

Analysis and Modeling of Social and Information Networks

CIS 4524/5524, Spring 2021

Homework 6

Due: March 18th

Submit homework as Zipped folder by email to vujicic.tijana@gmail.com

The GCRF tool:

The Gaussian Conditional Random Fields (GCRF) is a structured regression model that incorporates the outputs of unstructured predictors (based on the given attributes values) and the correlation between output variables to achieve a higher prediction accuracy. This representationally powerful model is applied successfully for various social and information networks predictive modeling tasks.

GCRF GUI TOOL integrates various GCRF methods and supports training and testing those methods on real-world data from different domains.

GCRFs is Java library contains basic classes for GCRF concepts and it can be easily extended with new GCRF based methods.

Visit <http://gcrfs-tool.com/> and download GCRFs tool and GCRFs Java library.

When you download and unzip the file run gui.jar file. A user manual is available here <http://gcrfs-tool.com/installation-and-user-manual/>.

This software requires:

- Java 8 - <http://www.oracle.com/technetwork/java/javase/downloads/jdk8-downloads-2133151.html>
- Matlab – Install from Temple Computer Services Download Site: <https://download.temple.edu/>

Assignments:

- 1. Train and test networks** - Train DirGCRF algorithm on "Teen Asymmetric 3x" (teenagers) dataset provided with the tool. Use neural network as unstructured predictor. Also, apply standard GCRF. The model name should be YourName_Assignment1.

For this assignment submit:

- A screenshot of the message that appears after training and testing the model.
- Zipped folder of your model (it will be located in the software folder).

- 2. Train and test temporal networks** - Train m-GCRF algorithm on "Random m-GCRF" dataset. Use linear regression as unstructured predictor. The model name should be YourName_Assignment2.

For this task submit:

- A screenshot of the message that appears after training and testing the model.
- Zipped folder of your model (it will be located in the software folder).

- 3. Train and test random networks** - Train model for random directed graph and directed acyclic graph with an arbitrary number of nodes. Also, train it by a symmetric algorithm. After training these models, test them.

For this task submit:

- A screenshot of the results (table) after training the models.
- A screenshot of the results (table) after testing the models.

- 4. Datasets** -Add a new dataset using txt files that you should generate according to the given rules. Use random generated numbers. Dataset name should be YourName_Assignment4. After adding dataset rename it to YourName_Assignment5.

For this task submit:

- A screenshot of Manage dataset screen after adding your dataset.
- A screenshot of Manage dataset screen after renaming your dataset.
- Zipped folder of your dataset (it will be located in the software folder, in the Datasets subfolder).

- 5. Create basic example using GCRFs Library** and instructions given at <http://gcrfs-tool.com/quickstart-tutorial/>

You can use provided datasets (folder "Dataset" in "GCRFsTOOL" folder) or any free dataset that you can find online.

- For this task submit source code.

- 6. Questionnaire** - Once you are done with all tasks, fill the questionnaire on this link (mandatory task): <http://gcrfs-tool.com/questionary/>

If you have any questions or problems to report please use Q&A section:
<http://gcrfs-tool.com/questions/>

