R & D
About the Reader

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April 6, 2015

Reader Profile

Who will be the typical reader of the report?

- Researchers/students in the field of computer science, evolutionary robotics and energy efficient vehicle control with a good mathematical background

Who should be able to understand at least half of it?

- Anyone that understand the high level concepts of evolutionary algorithms, artificial neural networks (and some basic physics)
- Anyone with the ability to understand and follow abstract concepts, algorithms and ideas.

Reader Profile

What knowledge do you expect the reader to have on a...

- General level
  - ANNs can be used for control tasks
  - EAs can be used to design ANNs
  - There are algorithms to apply EAs to ANNs
  - literature: -none specific-
- More Specific Level
  - EAs can evolve the weights and the topology of an ANN w.r.t. a given task
  - literature: -none specific-
- Detailed Level
  - -none-
  - literature: -none specific-

What shall the reader gain/learn?
General Level

- SOA approaches use Graph Search
- ANNs are able to outperform Graph Search approaches
- Transferring solutions onto real devices is non-trivial
- ANNs can be evolved for optimal energy efficient control
- Evolved ANNs have not been used on real devices for energy efficient vehicle control so far

What shall the reader gain/learn?
Specific Level

- Graph Search approaches have memory problems
- ANNs do not need much storage
- Problem with reality gap stems from inaccurate simulations
- Accurate simulations need too much computation time and memory

What shall the reader gain/learn?
Detailed Level

- The higher the level of discretization the more memory Graph Search does need
- ANNs are do not require a previous discretization of the problem
- NEAT is an SOA approach that can be used to design an ANN for energy efficient vehicle control
- The reality gap can shrink using more elaborate motor models
- The transferability approach can minimize the reality gap