Differential Evolution and Homes for Hubs

Cao, Chi

A network of multiple wireless hubs is needed to provide Wi-Fi access to all buildings on the LSU campus. The primary objectives of this project were to use a Differential Evolution (DE) program to determine the number of wireless hubs needed to cover all buildings on the LSU campus and the locations of these hubs. The secondary objective was to determine the optimal values of the control parameters FF and CR of the DE program. It was hypothesized that 0.9 is the optimum value for both FF and CR. In the experiment, a computer, LSU map, Excel software, and Google Earth software were used. The coordinates of each building were determined using Google Earth and graphed. The number of hubs necessary was approximated by graphing circles representing the range to cover all hubs. The DE program was executed in Excel VBA starting with a number of hubs greater than predicted. The final solution with the least number of hubs was graphed. The solution contained sixteen hubs, as predicted. To find the optimal values for FF and CR, the DE program for sixteen hubs was run three times for each combination of FF and CR values of 0.1, 0.5, and 0.9. Only one run for FF = 0.1 and CR = 0.5 yielded a solution. The hypothesis that the best combination would be FF = 0.9 and CR = 0.9 was not supported.

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