Web-Based Educational Experiments

Justin Pniower (Undergrad, BU), Eric Hyman (Undergrad, BU), Suwada Hinds (BU) Prof. Michael Ruane (BU), Prof. Bennett Goldberg (BU), Prof. Selim Ünlü (BU)

Goals
- To demonstrate basic science/engineering phenomena using photonics equipment
- To prepare students for subsequent in-lab work in physics and photonics courses
- To develop LabVIEW and Java tools for extending on-line lab presence

Significance
- To increase student access to valuable or one-of-a-kind experimental hardware
- To provide attractive web site that will create student interest in subject matter
- To support distance learning and research using Internet bandwidth for telepresence

Technical Approach
- Use standard controller boards or D/A converters to run experiments.
- Collect sensor data over GPIB IEEE 488.2 bus or A/D boards.
- Use NT server to host LabVIEW controller software for boards and GPIB.
- Provide user with attractive GUI with experiment control and data handling.
- Link experiments to web-based data for theory and equipment information.
Relation to CenSSIS
• Barrier: Experimental experiences are limited for many because of cost, inaccessibility, and scheduling.
• Web-based experiments developed at one site can be accessed throughout CenSSIS
• Web-based experiments can support outreach and distance learning.
• System level tools can be adapted at other sites to extend web-based learning.

Other Connections
• LabVIEW and Java code were developed by undergraduates with corporate, REU or UROP funding
• Melles Griot, Inc. has supported this and other web-based activities under BU curriculum project.
• This effort created HP-VEE Senior Design project for remote web based control of electronics lab equipment.

Current Status
• One undergraduate is continuing to develop web site and make more realistic GUI and Java tools.
• Melles Griot funding is continuing to pay student for UROP.

Plans and Project Evolution
• LabVIEW, HP-VEE and web experience and code will support Tools and Toys Lab interactions (year 1)
• Web-based tools and high bandwidth support on-line instruction, demonstrations, experimentation, and K-12 outreach throughout CenSSIS. (year 3)
• Distant data collection and experiment regularly control by students or researchers. Reconfigurable image collection and processing will be dispersed and controlled over wireless IP communications channels. (year 5)

References

PI Contact Information
Michael Ruane
Associate Professor, Electrical & Computer Engineering
Boston University
8 St. Mary's Street, Boston, MA 02215-2103
617-353-3256 617-353-6440 fax
mfr@bu.edu
http://people.bu.edu/mfr