculture to find herds of cattle in large spaces, forestry to find animal groups in large spaces and in the security area as a potential anti-terrorism application that can find moving groups of people then return a GPS point where a cluster of them will occur.

Skills: Basic understanding of robots or UAV's or physical system interfaces to sensors and
software. Basic understanding of development board systems such as Raspberry
Pi. Basic programming experience with a programming language such as Java, C/C++ or
Python. A desire to learn about deployment real physical systems.
Project Sponsor: Eric Matson

3. Control System Deployment for the Waggle Stack Sensor Project (Argonne National Laboratory)

Employment of the Waggle Stack sensor platform in urban or developed areas is easily managed due to the availability of power and Wi-Fi. When deploying the Waggle Stack to a remote, non-urban environment where power, internet or safety systems exist, the challenge becomes powering the system, remaining operational, connected and safe to environmental conditions or events.

To solve this problem, we will implement a self-organizing, autonomous power generation, control and management system deriving power from solar and wind. Because of potential for extreme conditions such as winter cold, summer heat, and exposure to fire and other natural events, we built in climate control to guard against deviations in temperature that would force the system to a non-operational state. The main goal of this system is to provide continuous power and remain operational 24 x 7 x 365, regardless of the environmental conditions. A secondary goal is to integrate seamlessly into a natural environment with minimal disruption.

The designed system will power the Waggle Stack as an autonomous node allowing for the collection of environment data. The system will also provide operational data to monitor the operational status to determine if maintenance is required. Two nodes were developed,

one high power and the other low power. Ends of the spectrum were tested with the idea that the more efficient, smaller and inexpensive the system can be, will provide a less invasive environmental impact and make it easier to deploy.

We will build the system and deploy it to a rural area about 10 miles south of Purdue on arural farm.

* **Preferred skills**
- **Basic knowledge of design**
- **Basic knowledge of electronics and sensors**
- **Basic knowledge of programming in C/C++ or Java**

Mentor: Pete Beckman and Raj Sankaran, Argonne National Labs.

Purdue Mentor: Eric Matson

4. Site Development for Briggs Dynamics

A shooting/training range out in Fowler (www.briggscoredynamics.com) operated by a former Ranger and GRS contractor with a wealth of knowledge in these areas, is in need of technical help to redesign his website. He has normally done the development himself

but lacks the technical skill to go to the next level.

The work will mostly be technical, but also a bit of design work, all within the WP

framework (WP plugins, some custom HTML/CSS and php). This will create significant improvements for the business public face given significant improvements made on the backend and front-facing of the website. (Perfect for a little Scrum project).

Technical contact: Robert Bott

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2021.05.11일 17시. 최초 공지
2021.05.12일 10시. 1차 수정 (세부 프로젝트 내용 및 선발기준 등)