CS 6320 - Project Proposal

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1 Introduction

Data stuff and "what's the point"

Ally and Ryan

Data stuff from proposal:

Our principal dataset is available from the University of Florida Sparse Matrix Collection [1]. We will be partitioning several graphs from this dataset to show that our algorithm is robust and stable. We also plan to include a brain connectivity matrix to see how our algorithm cooperates with a large matrix with real anatomical data [2].

Goals stuff from proposal:

With this project, we aim to partition an undirected graph using the Lanzcos algorithm [3] to find the second smallest eigenvalues and corresponding eigenvectors. We will test the differences between full reorthogonalization and no reorthogonalization in communication, speed and amount of work. We will also test the differences in the amount of iterations to be performed when using Lanzcos. We would compare from 10 to 160 iterations and compare the quality of the partition. We will be analyzing the graphs using SCIRun visualization to check the correctness of our partitions.

2 Description of Algorithm

Ryan

3 Testing & Analysis

Ally

4 Conclusions

Ally

5 References

1. The University of Florida Sparse Matrix Collection, T. A. Davis and Y. Hu, ACM Transactions on Mathematical Software, Vol 38, Issue 1, 2011, pp 1:1 - 1:25.

   http://www.cise.ufl.edu/research/sparse/matrices.

2. David K. Hammond, Yaniv Gur, and Kyle Morgan, "Improving EEG source estimation with DWI-based Anatomical Brain connectivity via sparse representation with cordial graph wavelets."

3. James Demmel, Applied Numerical Linear Algebra, 1996

4. SCI Institute, SCIRun: A Scientific Computing Problem Solving Environment, Scientific Computing and Imaging Institute (SCI), Download from: http://www.scirun.org, 2015

5. Emden R. Gansner and Stephen C. North, "An open graph visualization system and its applications to software engineering", SOFTWARE - PRACTICE AND EXPERIENCE, 2000, 30, 11, 1203–1233, Download from www.graphviz.org