

BIO-METRIC-BASED LAB EQUIPMENT ACTIVATION INTERFACE PROJECT

Project Sponsor / Client: SDSM&T INDUSTRIAL ENGINEERING DEPT

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SDSM&T Project Program: Industrial Engineering & Engineering Management

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Project Overview:

The Industrial Engineering Department of the South Dakota School of Mines & Technology is concerned with the development of a way to control powered access to laboratory equipment. The proposed system would collect bio-metric information about the equipment operator and match this information against a database of trained and permitted users before energizing the equipment.

For the Biometric Equipment Activation Project, the following deliverables are sought:

- Identification of available biometric sensors for operator identification.
- Development of spreadsheet or database model for tracking the training and permitted operation status of potential operators.
- Proposal of a cost-effective systems for integration with existing laboratory equipment.
- Prototyping and testing the designed system for correct performance within the Manufacturing Inductive Learning Lab.

Student project team members will research existing sensors and design/adapt these for testing. They will capture relevant data and develop performance models to share with the department faculty.

Project Background:

In the very recent past, there have been documented incidents of students accessing laboratory equipment without following proper safety and operator training protocols. Students have damaged equipment and suffered severe physical injuries at SDSM&T, and been killed at Yale University.

As an alternative to the ID-card based access control to be implemented at the Mechanical Engineering Conventional Manufacturing Labs, a biometric based system may offer advantages. These advantages may include a greater difficulty in circumventing the controls, lower implementation and operating costs, and the ability to adapt to the changing physical and mental state of the operator. The development of a prototype biometric system could be compared with the implemented ID card system and the results could be used to develop a patentable product or an excellent conference paper.

Project Team Requirements and Deliverables Description:

This project will require a team of approximately four senior design students. The following deliverable items are expected for this project:

Identification of viable biometric sensors – research current product information, including effectiveness, operation, and cost data.

Identification of viable power controls – research current product information, including operating modes and cost data.

Develop a proposal for a prototype system – integrating the results of the sensor and control research, develop a proposal for the design and prototype development of a biometric control system.

Prototype Development – Construct and implement a prototype system on at least one piece of equipment within the existing MILL lab.

Prototype Testing – Exercise the developed system for a selection of events in the existing lab.

These items are expected within the time frames and along with the other deliverables described in the Industrial Engineering and Engineering Management Senior Design Projects document. That document provides a more complete description of the process, deliverables, and timing of SDSM&T IEEM Senior Design Projects.