FriendCluster

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Problem

Problem: Keeping a Group Together

Solution

What is FriendCluster?

Dynamic spatial alarms that aim to keep groups together

System Architecture

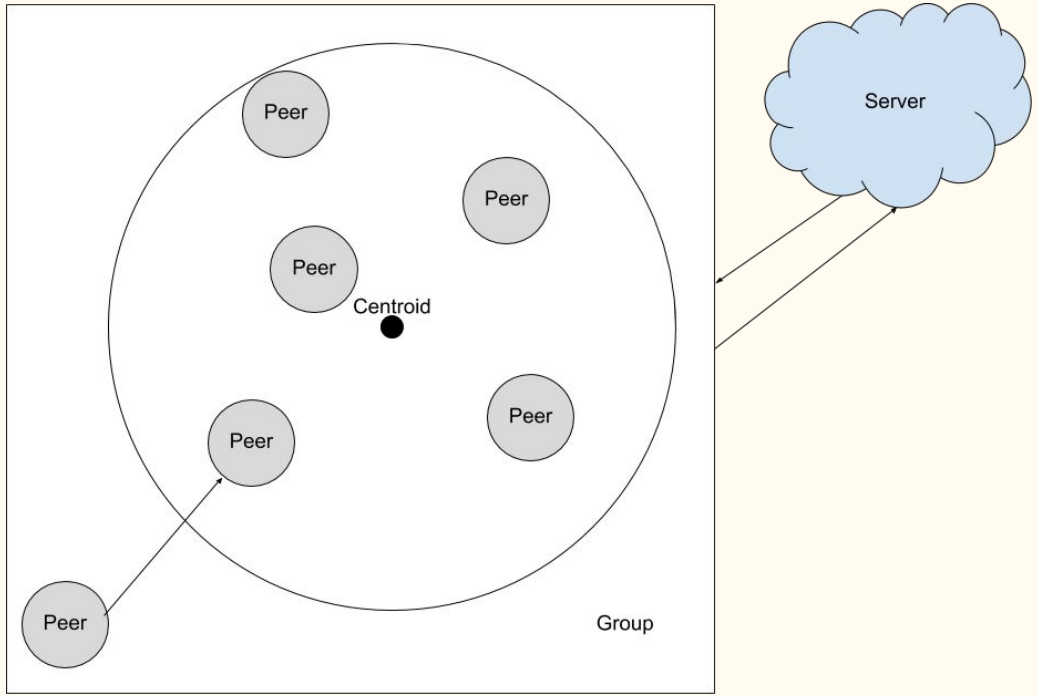


Figure 1. Architectural Design of FriendCluster

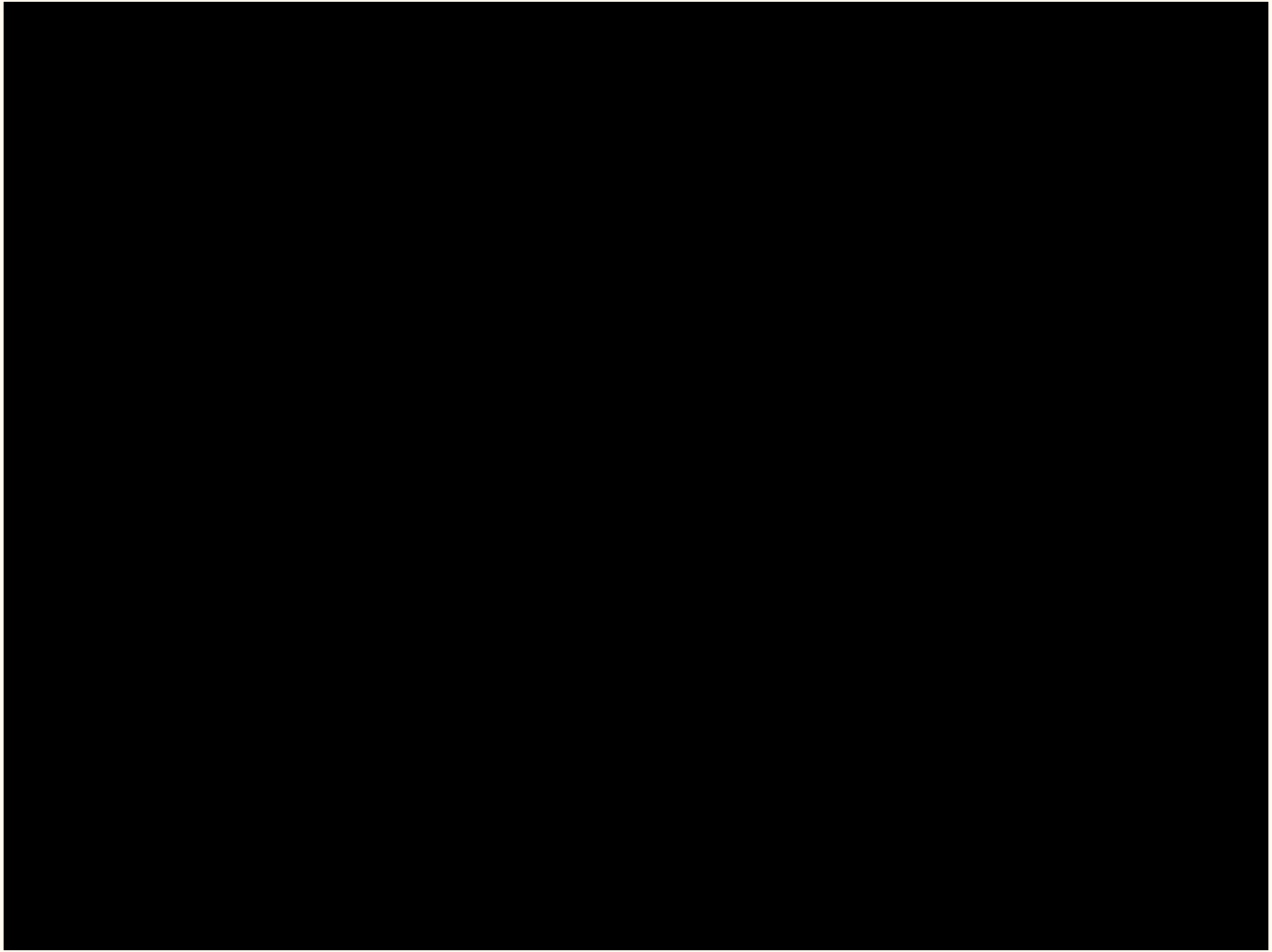
“Safe zones”

- Area determined by the backend in the server that is considered within acceptable closeness to group
  - Deviating from this area triggers an alert
- 3 Types of Safe Zones:
  - Should be able to either have a dynamically calculated centroid circle
    - Friends trying to stay together at a park or music festival
  - Circle centered on a single person
    - Mom and child
  - Circle fixed on GPS location
    - Don’t leave the designated or rendezvous point
    - Meeting up for a group meeting

Demonstration


Tech Green
Campanile Fountain


Campanile Fountain



Methodology and Approach

Inspiration

GT Mobisim

Pros:

- Inspiration for visualizing complicated traces
- Inspired many of the features present in our version of simulating traces

Cons:

- Over-engineered for our project
- Modular Design

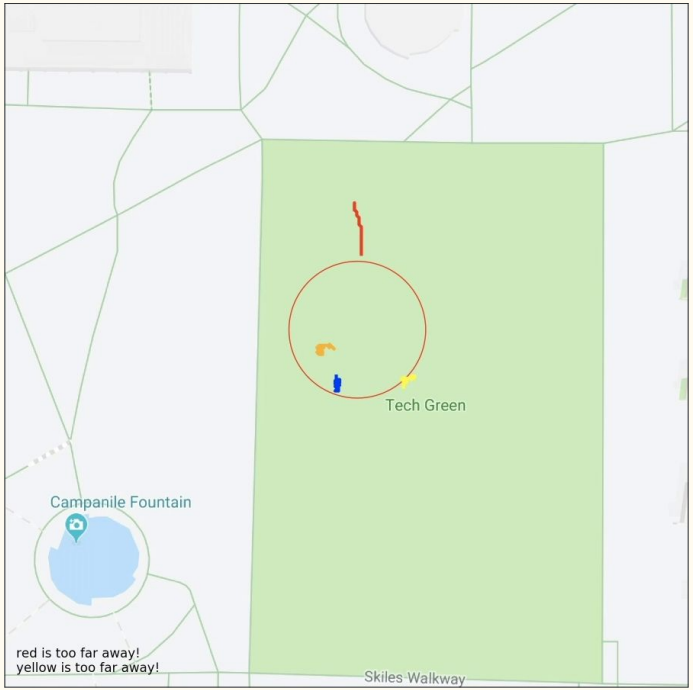
Technologies Used

Walk/Trace Generation

- For development and testing, we created a random walk/trace generator
- Inputs:
  - Heading - 0° to 360°
    - 0° is North and proceeds counterclockwise
  - Strength - 0 to 100
    - 0 creates a random walk
    - 100 follows the heading exactly
    - Strengths in between probabilistically follow the heading
  - Delay - number of ticks
    - the weight parameters are ignored for the first n ticks
- Output:
  - Text file containing the coordinates of each frame of the random walk
  - Each text file simulates one moving object

Walk/Trace Visualizer with Simulation

- Matplotlib
- Visualization of the peers/agents
- Centroid Calculation
- “Safe zone”
- Out of “safe zone” alert



Centroid Calculation

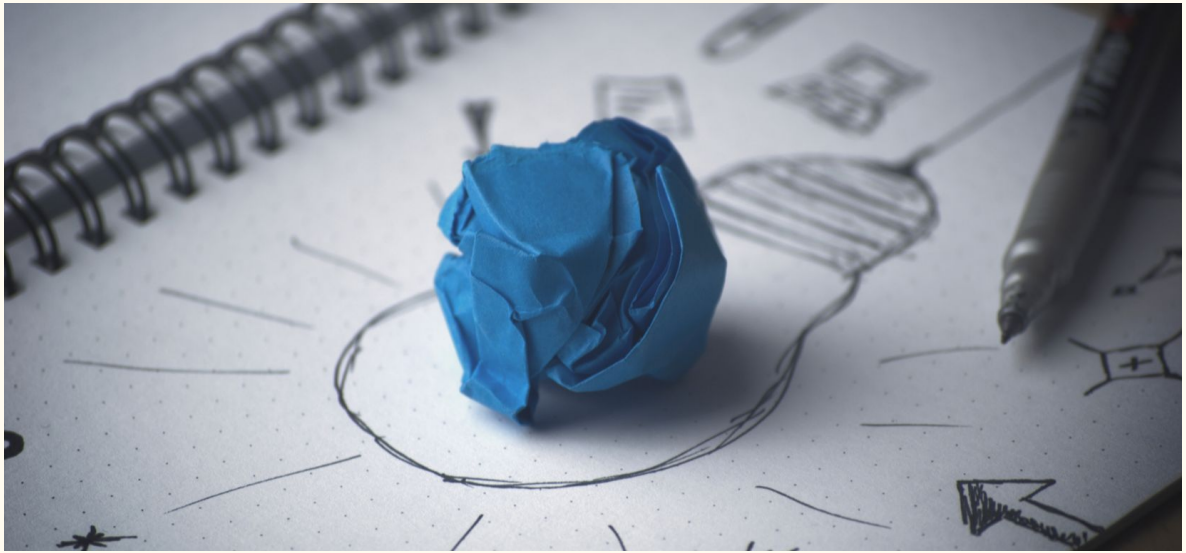
```
def get_centroid(x, y):
    return (sum(x) / len(x), sum(y) / len(y))
```

```
def in_circle(cx, cy, r, zipped):
    return [(z[0] - cx) ** 2 + (z[1] - cy) ** 2 < r ** 2 for z in zipped]
```

Extensions

Prototype

- Simulate a basic version of what our end product would be
- Proof of concept
- Show use cases

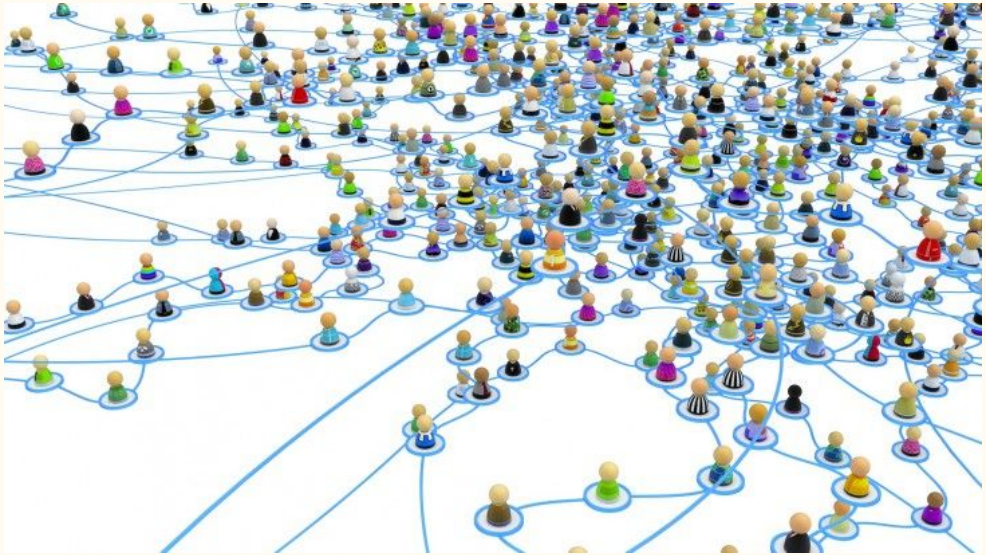


Future Work

- Traces from GPS logging application
- Cloud-based backend deployment
- Mobile app implementation
- Privacy and security issues
- Platform Optimization
    - Apply best practices from spatial alarms

Extra Features

- Modify group after formation
- Look for nearby groups
- Social Network
  - Connect with existing friends
  - Find new friends
  - Integrate login with Facebook/Google to connect with people already in your social circle



Questions?