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## The GNU Neural Network Visualizer (GNNV)

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**Presenter Information**

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Poster Presentation 31

THE GNU NEURAL NETWORK VISUALIZER (GNNV)

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The GNU Neural Network Visualizer (GNNV) is an undergraduate research software project currently being developed by the Shelley Research Group (part of the Illinois Wesleyan Intelligence Network on Knowledge - IWINK) which, in turn, is a part of the Cognitive Science Consortium.

GNNV visualizes a fully-connected feed-forward three-layer artificial neural network, which learns by utilizing an implementation of the Backpropagation Algorithm. Artificial neural networks are a paradigm for pattern recognition which uses as a point of departure the biological structures of neural pathways and learning through the strengthening and weakening of these neural paths. The artificial neural network used by GNNV, built upon source code by Dr. Jeff Shufelt of Carnegie Mellon University, accepts as input the pixel values of digital images, and produces output in the form of answering questions such as, "Is the person in this image smiling?" Artificial neural network learning in GNNV currently consists of face recognition, but is being expanded to be user-definable with the use of any image set (e.g., faces, letters, shapes, etc).

GNNV is designed to be an interactive teaching tool, for use both as a classroom demonstration, and an application for individual student use. Courses in which GNNV may be used include Cognitive Psychology (PSYC 212), Artificial Intelligence (CS 338), and Mind and World (PHIL 103).

GNNV is comprised of two primary components: the foundational artificial neural network backbone, and the graphical user interface. The former is designed to be non-context specific: meaning that this foundational code isn't limited either to pedagogical purposes or even visualization. The later is implemented using the GTK+ graphics toolkit. Both components strongly stress object-oriented programming techniques in their design and implementation. Further, GNNV has provided the researchers involved with experience in large scale software development and the many topics which that involves: software design, distribution of tasks, version control, and issues of human-computer interaction.

GNNV is distributed under the GNU General Public License, which provides that the original source code will always be freely available to the general public.