

HANOI UNIVERSITY OF SCIENCE AND TECHNOLOGY
SCHOOL OF INFORMATION AND COMMUNICATION
TECHNOLOGY

GRADUATION THESIS
DEPARTMENT OF COMPUTER SCIENCE

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Class : ICTX - K6X
Supervisor : Associate Professor X

Hanoi, May 2020

Graduation mission ticket

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Main purpose of the thesis

1. Research about
2. Research and apply

Specific mission of the thesis

1. Research
2. Apply
3. Implement
4. Conduct the experiments, synthesize and analyze the result.

Pledge of student

I am *Nguyen Van X* guarantee that this thesis is my own work under the supervision of Associate Professor X.

The proposals and results in this thesis are authentic and original. .

Hanoi, xxth, Month 202X

Author of thesis

Nguyen Van X

Confirmation for the completeness of the thesis and permission for the thesis to be defense from supervisor

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Hanoi, xxth, Month 202X

Supervisor

Assoc Prof. X

Acknowledgement

I would like to thanks

Hanoi, xx^{th} , Month 202X
Nguyen Van X

Abstract

Abstract of your thesis
The thesis is organized as follows:

- **Chapter 1** provides
- **Chapter 2** introduces
- **Chapter 3** presents
- **Chapter 4** represents

Preface

Describe overview of the field and your motivation why are you doing this topic

Glossaries

| Acronym | Full terminology |
|---------|--|
| EA | Evolutionary Algorithm |
| GA | Genetic Algorithm |
| EP | Evolutionary Programming |
| GP | Genetic Programming |
| ES | Evolution Strategies |
| MFO | Multifactorial Optimization |
| MOO | Multi Objective Optimization |
| ANN | Artificial Neural Network |
| MFEA | Multi Factorial Evolutionary Algorithm |
| MDP | Markov Decision Process |
| RL | Reinforcement Learning |
| SL | Supervised Learning |
| SBX | Simulated Binary Crossover |
| FSM | Functional Synergies Measure |

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Chapter 1

Introduction

1.0.1 Deep Q-Network

Deep Q-network [?]

Chapter 2

Problem formulation

Chapter 3

Proposed method

3.0.1 New algorithm

Algorithm 1 Assortative mating

Consider two parent candidates p_a and p_b randomly selected from *current* – *pop*

- 1: Generate a random number $rand$ between 0 and 1
 - 2: **if** $(\tau_a == \tau_b)$ or $(rand < rmp)$ **then**
 - 3: Parents p_a and p_b crossover to give two offspring individuals c_a and c_b
 - 4: **else**
 - 5: p_a is mutated slightly to give an offspring c_a
 - 6: p_b is mutated slightly to give an offspring c_b
 - 7: **end if**
-

Chapter 4

Result

4.0.1 Small instance

| Gravity | EA | | | | MFEA | | | |
|---------------|--------|--------|-------|----------|--------|---------------|-------|------|
| | Best | Mean | Std | Time (s) | Best | Mean | Std | Time |
| gravity=0.80 | 200.00 | 200.00 | 0.00 | 1.10 | 200.00 | 200.00 | 0.00 | 1.13 |
| gravity=10.80 | 200.00 | 200.00 | 0.00 | 1.10 | 200.00 | 200.00 | 0.00 | 1.13 |
| gravity=20.80 | 200.00 | 200.00 | 0.00 | 1.10 | 200.00 | 200.00 | 0.00 | 1.13 |
| gravity=30.80 | 200.00 | 200.00 | 0.00 | 1.10 | 200.00 | 200.00 | 0.00 | 1.13 |
| gravity=40.80 | 200.00 | 200.00 | 0.00 | 1.10 | 200.00 | 200.00 | 0.00 | 1.13 |
| gravity=50.80 | 200.00 | 196.95 | 11.29 | 1.10 | 200.00 | 200.00 | 0.00 | 1.13 |
| gravity=60.80 | 200.00 | 199.99 | 0.04 | 1.10 | 200.00 | 200.00 | 0.00 | 1.13 |
| gravity=70.80 | 200.00 | 189.38 | 24.78 | 1.10 | 200.00 | 200.00 | 0.00 | 1.13 |
| gravity=80.80 | 200.00 | 191.43 | 18.90 | 1.10 | 200.00 | 199.31 | 2.95 | 1.13 |
| gravity=90.80 | 200.00 | 167.84 | 26.90 | 1.10 | 200.00 | 193.62 | 11.08 | 1.13 |

Table 4.1: some description

Conclusion

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