Anthropomorphic Task Analysis for Simulation

Time Slot: 1630-1800

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Abstract

This tutorial discusses the use of anthropomorphic strategies and tools for Simulation. Advances in simulation have produced a suite of strategies and tools for simulation, both open source and commercial. Strategies include numerical, graphic, symbolic, transfer-function models, object oriented models such as Modelica based tools, DEVS and multi physics [COMSOL is such an example].

However, as simulation domains become more complex and draw techniques from various research communities, tools are becoming multi-purpose and multi-modal. This scaling across research domains is an extremely complex simulation interoperability problem. Tools from different research communities that once needed to scale within the communities domain of primary interest now have to scale between research communities. Many solutions attempt to scale via extensions to the community strategies and tools to attach strategies and tools from other communities. This attempts to provide bridge solutions that cross research multi-purpose and multi-modal domains for ever more complex simulations.

This tutorial attempt to provide the audience with a class of bridging solutions based upon anthropomorphic principles and human factors.

Example: Any Downtown with mixed residential, office and commercial.

Requirements for various anthropomorphic interoperability solution

1) Anthropomorphic DAQ [Data Acquisition, I.E., cyber physical]
a) High speed real time
b) Vision [sight]
c) Sound
d) simulated sensors for input from various locations in an extremely complex virtual environment

This requirement requires tools like Labview which is a parallel data flow icon language. The program statements are graphical icons. MATLAB, MATLAB toolboxes and Simulink to absorb the input and Simulink 3D Animation to integrate in a virtual environment. Plus standards and reference implementations [OpenScengraph, X3D viewers] related to WebGL, VRML and X3D derived from open standards communities such as the Web3D consortium and Kronos [OpenGL, OpenCL, WebGL standards].

2) Anthropomorphic computation for the science required by anthropomorphic tools
a) I like to call this Symbolic Algebraic Manipulation
b) plus some logic [PROLOG, ordinal numbers in MAPLE]
c) MATLAB toolboxes. MAPLE and Mathematica and Mathematica's system modeler
d) Numerical physics [COMSOL is an example]
This requirement is for symbolic multi-modal simulation

3) Human Factors Programming
a) Anthropomorphic Languages
b) Usability
This requirement needs anthropomorphic languages in conjunction with standard languages [C, Python, FORTRAN and Parallel API's].
It also helps to throw in English [or French]. An example is equivalents such as SuperCard on the Macintosh or MetaCard for other systems.

This tutorial discusses a solution based upon Human Factors and Task Analysis for formulating an interoperability solution that combines anthropomorphic DAQ, computation and Task Analysis for complex distributed simulation