

IITG Project Outcomes Form - Report Outcomes : Entry # 239

Name of person reporting outcomes

Lijun Yin

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IITG Project Title

2013-Binghamton-Yin-iTutor and iDemo

Have you applied for, or received additional funds? (choose all that apply):

- Have applied for support from a large funding sources (e.g., NSF, NIH)
- Other (please specify in text box below)

(1) Our 3D/4D facial expression database has been released to the non-for-profit research community through the licensing office of Technology Transfer Office, Research Foundation of Binghamton University. It has also licensed to a number of industry companies, and has received license fees over 20,000\$ as of 2014.

(2) Based on the IITG project, we extended the algorithms of facial expression analysis to develop an automatic pain expression analysis approach for health care application. We have submitted a proposal to the SUNY Health Network of Excellence program, and got funded (150,000\$ July 2015 – June 2016). Title: Health Network: SUNY Network Partnership for Automated Pain Assessment and Pain Management Research. This project is to use 3D imaging sensor and biochemical sensor to assess pains and the level of pains of patients. This is a collaborative project across three SUNY campuses: Binghamton University, SUNY Upstate Medical University, and SUNY Polytechnic Institute (SUNY IT). PI: Prof. Lijun Yin; Co-PIs: Prof. Wunmi Sadik, Prof. Peter Gerhardstein of Binghamton University; and other two Co-PIs from SUNY Upstate Medical University and one Co-PI from SUNY IT.

(3) We will start a new stream in Fall semester of 2015 (so-called Image and Acoustic Signal Analysis (IASA) stream) through the Freshmen Research Immersion Program at Binghamton University. The results generated from the IITG project will be used for undergraduate research projects in next Spring and Fall. This IASA stream has enrolled 30 freshmen student this Fall.

(4) We have submitted a proposal to NSF Improved Undergraduate STEM Education (IUSE) program 2015 and a proposal to the US Department of Education (Institute of Education Sciences) for the education research program in 2014.

1st Choice:

Instructional Technologies

Instructional Technologies

- Artificial Intelligence
- Games (Hardware/Software)

2nd Choice:

Instructional Design

Instructional Design

- Interaction
- Personalized Learning

3rd Choice:

No further selection

What recommendations would you make to scale-up or share your project more broadly (within an educational sector, or perhaps SUNY-wide)?

Project websites and technique publications will be the best way to share the results of the project.

If you would like to create a community of practice within the SUNY Learning Commons, please describe "members of your community" who would be most interested in your outcomes. Please be specific (e.g., math faculty, instructional designers, student services, registrars, administrators, accreditation or assessment specialists).

This project could be of interest to the instructional designers and instructors and researchers in science, engineering, and education.

Do you intend to create an ongoing "Community of Practice" within the SUNY Learning Commons to continue work and dialog regarding this project?

Unsure at this time

Overall, how successful was IITG in meeting your project goals? (You may elaborate on your response in the final question if not addressed elsewhere.)

Successful

The developed system has several components for creating a quality learning environment, including learners' behavior understanding through facial expression analysis, gaze and pose analysis, hand gesture understanding and interaction, voice instruction understanding, and virtual scene generation. The advanced technology and general framework of such learning environment have been developed for proof-of-concept. However, the voice instruction understanding and avatar response component needs to be further improved in order to increase its reliability, usability, adaptability, and the level of intelligence. There is still much work to do in order to make it work in a practical environment. We will continue to refine and revise the system. It will not be ready to create a "Community of Practice" until the system functions more robustly.

Do you wish your current abstract to be used?

No

If you wish to re-word the abstract to reflect updates or outcomes, you may do so in this text box (please keep it brief – less than 150 words - you can expand on this in your files and links)

Principal Investigator: Dr. Lijun Yin, Binghamton University

This project aims to develop an advanced learning technology by utilizing the computer vision and computer graphics technology and further develop a facial expression analysis approach to improve the teaching and learning.

Specifically, two proof-of-concept software systems will be developed: (1) An Idea Illustration and Demonstration (iDEMO) tool will be created, by which the graphical scene will be constructed from the input of speech or text, allowing an instruction or concept to be visualized intuitively; meanwhile, the gesture based interaction could make the system intuitive to use. (2) An Intelligent Virtual Tutor System (iTUTOR) using a synthesized individualized graphical avatar as a “virtual instructor” will be created for interacting with a user. The system will engage learners through recognizing their expressions, voices, poses, eye gazes, and adjust the response and presentation accordingly. Such state-of-the-art system will open a new way towards enhancing effectiveness and engagement of learning.

File One Upload and Brief Description

This is a report of project activity and outcome, including project description and outcomes, resulting publications, and future development.

File One

- [2015Aug_FinalReport_Description_ProjectActivity-v1.pdf](#)

Project Website Address (Hyperlink 1)

<http://www.cs.binghamton.edu/~lijun/Research/IITG/iDemo-iTutor-IITG.html>

Project Website Address (Hyperlink 2)

http://www.cs.binghamton.edu/~lijun/Research/3DFE/3DFE_Analysis.html

Hyperlinks to journal articles or campus/local/national press releases describing your project

<http://www.wicz.com/news/video.asp?video=5-28-13face%2Eflv&zone=News>

Any additional comments or resources you wish to share?

Binghamton Magazine (2014): ‘Room for innovation’
http://issuu.com/suny.binghamton/docs/research_winter_2014 (page 40-43)

Youtube video: “The face of future” by Binghamton University
<https://www.youtube.com/watch?v=HUo6xo6rHNc>

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