CMPT 826 - Data and Process Modeling and Analytics

Assignment 3

STEP 1: Preparation (20 Marks)

Using code from or similar to the MAUP assignment, filter out participants with less than 50% of possible battery data, and GPS points outside of Saskatoon, using the same bounding box as the MAUP assignment (52.058367, -106.7649138128), (52.214608, -106.52225318), and a reported accuracy of 100m or better. Aggregate location to the duty cycle level. Grid space at 100 m, and express all locations as positions on this grid.

STEP 2: Find collocation (20 Marks)

For each grid cell, find the records where at least two participants were in the grid cell at the same time (duty cycle). You should have a matrix of participant-participant contacts (1 or 0) for every duty cycle. This represents a dynamic unweighted graph of contacts.

STEP 3: Make a graph (20 Marks)

Aggregate the dynamic graph into a single weighted graph by summing and normalizing the per duty cycle graphs. Each cell of the graph should be the ratio of the total number of times that a pair of participants were proximate over the course of the study, divided by the total number of participants in the study. Use the networkx library to build the graph. Output a visualization of the total contact graph. Describe the contact patterns. For the contact graph, plot the degree distribution. Note its shape, and likely statistical properties.

STEP 4: Centrality (15 Marks)
Using Networkx calculate the degree, betweenness and eigenvector centrality of each node, and report in a table, sorted in order of betweenness. Based on the graph image from step 3, describe three inconsistencies in the ordering of nodes between the different centrality measures by referring to the definitions of those centralities.
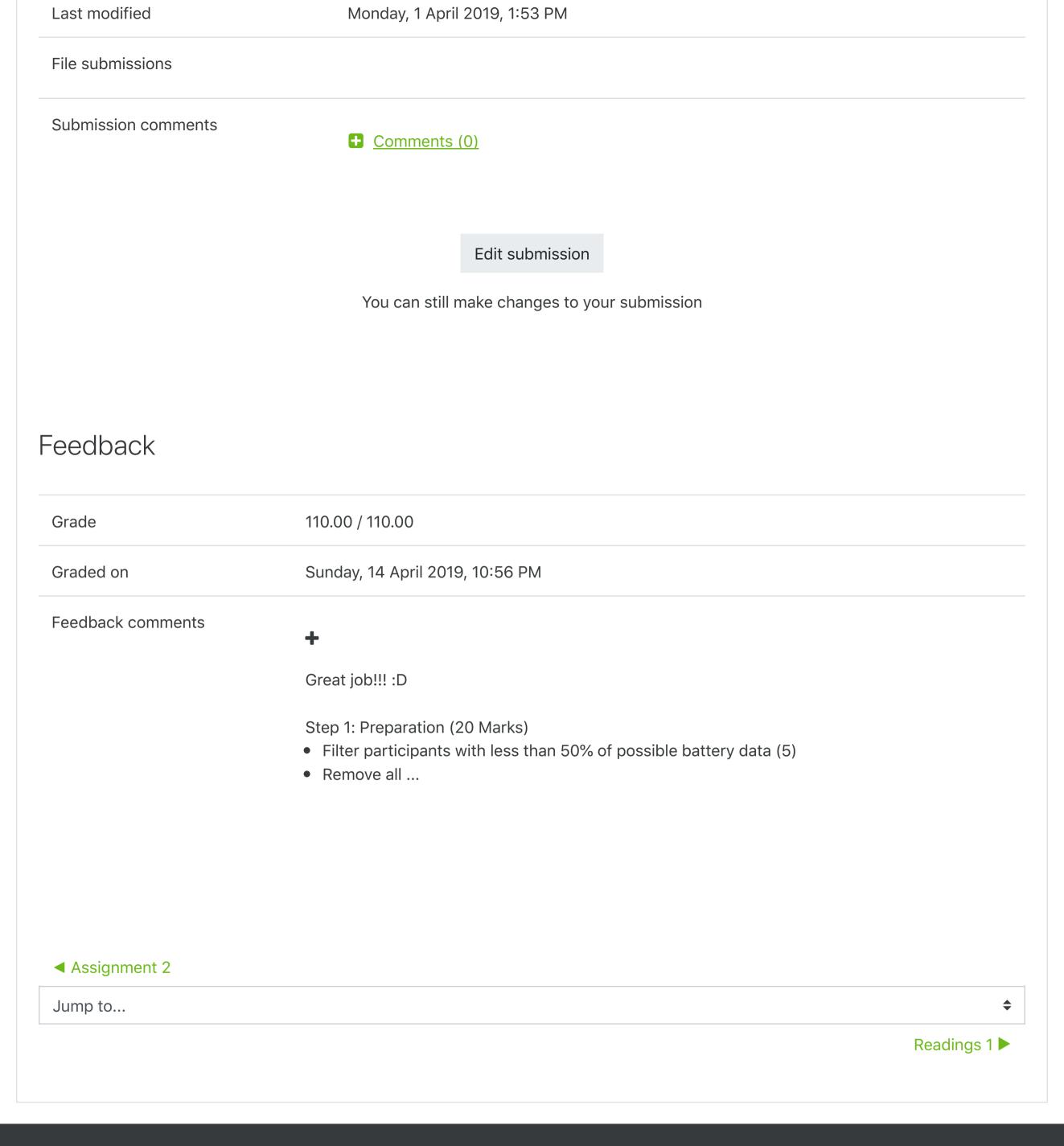
STEP 5: Cluster (15 Marks)

Use Clauset-Newman-Moore greedy modularity maximization clustering in Networkx to partition the graph. What community structure did the algorithm create? How does this relate to what you observed in steps 3 and 4?

Quality of writing and presentation (10 Marks)
Quality of code and code comments (10 Marks)

Submission status

Submission status	Submitted for grading
Grading status	Graded
Due date	Friday, 5 April 2019, 12:00 AM
Time remaining	Assignment was submitted 3 days 10 hours early

Last modified	Monday, 1 April 2019, 1:53 PM
File submissions	
Submission comments	➕ Comments (0)

<div align="center">

Edit submission

You can still make changes to your submission

</div>

Feedback

Grade	110.00 / 110.00
Graded on	Sunday, 14 April 2019, 10:56 PM
Feedback comments	**+** Great job!!! :D Step 1: Preparation (20 Marks) • Filter participants with less than 50% of possible battery data (5) • Remove all ...

◀ Assignment 2

Jump to...   ⬍

Readings 1 ▶