SIMULATION of CONSCIOUSNESS using EVOLUTION

J. D. Horton

Problem Statement: Can computers become conscious?

Strong AI says this is possible. It has been estimated that 10^{16} flops may be enough to simulate the human brain: the Chinese Tianhe-1A supercomputer is capable of 2.57×10^{15} flops today. This is far too much for us to use now. We have no good idea of how to develop consciousness in a computer. The only example we have of consciousness occurring came through

Evolution: This requires many generations of agents. Our computers are not powerful enough to deal with one human-like brain, let alone many; therefore, the agents must be much simpler.

Artificial Life: Much of the human brain has to deal with the complexity of our three dimensional universe. Many artificial life simulations still use two dimensional geometry, but this is more complicated than necessary.

Simplified Universe: A universe requires locations (nodes) and you must be able to move from one location to another (edges), thus, the universe is a graph. To populate this universe, we have Beings whose Universe is a Graph, or BUGs. Despite these simplifications, we do not have enough computer power to anticipate consciousness occurring. To get more power, use a

Distributed System, like SETI@home. To attract users, future work requires the development of a fun

Game Interface.

This project could easily take 10 years or more.
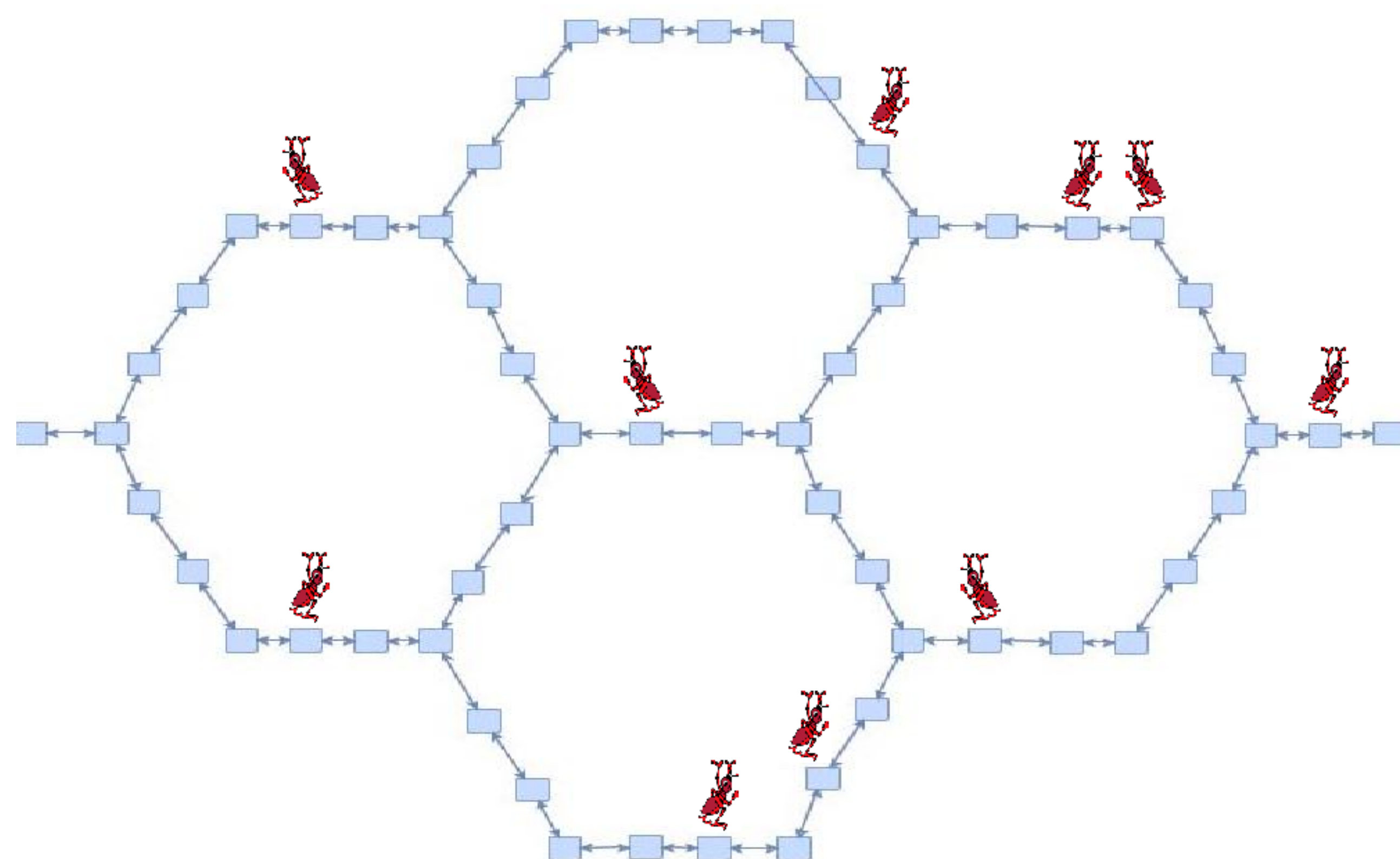
Evolving Communication in an Artificial Simulation.

Michael Francis

Motivation: Communication is often studied to understand its evolution and to develop innovative communication methods for multi-agent systems.

Goal: Develop meaningful situated, unstructured communication between agents in an artificial simulation modeled on the one described here

Methodology: After completing a prototype of the simulation, a communication ability will be given to the BUGs, using a dedicated communication channel. Evolutionary pressure for communication development could arise from:

- Requiring BUG cooperation to consume resources,
- Competition (predator/prey), or
- Through specific graph topologies (see diagram).

Over time, BUGs should come to associate certain events with specific communication signals.

Evolving Emotion-Based Decision making for Virtual Creatures
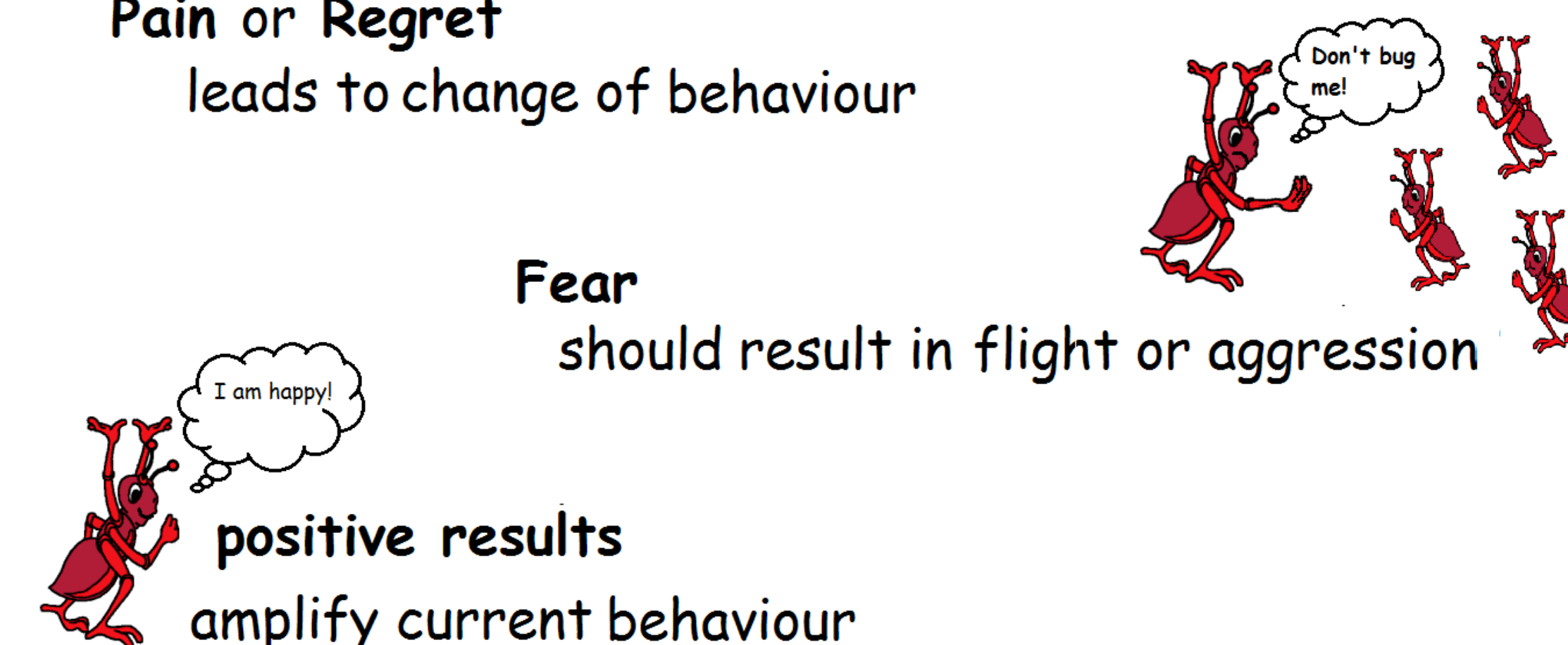
Eckart Sußenburger

Basic Concept:

Decisions that bugs make depend on their emotional state.

Hunger invokes eating

Pain or **Regret** leads to change of behaviour

Fear should result in flight or aggression

positive results amplify current behaviour

Major Goals:

investigate how different universes affect the outcome of evolution

compare various decision making strategies

Invoke Drive