Name of Principle Investigator: Lijun Yin
Project Title: iTutor and iDemo: 3D Computer Vision/Graphics with Intelligent Avatar Interaction

1. Please consider the original timeline and deliverable targets. How is your project progressing compared with the original estimates?

During the past semester (Fall 2013), we have developed algorithms and software for interaction between students and computer. Two papers have been presented and published in two technical conferences:

- K. Hu and L. Yin, "Multi-scale topological features for hand posture representation and analysis", 14th IEEE International Conference on Computer Vision (ICCV), December 2013.
- P. Liu, M. Reale, and L. Yin, "Saliency-guided 3D head pose estimation on 3D expression models", 15th ACM International Conference on Multimodal Interaction (ICMI), December 2013.

Compared to the original schedule, we have made progress on part of the technique and software design and implementation. Partial software program has been tested and evaluated using the data from our existing database.

Due to some unexpected hardware equipment problems in the special audio-video sensor and data streaming, we have to delay the further test and evaluation as we scheduled.

We plan to fix the problem and upgrade the system, and will have a new data collection for further testing especially for 3D facial expression data collection and test in both lab and classroom. We request to extend the project for extra six months.

2. How is spending progressing when compared with the original budget estimates?

In the past semester, we have spent funds on (1) purchasing PCs, Tablet, display switch adaptor and Ethernet adaptor, etc. (2) supporting a graduate student as a full-time Research Assistant to perform the system design and software development; (3) partially supporting another graduate student as a part-time RA for system setup and hardware maintenance, and (4) supporting a student to attend a technical conference to present our published papers as listed above.

In general, approximately 43% of funds have been spent in the Fall 2013.

3. Please provide feedback regarding your experience with the project execution. In particular, any issues or roadblocks you've encountered that may have been unexpected.

The project requires the hardware composition, system setup, software design and implementation, and system application for class teaching and learning. The reliability of the hardware and system is the first crucial step towards the success of the project. Due to some unexpected hardware equipment problems in the special audio-video sensor, data streaming, and multi-modal data synchronization, we have to delay further test and evaluation as we scheduled. We plan to use our 3D imaging system to test and collect new data for helping diagnose the problem and software training, and will upgrade our hardware equipment. A collaborator of Harpur College of Arts and Science of Binghamton University will help on new 3D imaging data collection through student interview and training in Spring 2014.

4. What are your positive observations or pleasant surprises about your team's interaction or project process that might would be helpful to other PI's?

During the period of project development, we had some student volunteers to use and test the program. Their suggestions and feedback on the usability of the human computer interaction were beneficial to us to revise the algorithm and make the software easier and better to use.

5. Please describe any challenges you've encountered working with your project team that you've found solutions for that might be helpful to other PI's.

In the past semester, I was mainly working with my graduate students to design and implement the software system for graphical scene generation and interaction. We had some undergraduate student volunteers to work in the same project. As a team, graduate students took a leading role as mentors to supervise undergraduate students to make the project more productive. Undergraduate students also provided many constructive suggestions on how to make the system design more intuitive for a learning tool. Our two technical publications are the results of this effective collaboration.