Fuda van Diggelen

PhD candidate,

Artificial Intelligence: Evolutionary Robotics
https://fudavd.github.io

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Social Network ——

- ORCID: 0000-0002-7972-1649
- Google Scholar profile
- LinkedIn profile
- Github

Languages ——

- 🇳🇱 Dutch ● ● ● ● ●
- 🇬🇧 English ● ● ● ● ●
- 🇩🇪 German ● ● ● ○ ○

Hard Skills ——

- Scientific Research
- Python, C++, MATLAB
- Robotics, Modeling & Simulation
- Statistics & Analysis

Soft Skills ——

- Creative Thinking
- Communication
- Writing
- Problem Solving

About Me

Second year PhD candidate in evolutionary robotics with a broad curiosity in topics of (embodied) intelligence, complex systems and control theory. Graduated with two masters: Human Movement Science and Mechanical Engineering. With a focus on neuromechanics and bio-robotics respectively. In general, I like to tackle hard problems by implementing out of the box ideas that combine techniques/mechanisms from different fields and/or nature. Currently, I am mostly interested in using machine learning techniques for data-driven modelling of complex systems in robotic control.

Working Experience

2022 – 2022 — **Visiting Researcher** — Technology Innovation Institute
Autonomous drone swarm experiments using CrazieFly platform

2020 – Now — **PhD Candidate** — VU Amsterdam, *Computer Sciences*
Artificial Intelligence: Evolutionary Robotics

2019 – 2020 — **Research Internship** — VU Amsterdam, *Computer Sciences*
Conducting evolutionary robotics research for my master thesis.

2019 – 2020 — **Master Programme Committee** — VU Amsterdam, *Behavioural and Movement Sciences*
Representing students' interest and advising programme board to improve education.

2018 – 2018 — **Teacher Assistant** — VU Amsterdam, *Behavioural and Movement Sciences*
Teaching during practicals in the course Physics and Measurements.

2014 – 2019 — **Teacher** — Bijlesnetwerk/Lyceo
Tutoring high school students in mathematics, physics, chemistry and biology.

Education

2018 – 2020 — **MSc. & ME. Mechanical Engineering, *Biorobotics*** — TU Delft
Focus: Analysis and application of bio-inspired design for robotic systems.

Master Thesis ($\varnothing\,8.5$) — TU Delft
Title: *Adaptive Control for Evolutionary Robotics.*
Designing and implementing continuous learning for adaptive feedback control. Analysis on the resulting performance dynamics in robots during a machine learning task.

2017 – 2020 — **MSc. Human Movement Science: Research** cum laude — VU Amsterdam
Focus: Integrating fundamental scientific research with relevant questions from clinical and sports practice.

Master Thesis ($\varnothing\,8.5$) — VU Amsterdam
Title: *The Role of Proprioceptive Feedback in Learning Locomotion.*
Testing the Internal Model Control hypothesis in bio-inspired robots that learn locomotion.

2014 – 2017 — **BSc. Bewegingswetenschappen** — VU Amsterdam
Focus: Broad understanding of human movement and all the underlying processes.

Bachelor Thesis ($\varnothing\,8.0$) — VU Amsterdam
Title: *Do humans continuously minimize metabolic energy expenditure per meter during walking?*
Research on the capabilities of humans to continuously optimize their walking behaviour during locomotion.

Besides Work

Relaxing   Sports, reading books and meeting with friends.
Sports   Climbing/bouldering, football, and running.
Music   Writing songs, playing the guitar and going to festivals.
Gardening   Growing a vegetable garden.

Other Activities, Projects & Achievements

- **Nominated for best Master thesis award:** at Vrije Universiteit Amsterdam for my work *The Role of Proprioceptive Feedback in Learning*.

- **Research Visit:** Collaboration on machine learning applications in racing drones (at ICRA) and swarm robotics experiments, at Technology Innovation Institute (TII) Abu Dhabi.

- **Volunteering during COVID-19:** Helped build the *Dutch ICU Data Sharing* pipeline, and developed reinforcement- and supervised- learning models to improve hospital policies.

- **Dam tot Damloop:** Completed 16k run in 1:12:27 with an average pace of 4:30.

References

prof. dr. **Guszti Eiben**
VU Amsterdam, Computer Science   `a.e.eiben@vu.nl`
Relationship: Guszti Eiben is head of the Computational Intelligence group at the Vrije Universiteit Amsterdam, and my main supervisor during my PhD.

dr. ir. **Eliseo Ferrante**
Technology Innovation Institute & *VU Amsterdam, Computer Science*   `e.ferrante@vu.nl`
Relationship: Eliseo Ferrante is a senior director at the Technology Innovation Institute (TII), assistant professor at the Vrije Universiteit Amsterdam, and my daily supervisor during my PhD.

Publications

2022   **Comparing robot controller optimization methods on evolvable morphologies**
F. van Diggelen, E. Ferrante, A.E. Eiben
Evolutionary Computation, UNDER REVIEW

2022   **Environment induced emergence of collective behaviour in evolving swarms with limited sensing**
F. van Diggelen, T. Karagüzel, J. Lo, E. Ferrante, N. Cambier, A.E. Eiben
In Proceedings of the Genetic and Evolutionary Computation Conference. pp. 31-39
doi: 10.1145/3512290.3528735

2021   **The Influence of Robot Traits and Evolutionary Dynamics on the Reality Gap**
F. van Diggelen, E. Ferrante, N. Harrak, J. Lo, D. Zeeuwe, A.E. Eiben
IEEE Transactions on Cognitive and Developmental Systems
doi: 10.1109/TCDS.2021.3112236

2021   **Large-scale ICU data sharing for global collaboration: the first 1633 critically ill COVID-19 patients in the Dutch Data Warehouse**
L.M. Fleuren, M. Tonutti, D.P de Bruin, et al.
Intensive care medicine 47(4). pp. 478–481
doi: 10.1007/s00134-021-06361-x

2021   **Comparing lifetime learning methods for morphologically evolving robots**
F. van Diggelen, E. Ferrante, A.E. Eiben
In Proceedings of the Genetic and Evolutionary Computation Conference Companion pp. 93-94
doi: 10.1145/3449726.3459530

2021   **Risk factors for adverse outcomes during mechanical ventilation of 1152 COVID-19 patients: a multicenter machine learning study with highly granular data from the Dutch Data Warehouse**
L.M. Fleuren, M. Tonutti, D.P de Bruin, et al.
Intensive care medicine experimental, 9(1). pp. 32
doi: 10.1186/s40635-021-00397-5

2021   **Learning Directed Locomotion in Modular Robots with Evolvable Morphologies**
G. Lan, M. De Carlo, F. van Diggelen, J. M. Tomczak, D. M. Roijers, and A.E. Eiben
Applied Soft Computing, 111. pp. 107688
doi: 10.1016/j.asoc.2021.107688

2020   **The Effects of Adaptive Control on Learning Directed Locomotion**
F. van Diggelen, R. Babuska, and A.E. Eiben
IEEE Symposium Series on Computational Intelligence (SSCI). pp. 2117-2124
doi: 10.1109/SSCI47803.2020.9308557