Luke Marsh Meeting

1. Ant: Drones
2. BZ: C…
3. Obstacles
4. Shepherding
5. Heuristics, Metrics (Ammunition)
6. Collaborative Environment

Flocking

Python
Target???, Source??? Known, Unknown (To be)
No Specific Path Planning (To be)
Agent Knowledge (Gossip to be)
Lost???, Threshold for connection
Exchange of Information
Obstacles, detected from Range
Communication Range & Detection Range (Seek Mode already)
Vehicle Profile (To be)
Gossip Algorithm
Genetic
Auction (Most recent)
Energy (To be)
MESA (2D only)

WF

Target detection
Follow Leader Keeps Global
Multi Paths
Multi Flocks
Graph
Starting Points
Joining Conditions (Cohesive coefficient)
De-Centralize Processing
Increasing communication Power
Encrypting Intercepting
ML, Vehicle Dynamics
Obstacles
Friendly forces
Drones (Information Sources)
Repulsion when Colliding
Coding & Agent Size Limitation

SPP-1

GA to find paths
ANN to find SA
Stage I: Single Vehicle, 10 Obstacles, Circular, 2D, Vehicle Profile, X, U
Stage II: Dynamic Obstacles (Range detection)
Stage III: Multi-Vehicle (Flocking, Starting Points, Different Routes)
Detection & Action with ANN

CM Observations:

1. Path
2. Vehicle Dynamics
3. Vehicle Profile and Environment
4. Boundary, Map Size
5. Processing Power, Battery, Number of Agents

Schedule

1. Shepherding
2. SPP Notebook
3. LR
4. Clone MR Environment for Comparisons
5. Flocking

SPP Comparisons:
Best Path, Lowest cost, safest Index?

Shepherding

Ref: Solving the Shepherding Problem
https://parasol.tamu.edu/groups/amatogroup/research/shepherding/

Flocking
Drone
Sweden
Dog, Cohesive Cluster
Drive
Attracted to Centre of Mass (COM)
65m
Target known
Small number harder COM movement
Safety range
Funnel effect, Ramp, Pin
V Shape Control (Misread)
3R (3.R) Japanese
Pc, Pd
Activation Distance (Stall factor)
Closer, Far (Better)
Steps
Path length, Collection, Driving, Shed
Line of Sight?? ← No Sound, NO
Dog knows (GCM), Sheep (GCM), Line of sight
Obstacles

Sheep (Collection of Agents), Shepherding (Control)
Force Vector
Total Travel (Minimizing distance travel)
Python 2 to 3 Issue, Area as Trapezoidal
Python version dependency
Reinforcement Learning, Rewarding
Obstacle Types: Funnel (I/O), Pin, Narrow Gap

Way Forward

- Changing posture
- PF
- Abstraction (Dynamics, Agents control Agents)
- Communication
- UNSW,(Ontology, Semantics, Symbolic, Non-Symbolic)
- Clustering
- General Prior Knowledge, Reinforcement Learning
- Three Sheep, Motor Bike Issue, Herd Optimal Number
- Horse Shoe Issue
- GOAL (Rob)

CM Observations:

- Sheep, Smart Agents, Dog Knows all Herd Details
- SPP, Vehicle non-uniform vehicle profile, Sheep all similar, different path, own control
- Sheep→Shephard???, Multi Flocks and Shephard
- Obstacles (Tangible or non-tangible)
- **Python**, Octave or Matlab
- Vector Method
- Cohesive Flock Definition
- Guiding Systems (GPS, Differential?, Drones, Friendly agents)
- **Time to Reach the Goal**
- PSO for Flocking

Overall

SPP: Best and Safest Path
Flocking: Best Flocking movement
Shepherding: Best Sherpherding

CM:
KERs
SPP LR
Flocking: LR
Shepherding: LR

Safe Path Planning (SPP):

- Vehicle Profile
- Stage I, II, III
- Safe, Shortest, Fastest Path
- LR (Paths & GPS, Autonomous, Our approach)
- PF with DST-Cost Function, Horse Shoe effect, Ant's Obstacles

Shepherding-Strombom Paper:

- 3Ra???
- Shep
  - Start
  - Collect Agents (Side to Side, V Shape better)
  - Cohesive Flock
  - Drive Flock
  - Driving/Collecting
  - Reach Goal
- Centre of Mass (Local & Global)
- Blind Zone