Project-RQ: Radio quality cartography

Topic description:

The application « Radio Mobile Network Tool » is a JavaScript application used for testing and educational purpose. The application uses the Leaflet API that provides some tools to manage geographical data.

The objective is then to develop a few extensions of this application to familiarize themselves with radio engineering concepts. Therefore, this work consists in developing an extension of a network optimization tool.

To assess the quality of a cellular network, the decision maker needs a graphical representation of the radio measurement. The “Mobile Network Optimization Tool” application already provides some essential cartographies such as: cellular cartography, power cartography and interference cartography.

In this project, the students should implement two new cartographies. The first one, called handover cartography, should represent the handover area where the handover could be performed in good conditions. The second cartography should represent the radio constraints between stations, i.e., when the amount of interference between two station is high (see interference computation), the two stations should be linked by a line whose color represents the intensity of the radio constraint.

The geographical area is divided into equally sized meshes of 10mx10m. Already implemented functionalities allow to compute the power signal received on each mesh from each antenna. The students should manage this input for the two cartographies.

The handover cartography shows the ability of meshes to achieve the handover in good conditions. The handover is well achieved when the number of good signals received on a mesh is sufficient. 6 good signals is a very good situation, 3 signals is an average situation and 1 or 0 is bad situation.

The radio constraints cartography is depicted by a graph linking the antennas. Two antennas are linked when the overlapping degree between them is high. The overlapping area could be measured by the area where the ratio between the signals provided by the two antenna is close to 1. Other measurements could be considered.

Methodology, quality process:

- Every week: forum report on the work done (evaluated)
- Program to develop and to run with appropriate GUI (evaluated) ➔ student must join a clear manual of how the simulator is used
- Deliver the program at the latest June 11 (evaluated)
- Presentation of the work via Teams (evaluated) ➔ to be specified later

Best regards,
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