

## Abstract

In this Final Project, Cellular Automata (CA) model to simulate the spread of fire in forest fires is given by using wind data and topography. The case studies for the simulations raised in this Final Project are forest fires on the island of Sumatra, especially forests in Riau Province. The CA model is an alternative model of partial differential equations that have been widely used in modeling for a dispersion problem. Thus, in this Final Project, parallel architecture (shared programming) using OpenMP is also discussed to reduce the problem of computing time. By testing for several grids  $100 \times 100$ ,  $200 \times 200$ ,  $400 \times 400$ ,  $800 \times 800$ , and  $1600 \times 1600$  obtained CPU time values for series and parallel programs. With a grid amount of  $1600 \times 1600$ , CPU time yields for series and parallel programs with wind effects gained respectively 209,055 and 119,558 seconds. The result of Speedup and Efficiency for simulation with wind effect reached respectively 1.74 and 43%

**Keywords:** Simulation, Cellular Automata (CA), OpenMP, Parallel, Fire forest.