Thomas Jefferson Hallway Traffic Simulation
TJHSST Senior Research Project Proposal
Computer Systems Lab 2009-2010

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1 Purpose and Scope

The people-traffic in the hallways at TJ is erratic. Some hallways are jam-packed between periods, during lunch, and before school. Others are deserted, save for three or four students standing in an alcove talking. My intention is to model the traffic of people, both students and faculty, during the school day. Each agent would have social factors coded into it which may change based on interactions with other agents. My program will be easily scaleable and changeable in that it will be easy to change the layout of a school and alter numbers of all types of agents. The because decisions are generatied dynamically, the agents will adapt to whatever environment they are generated in.

Keywords: agent, agent-based modeling, simulation

2 Background Research

I found one helpful article on portal.acm.org, which related to a study of social dynamics within a virtual ecosystem. It discussed a mathematical algorithm for assigning a numerical value to the compatability between two agents. I found this numerical assignment interesting it started me thinking about a scale-based personality method rather than a numerically-unrelated system.

There have been several tech-lab projects on the same general topic in the past. Paul Wood's simulation was also modeled after TJ's hallway traffic, but his simulation was focused on whether or not students were able to make it to their classes on time rather than how social factors affected the congregation areas.

3 Procedure and Methodology

I'll be coding this simulation in Java using JGrasp. There are a number of ways that I'll be able to evaluate my program: lag in the interface, success of agents' pathfinding, accuracy of congregation areas, and sheer number of social factors taken into account.

For much of the first quarter, I've been working on getting the framework and basic functions of the program running. So far, I'm able to direct students to classrooms using standard Real Time Strategy-based controls. To add to the interface experience, I've added a number of views - individual color, grade, gender, and race - which the user can toggle between to better understand the dynamics of the model. Very soon, I intend to implement a schedule-based system which would automatically direct agents (specifically the students) to new destinations (clasrooms) at certain times.

4 Expected Results and Applications

From this simulation, I expect to get a polished visual experience. Almost all of the data will be qualitative and displayed in the way of agents on the screen. These qualitative results would provide an interesting insight into what causes the build-ups of people in certain hallways and intersections. Ideally, the program would be lag-less and perfectly model several hundred agents' movement around the school. The agents would also adapt to changes in the environment such as drops or surges in the number of other people or even an entirely new layout to the building.

This (preferably) comprehensive simulation would have several uses. In light of the expected renovations to TJ, my model could be used to design a hallway and classroom layout which would minimize bottlenecking of hallways. With a well-developed framework, people interested in my project could easily extend it in the future.