



Hydrocarbon Sensing

Swarm Behavior & Remote Sensing

By Dave Cavaletto

- Dave Cavaletto
- Sophomore • Computer Science
- Oil Slicks are hard to find if not reported
- Hard to track in real-time and accurately estimate size/volume
- How to monitor an area 24/7/365

Previous and Related Work

- Chris McMurrough – Simulations of Swarm Behaviors
 - <http://heracleia.uta.edu/~mcmurrough/>
- Jorge Cortez – UC San Diego - Distributed Ocean Monitoring via Integrated Data Analysis of Coordinated Buoyancy Drogues

My Approach

- Using an OOL (C#) building a simulation of a swarm
- Each robot only communicates with its immediate neighbors
- Robots will be able to determine the area of a given 'oil spill'

Current State

- Swarm covers given area – spacing dependent on number of bots in swarm/ecosystem size
- User definable number of bots in swarm
- User definable ecosystem size
- User definable background (static)

Future Simulation Goals

- Recognize and identify 'oil' in the water
- Swarm to the oil
- Identify and patrol the perimeter of the 'oil'
- Calculate area of the 'oil'

Future Work

- Oil spill size/shape change to simulate expanding spill
- Employ sub-swarms to make communication more realistic (gateway)
- Ocean current robots must work against to maintain position
- Obstacles that must be navigated around/avoided

Conclusion

