RNA-seq Visualization Absract

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The Functional Genomics Research Stream is currently analyzing gene expression changes among four yeast species in response to an environmental perturbation through the next generation sequencing technique RNA-seq. Visualization software has been developed for the Functional Genomics Research Stream to manage the data loads of these sequencing outputs. By graphically displaying a set number of genes, patterns implicit to the image can be recognized intuitively by researchers. The software provides beginners a development template that will generate presentable, original, and discussion-orienting computational work. The project utilizes the Open Graphics Library to render genes in rows and columns, relying on file input to assign a unique height based on the expression value associated with the gene. In the Android display app, the user first selects the experiment, then the species, then the cluster of the image they wish to view. This reductionist experience is based off the generation process of input files. Software solutions that were addressed in the project included drawing information iteratively with OpenGL, creating a formatting program to generate file input, and partitioning tasks among multiple software programs to provide the resources needed to produce the final gene image. Currently, genes are drawn as red with an up arrow to indicate up-regulation and green with a down arrow to indicate repression in an experiment. Future development will center upon adding more detailed information to the final images and finding new ways to group genes into pictures. This visualization software allows a future user infinite possibilities for creative development, encouraging students beginning their research careers to delve deeply into their understanding of the Functional Genomic Stream's research. Researchers can possibly produce additional unique work contributing further to the project, or even genetic discoveries while engaging in the exciting computer output of graphics and application software.