

Decentralizing Self-organizing Maps

Md Mohiuddin Khan, Kathryn Kasmarik, and Matt Garratt

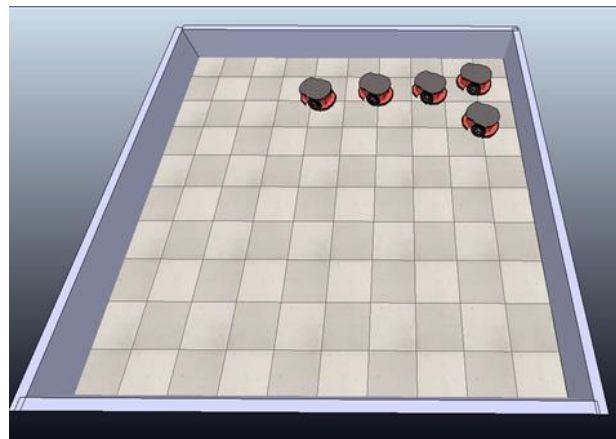
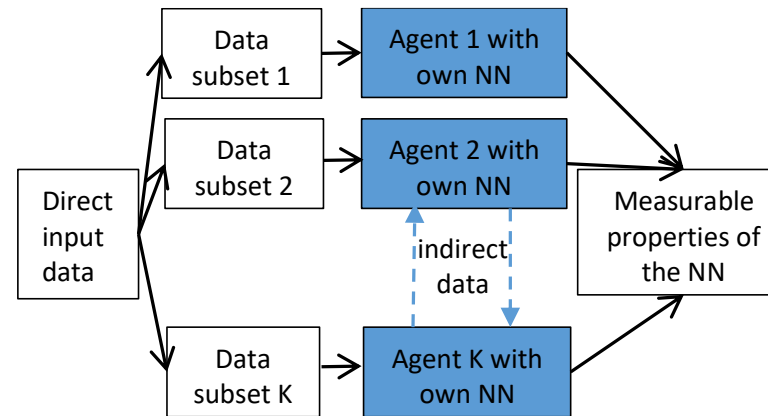
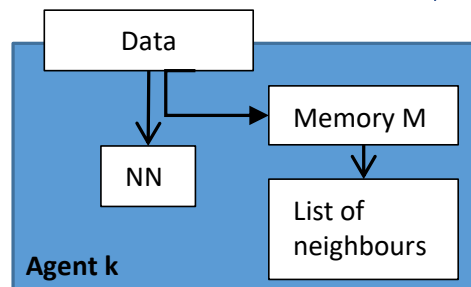
University of New South Wales, Canberra

Introduction

- There are now many mobile robotics platforms available, with increasing application to robot swarms
- There is a need for new machine learning algorithms that can exploit the distributed nature of sensing.
- We examine one such algorithm for decentralized pattern recognition, a **decentralized self-organizing map**.

Approach

- We present a distributed agent model
- Agents use a gossip protocol to communicate



Experiments

- This paper presents experiments with a distributed SOM on
 - Networks with different topologies
 - Agents with imperfect sensors

Performance Metrics

- Quality of representation compared to the original data
- Consistency of representation between agents
- Comparison to individual “centralised” agents

Conclusions

- Decentralised SOMs can learn:
 - Equivalent representations to centralized SOMs
 - More accurate representations in the presence of sensor failure, or heterogeneous sensors
- Future work:
 - Examine performance on dynamic networks while robots are moving in a physical space