MODELING OF PEDESTRIAN TRAFFIC AROUND BOBBY DODD STADIUM

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INTRODUCTION

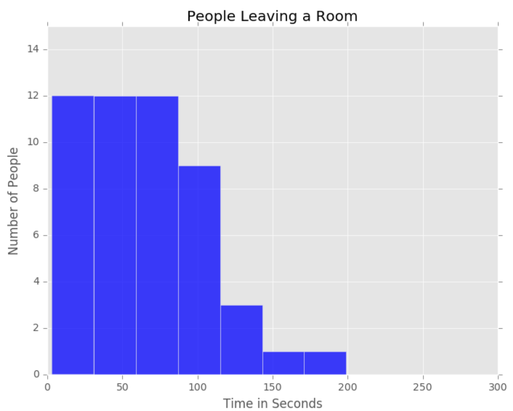
This project is a simulation of foot traffic after the conclusion of a Georgia Tech football game taking place at Bobby Dodd stadium. The main objective of the project is to evacuate the crowd efficiently to minimize evacuation time.

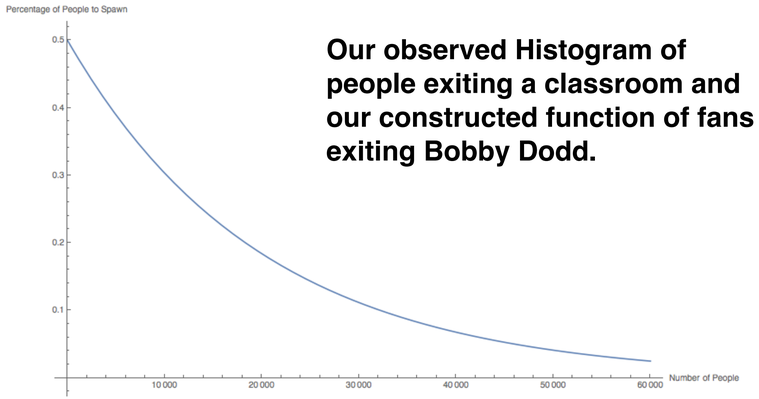
Cellular automata (CA) methods are used to model crowd behavior. A CA method represents pedestrians' walking paths by cells on a 2D lattice. All pedestrians follow local rules considering both physical and social factors to govern their movement. At each time step, a particular cell considers each neighboring cell closer to an exit as a potential next destination assuming no other pedestrian or obstacles interfere.

INPUT ANALYSIS AND QUANTITATIVE DATA COLLECTION

Input parameters for the model are derived primarily from empirical data using assumptions based on existing literature.

An observational experiment of students leaving a classroom was conducted and extrapolated to define a spawning function.





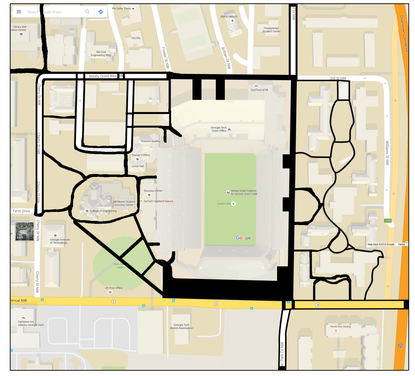
Our observed Histogram of people exiting a classroom and our constructed function of fans exiting Bobby Dodd.

CONCEPTUAL MODEL

The model is based on a 2-dimensional grid over the map of the Bobby Dodd stadium obtained using Google maps and is segmented into a matrix of different pixel values. We select the path network.

Pedestrians spawn at one of ten stadium gates and move towards five chosen exit points via force fields (North Ave. parking, CULC, Klaus, Tech Square, and North Ave MARTA). The static field serves as an "attractor" for the exits in the map.

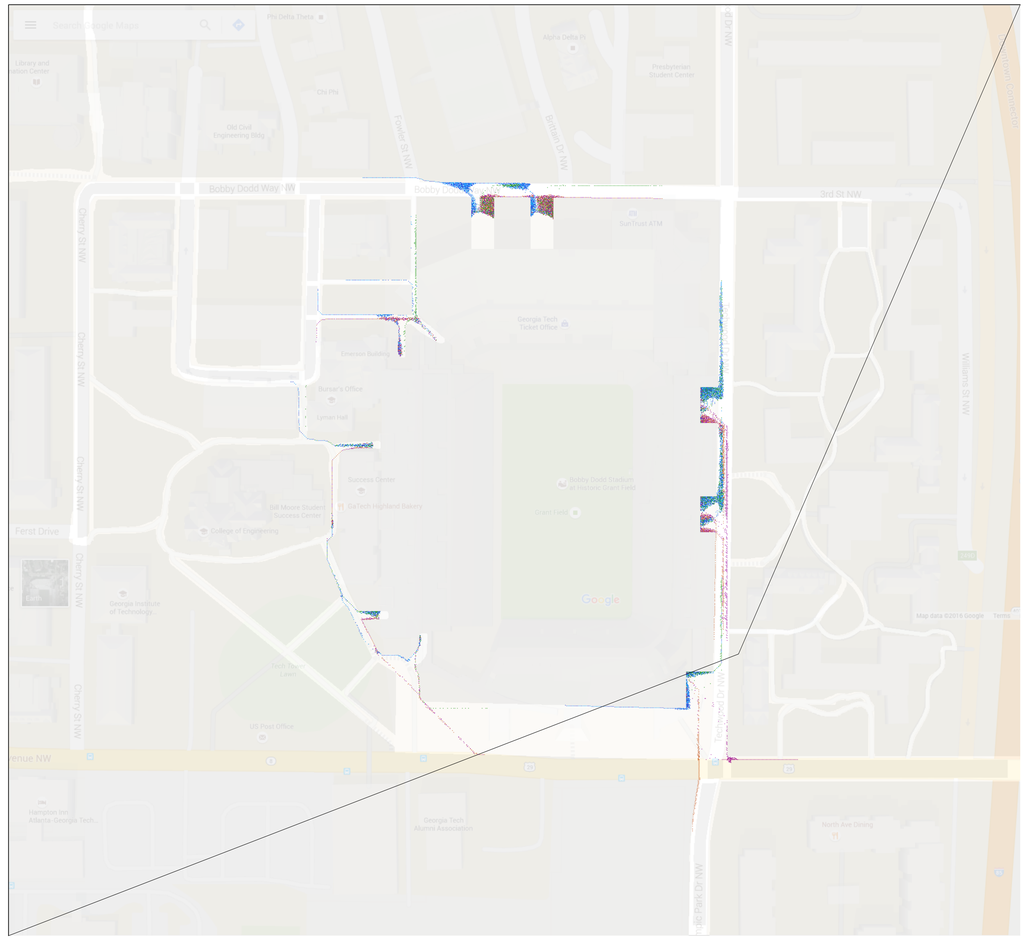
Easily scalable to include more paths, CA rules, and social heuristics.



Selected paths for people to move.

Data: Floor object, vector of humans
while *(current time < max time)* **do**
  Walk all humans;
  Resolve conflicts;
  Remove exited people from simulation;
  Increment time;
  if *time % 100 = 0* **then**
    Write bitmap;
  end
end

Simulation Algorithm.



Single time frame of the final simulation following implementation of the force fields.