GLuskap: Visualization and Manipulation of Graph Drawings in 3-Dimensions⋆

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Abstract. GLuskap is a software tool for displaying graphs in 3 di-
mensions, interactively editing the resulting drawing and finally creat-
ing a high quality ray traced image. The software is written in C++
and uses OpenGL and SDL. The interactive editing and navigation fea-
tures may also be used in stereoscopic mode providing an even more
realistic environment. The drawing can be exported either to a stan-
dard graph format or to source code directly suppliable to the POV-
Ray ray tracing package which then renders the drawing into any
standard image format. This software should be of value to all re-
searchers in the 3D graph drawing community and is freely available
at: http://www.cs.uleth.ca/~vpak/demo.

1 Overview

Drawing graphs in 3 dimensions (3D) is a recent active research area. Whereas 2-
dimensional graph drawing has been supported by a variety of powerful software
tools for some time, there are only a few 3D graph drawing packages and most
are tailored for specific applications. GLuskap[1] is a software package for interac-
tively accomplishing the creative and exploratory graph drawing and modeling
commonly required by practioners in this area, and providing a general utility
for the manipulation and visualization of 3-dimensional drawings of graphs.

GLuskap serves as an easy-to-use graphical user interface that produces 3-
dimensional graph drawings in OpenGL. See figure 1. The user is presented with
numerous options for exploring 3D graph drawings, as well as having the ability
to freely modify the representations. Of particular importance is the real-time
interactive vertex and edge manipulation, which allows the user to modify the
graph drawing, and immediately see the results in 3D. Import and export options
accommodate various popular file formats, including GML and GraphML. A
distinguishing feature of GLuskap is its ability to export a 3D graph drawing to
the POV-Ray software package for subsequent rendering into a standard image
format.

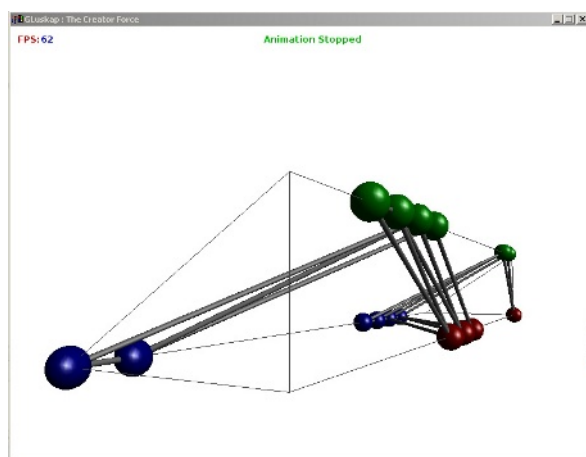[1] Gluskap is the Algonquin name for the *Creator force*
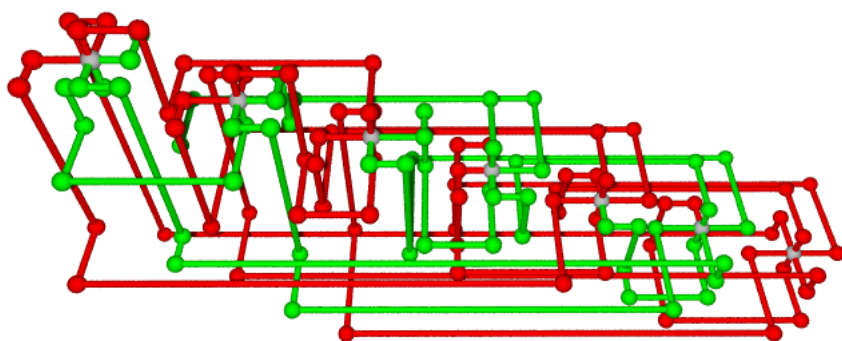
Fig. 1. Screenshot of `GLuskap`

Fig. 2. A Ray-traced image

Figure 2 shows a rendered drawing produced through this process. Many users may wish to bypass the graphical editing/navigating process and concentrate solely on this post-processing step of creating POV-Ray source code. Nevertheless, the navigation aspects of the software are unique, as they provide interactive, 3-dimensional exploration of a graph drawing. Coupled with support for stereoscopic viewing, these features make the visualization aspects of `GLuskap` especially powerful. `GLuskap` is available for download as Windows executables and as C++ source code from `http://www.cs.uleth.ca/~vpak/demo`. See the web site for further screenshots and more detailed information.