MASENO UNIVERSITY

SCHOOL OF COMPUTING AND INFOMATICS

DEPARTMENT OF COMPUTER SCIENCE

CCS 421: INTELLIGENT AGENTS

RESEARCH TITLE: PRACTICAL EXAMPLES AND APPLICATIONS OF REACTIVE AND GOAL BASED AGENTS

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A RESEARCH PAPER SUBMITTED IN PARTIAL FULFILLMENT OF THE REQUIREMENT FOR THE BACHELOR OF SCIENCE DEGREE (BSC.) IN COMPUTER SCIENCE

PRACTICAL EXAMPLES AND APPLICATIONS OF REACTIVE AGENTS.

1. **Mobile Robot**

   A mobile robot is a robot that is capable of locomotion. Mobile robots have the capability to move around in their environment and are not fixed to one physical location. Mobile robots can be "autonomous" (AMR - autonomous mobile robot) which means they are capable of navigating an uncontrolled environment without the need for physical or electro-mechanical guidance devices. Alternatively, mobile robots can rely on guidance devices that allow them to travel a pre-defined navigation route in relatively controlled space (AGV - autonomous guided vehicle). This is one example of reactive agent application in the engineering industry since the robot reacts to the environment around it.

2. **Entertainment**

   Video games where characters face difficulties in virtual word situation. Especially in fighting and shooting games.

3. **Electronic commerce**

    Agents combine business strategies to bring customers and suppliers together to do transactions online.

4. **Steel's Mars Explorer**

   This system, using the subsumption architecture, achieves near-optimal cooperative performance in simulated 'rock gathering on Mars' domain. The objective is to explore a distant planet, and in particular, to collect samples of a precious rock. The location of the samples is not known in advance, but it is known that they tend to be clustered. For individual (non-cooperative) agents, the lowest-level behavior, (and hence the behavior with the highest 'priority' is obstacle avoidance). It works as follows:

   1. If detect an obstacle then change direction
   2. If carrying samples and at the base then drop samples
   3. If carrying samples and not at the base then travel up gradient
   4. If detect a sample then pick up sample
   5. If true then move randomly

5. **RULER – Situated Automata**

Takes three inputs as components:

1. The semantics of the agent's inputs ('whenever bit 1 is on, it is raining')
2. A set of static facts ('whenever it is raining, the ground is wet')
3. A specification of the state transitions of the world ('if the ground is wet, it stays wet until the sun comes out').

4. **Traffic Light Control.**

   Agents can respond quickly to frequent traffic changes. Where agents are simple and react to their environment and also respond other agents adjacent to them.

PRACTICAL EXAMPLES AND APPLICATIONS OF GOAL-BASED AGENTS.

1. Network Management

Some of the first applications of multi-agent systems were related with network management. ARCHON was both a generic platform and a methodology to build up multi-agent systems integrating heterogeneous expert systems like agents.

2. Automated Driving

This is a goal based, utility-based agent. Cameras are used to gain positions of car, the edges of lanes and the position of the goals. The car can speed up, slow down, change lanes, turn, park, pull away and so forth.

3. Goal Oriented Action Planning

This is a planning architecture designed for real time control of autonomous character behavior in games. GOAP will give your agents choice and the ability to make intelligent decisions without having to maintain a complex finite state machine (FSM). It is an artificial intelligence system for autonomous agents that allows them to dynamically plan a sequence of actions to satisfy a set goal.