CHOPPER

Chebyshev Polynomial Based Efficient Proximity Retrieval

What is Chopper?

- **Chopper** is a MATLAB Toolbox used for retrieving Top-K proximities in large real world networks. Proximity calculation is based on well-known Chebyshev polynomial.
- Network proximity calculations with respect to the seed query are based on extension of **Random Walk with Restarts** simulations. **Chopper** provides tighter theoretical **upper bound** to accelerate Top-K proximity problem Random Walk with Restarts simulation. Please refer to the related paper for detailed explanations of algorithms used.

RUNNING Chopper

You need **MATLAB** to be able to use **Chopper** in your experiments.

REQUIRED ARGUMENTS

ChopperMain.m script requires 4 arguments:

- **network_file**: this is a sparse MAT file in which each column is normalized. If you have a raw unweighted network, set this score to 1 for all edges then use columnNormalizeEff.m file to normalize the network. If you have weighted network, you may use columnNormalizeEff.m file directly before start your experiments.

- **query**: this is the ID of query you are interested in.

- **damping factor**: this is a real number in (0,1) open interval.

- **K**: this number is for Top-K proximity nodes with respect to query node.

OUTPUT

ChopperMain returns basically four type of outputs:

- rwrScores: proximity scores using standard and Chebyshev based random walk with restart methods

- iterationnumber: number of iterations for standard, Chebyshev and **Chopper** methods.

- Runtime: run time for standard, Chebyshev and **Chopper** methods.
- TopK: top K nodes with respect to query node.

SAMPLE RUNS

```
>> [proxVectorRWR,iterRWR,RuntimeRWR] =
runRWR(normalizedNet,query,alpha);

>> [proxVectorRWRCheb,iterRWRCheb,RuntimeRWRCheb] =
runChebyshevRWR(normalizedNet,query,alpha);

>> [TopKResults,iterChopper, RuntimeChopper] =
runChopper(normalizedNet, query, K, alpha);
```

If you use this code in any case, please refer to corresponding SIGKDD paper.

For your questions, please contact Mustafa Coskun at mxc522@case.edu.