Simulasi Evakuasi Korban Bencana dalam Suatu Gedung Menggunakan Parallel Cellular Automata

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Abstract

The Cellular Automata (CA) model is used to define and apply simulation models, which allow investigating the dynamic behaviors of pedestrians in emergency evacuations. The case study for the simulation that is used in this Final Project is a building fire at London's Grenfell Tower. The CA model is a set of cells that assembled and creat neighborhood, on each state of the cell is given a certain rule according to the status of the iteration time. The CA model has been widely used in modeling for displacement problems, for example, pedestrian simulations. In this Final Project, parallel architecture is used to reduce the problem of computing time. In the simulation can be seen that the more dense people in the building and the larger the room, then the time to do the simulation will be longer. Then for the performance of parallel algorithm on CA using OpenMP parallel algorithm with 4 threads. Looking at graphical time series and parallel CPU time, with room size 1600 1600 and looping movement of people limited as much as 200 times, obtained time CPU program serial time is 19.8179 sec. As for the CPU time of the program parallel is 10.6584 seconds. Can be concluded by looking at the overall results of the CPU time serial and parallel program, that by increasing the size of the room will be seen execution of algorithm workmanship using parallel faster than serial

Keywords: simulation, cellular automata, evacuation, parallel architecture.
