ReadMe: A Clique Partitioning-Based Algorithm for Graph Compression

The repository https://github.com/srabin1/CPGC-Paper.git includes the following:

- Implementation of both Feder-Motwani (FM) and CPGC algorithm in C programming with the corresponding C codes `fm.c` and `cpgc.c`, respectively.
- Implementation of Erdös-Rényi model in R programming to generate bipartite graphs with the corresponding code `generate_graph_data.R`.
- Bash scripts to test FM and CPGC for multiple experiments with the corresponding names, respectively: `fmSbatchScript.sh` and `cpgcSbatchScript.sh`.
- Results obtained from both FM and CPGC algorithms as "Results.csv" file.
- Generated bipartite graphs provided in folder "New_generated_data".

The implementation of the algorithms in the paper have been organized as follows:

Programming Language: R

IDE: RStudio
Version: RStudio 1.2.1235

1. We implemented the Erdös-Rényi model using the *igraph* R package and generated instances for bipartite graphs with $|U| = |W| = n$ number of nodes equal to 2^i, where $i = 5, 6, \ldots, 14$ and having five different densities: $p(\%) = 80, 85, 90, 95,$ and 98.

2. The corresponding file `generate_graph_data.R` in the git repository generates such bipartite graphs.

Programming Language: C

Compiler: gnu
Version: 7 or 9

1. We implemented Feder-Motwani (FM) algorithm (`fm.c`). To compile the code use the bash script with name `fmSbatchScript.sh` in the git repository.

2. We also implemented CPGC algorithm (`cpgc.c`). To compile the code use the bash script with name `cpgcSbatchScript.sh` in the git repository.

3. To compile the FM and CPGC code use the following commands, respectively:
`gcc fm.c -lm -o fm` , `gcc cpgc.c -lm -o cpgc`.

4. The FM and CPGC executable files takes three arguments in the following sequence:
1) `nodes`, i.e., the number of nodes in the given graph,
2) `density`, i.e., the density of the given graph, and
3) `experiment_no`, i.e., the experiment number.

5. To run the FM and CPGC executable files for multiple experiments through a bash script use the following commands, respectively:
`bash fmSbatchScript.sh`, `bash cpgcSbatchScript.sh`