

Notes from ITR Meeting on 2/15/2005

- ITR team: Dr. Kaber, Dr. Chow, Dr. St. Amant, Zheng, Jae, Lloyd, Thomas, Becca, and Noa.
- Research goals
 - The robotic system carries out automated screening of molecular compounds, but the biopharmacologist is tasked with planning the process, system monitoring and error recovery, and data analysis of the results. Goal: Assist the biopharmacologist with tasks that are not currently supported by automation.
 - Four SAMI lines will be utilized by CELISCA in the future. Currently, six displays are used to monitor and control the screening process. This creates high workload and information loads on the operator. Goal: Develop a single interface that will enable the operator to interact with all SAMI lines efficiently.
- Research steps
 - Cognitive work analysis
 - Complete goal-directed task analysis (GDTA) of biopharmacologist work.
 - Create abstraction hierarchy (AH) models of currently used equipment and automation.
 - Create GOMS model of biopharmacologist tasks.
 - Using the GDTA and AH models, identify information requirements for adequate decision-making that are not met by existing automation.
 - Cognitive modeling: use G2A to translate GOMS code to ACT-R (LISP).
 - Based on cognitive model, develop and evaluate several interface prototypes targeted at different operator workload levels.
 - Develop physiological measures of operator cognitive workload.
 - Develop and train a neural network (NN) to classify workload states based on the physiological measures.
 - Design a user interface management system (UIMS) to adapt the interface to operator workload based on input from the NN.
- Current research status
 - Dr. Kaber completed a GDTA of high-throughput molecular compound screening by eliciting knowledge from a biopharmacologist (Kristin).
 - Dr. Kaber also completed AH models of the equipment used in this process (a bar code device, a pipetting system, an incubator, a robot for transporting micro-plates, and a plate reader) and the automation used to control it.
- Tasks for near future
 - Identify information requirements for adequate decision making that are not met by existing automation.
 - Create GOMS model.

- Develop a draft cognitive model.
 - Acquire information about communication between the supervisory control station and the four SAMI lines; consider remote control (from NC State) of the lines.
 - Develop website for research project – Lloyd, Jae, and Noa.
- Important dates
 - Biweekly meetings. Next meeting – 2/28/05 at 3:00pm.
 - Kristin to arrive in July.