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Research Interests

My research interests are in the broad area of Artificial Intelligence Techniques. More specifically, I am interested in computational intelligence, theory and applications of genetic programming and evolutionary computation. I am also involved in evolutionary art, where the personal aesthetic preference is modelled and followed by evolutionary methods. Additionally, I am interested in data mining for engineering, design and health areas. More recently, I have started contributing to social learning and trust in AI.

Employment

School of Computer Science and Digital Technologies
College of Engineering and Physical Sciences
1 Sept 2023 → present

Computer Science Research Group
College of Engineering and Physical Sciences
21 Feb 2012 → present

Engineering for Health
College of Engineering and Physical Sciences
15 Dec 2023 → present

Aston Centre for Artificial Intelligence Research and Application
College of Engineering and Physical Sciences
15 Dec 2023 → present

College of Engineering and Physical Sciences
Birmingham, United Kingdom
1 Jan 2006 → present

Professor
Applied AI & Robotics
College of Engineering and Physical Sciences
1 Sept 2023 → present

Guest editor for Special Issue of the IEEE Transactions on Games journal on Evolutionary Computation for Games
IEEE
Bangalore, India
1 Jan 2021 → present

Partner Editor for Evolutionary Computation, Springer Nature Computer Science
Springer Publishing

Heidelberg, Germany
1 Jan 2021 → present

Associate Editor, International Journal of Virtual and Augmented Reality
IGI Global
1 Jan 2017 → present

Editorial Board Member, Genetic Programming and Evolvable Machines journal
Springer
1 Jan 2012 → present

Research outputs

Predictive World Models for Social Navigation

Oguzie, G., Ekárt, A. & Manso, L. J., 1 Feb 2024, *Advances in Computational Intelligence Systems, Contributions Presented at the 22nd UK Workshop on Computational Intelligence*. Naik, N., Jenkins, P., Grace, P., Yang, L. & Prajapat, S. (eds.). Springer, p. 53–64 13 p. (Advances in Intelligent Systems and Computing (AISC)).

Estimating the Limits of Organism-Specific Training for Epitope Prediction

Ashford, J., Ekárt, A. & Campelo, F., 1 Jan 2024, *4th Workshop on Artificial Intelligence and Big Data vs. Pandemics: at 2023 IEEE International Conference on Bioinformatics and Biomedicine (BIBM)*. IEEE, p. 4195-4202

The Stuff We Swim in: Regulation Alone Will Not Lead to Justifiable Trust in AI

Powers, S. T., Linnyk, O., Guckert, M., Hannig, J., Pitt, J., Urquhart, N., Ekárt, A., Gumpfer, N., Han, T. A., Lewis, P. R., Marsh, S. & Weber, T., 31 Dec 2023, In: *IEEE Technology and Society Magazine*. 42, 4, p. 95-106 12 p.

Predicting Normal and Anomalous Urban Traffic with Vectorial Genetic Programming and Transfer Learning

Hamilton, J. R., Ekárt, A. & Patelli, A., 9 Apr 2023, *International Conference on the Applications of Evolutionary Computation (Part of EvoStar)*. Correia, J., Smith, S. & Qaddoura, R. (eds.). 1 ed. p. 519–535 16 p. (Lecture Notes in Computer Science (including subseries Lecture Notes in Artificial Intelligence and Lecture Notes in Bioinformatics); vol. 13989 LNCS).

Is Beauty in the Age of the Beholder?

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Axial Generation: Mixing Colour and Shapes to Automatically Form Diverse Digital Sculptures

Easton, E., Ekárt, A. & Bernardet, U., Nov 2022, In: *SN Computer Science*. 3, 6, 17 p., 505.

The Use of Retinal Microvascular Function and Telomere Length in Age and Blood Pressure Prediction in Individuals with Low Cardiovascular Risk

Shokr, H., Lush, V., Dias, I. H., Ekárt, A., De Moraes, G. & Gherghel, D., Oct 2022, In: *Cells*. 11, 19, 15 p., 3037.

A GENTLER Approach to Urban Traffic Modelling and Prediction

Patelli, A., Hamilton, J. R., Lush, V. & Ekart, A., 23 Jul 2022, *2022 IEEE Congress on Evolutionary Computation, CEC 2022 - Conference Proceedings*. IEEE, p. 1-8 8 p. 9870273

A Remote Breathing Relaxation System- A case-study for Web-based Real-time Adaptive Human to Virtual Human Interaction

Dar, S., Ekart, A. & Bernardet, U., 11 Jul 2022, *Proceedings of 35th British HCI Conference Towards a Human-Centred Digital Society, HCI 2022*. 4 p.

The Virtual Human Breathing Coach

Dar, S., Ekart, A. & Bernardet, U., 20 Apr 2022, *Proceedings of 2022 IEEE Conference on Virtual Reality and 3D User Interfaces Abstracts and Workshops (VRW 2022)*. IEEE, p. 434-436 3 p. (IEEE VRW Proceedings).

Fruit quality and defect image classification with conditional GAN data augmentation

Bird, J. J., Barnes, C. M., Manso, L. J., Ekárt, A. & Faria, D. R., 5 Feb 2022, In: *Scientia Horticulturae*. 293, 110684.

Evolving Neuromodulated Controllers in Variable Environments

Barnes, C. M., Ekárt, A., Ellefsen, K. O., Glette, K., Lewis, P. R. & Tørresen, J., 5 Jan 2022, *2021 IEEE International Conference on Autonomic Computing and Self-Organizing Systems (ACSOS)*. El-Araby, E., Kalogeraki, V., Pianini, D., Lassabe, F., Porter, B., Ghahremani, S., Nunes, I., Bakhouya, M. & Tomforde, S. (eds.). IEEE, p. 164-169 6 p.

Behavioural Plasticity Can Help Evolving Agents in Dynamic Environments but at the Cost of Volatility

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Editorial for the Topical Issue “Evolution, the New AI Revolution”

Ekárt, A. & Esparcia-alcázar, A. I., 1 Nov 2021, In: *SN Computer Science*. 2, 6, 433.

Chatbot Interaction with Artificial Intelligence: human data augmentation with T5 and language transformer ensemble for text classification

Bird, J. J., Ekárt, A. & Faria, D. R., 23 Aug 2021, (E-pub ahead of print) In: *Journal of Ambient Intelligence and Humanized Computing*.

Axial Generation: A Concretism-Inspired Method for Synthesizing Highly Varied Artworks

Easton, E., Ekárt, A. & Bernardet, U., 2 Apr 2021, *Artificial Intelligence in Music, Sound, Art and Design - 10th International Conference, EvoMUSART 2021, Held as Part of EvoStar 2021, Proceedings*. Romero, J., Martins, T. & Rodríguez-Fernández, N. (eds.). Springer, p. 115-130 16 p. (Lecture Notes in Computer Science (including subseries Lecture Notes in Artificial Intelligence and Lecture Notes in Bioinformatics); vol. 12693 LNCS).

Synthetic Biological Signals Machine-generated by GPT-2 improve the Classification of EEG and EMG through Data Augmentation

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A study on CNN image classification of EEG Signals represented in 2D and 3D

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Look and listen: A multi-modality late fusion approach to scene classification for autonomous machines

Bird, J. J., Faria, D. R., Premebida, C., Ekart, A. & Vogiatzis, G., 10 Feb 2021, *2020 IEEE/RSJ International Conference on Intelligent Robots and Systems, IROS 2020*. IEEE, p. 10380-10385 6 p. 9341557. (IEEE International Conference on Intelligent Robots and Systems).

Cross-domain MLP and CNN Transfer Learning for Biological Signal Processing: EEG and EMG

Bird, J. J., Kobylarz, J., Faria, D. R., Ekart, A. & Ribeiro, E. P., Jan 2021, In: *IEEE Access*. 8, p. 54789-54801 13 p., 9027853.

Beyond goal-rationality: Traditional action can reduce volatility in socially situated agents

Barnes, C. M., Ekárt, A. & Lewis, P. R., 1 Dec 2020, In: *Future Generation Computer Systems*. 113, p. 579-596 18 p.

Thumbs up, thumbs down: non-verbal human-robot interaction through real-time EMG classification via inductive and supervised transductive transfer learning

Kobylarz, J., Bird, J. J., Faria, D. R., Ribeiro, E. P. & Ekárt, A., Dec 2020, In: *Journal of Ambient Intelligence and Humanized Computing*. 11, 12, p. 6021-6031 11 p.

Country-level pandemic risk and preparedness classification based on COVID-19 data: A machine learning approach

Bird, J. J., Barnes, C. M., Premebida, C., Ekárt, A., Faria, D. R. & Hatzikirou, H. (ed.), Oct 2020, In: *PLoS ONE*. 15, 10, e0241332.

From Simulation to Reality: CNN Transfer Learning for Scene Classification

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British Sign Language Recognition via Late Fusion of Computer Vision and Leap Motion with Transfer Learning to American Sign Language

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Genetic Programming with Transfer Learning for Urban Traffic Modelling and Prediction

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Optimisation of phonetic aware speech recognition through multi-objective evolutionary algorithms

Bird, J. J., Wanner, E., Ekárt, A. & Faria, D. R., 1 Sept 2020, In: *Expert Systems with Applications*. 153, 113402.

On the effects of pseudorandom and quantum-random number generators in soft computing

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Overcoming Data Scarcity in Speaker Identification: Dataset Augmentation with Synthetic MFCCs via Character-level RNN

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Co-creating enduring institutions for socio-technical systems: The complementarity of content-based and value-based modelling approaches

Powers, S. T., Ekárt, A. & Lewis, P. R., 1 Jan 2020, *ALIFE 2018 - 2018 Conference on Artificial Life: Beyond AI*. MIT, p. 105-106 2 p.

Phoneme Aware Speech Synthesis via Fine Tune Transfer Learning with a Tacotron Spectrogram Prediction Network

Bird, J. J., Ekárt, A. & Faria, D. R., 30 Aug 2019, *Advances in Computational Intelligence Systems - Contributions Presented at the 19th UK Workshop on Computational Intelligence, 2019*. Ju, Z., Zhou, D., Gegov, A., Yang, L. & Yang, C. (eds.). Springer, Vol. 1043. p. 271-282 12 p. (*Advances in Intelligent Systems and Computing*; vol. 1043).

Increasing genetic programming robustness using simulated dunning-kruger effect

Griffiths, T. D. & Ekárt, A., 13 Jul 2019, *GECCO 2019 Companion - Proceedings of the 2019 Genetic and Evolutionary Computation Conference Companion*. ACM, p. 340-341 2 p.

Phoneme aware speech recognition through evolutionary optimisation

Bird, J. J., Wanner, E., Ekárt, A. & Faria, D. R., 13 Jul 2019, *GECCO 2019 Companion - Proceedings of the 2019 Genetic and Evolutionary Computation Conference Companion*. ACM, p. 362-363 2 p. (GECCO 2019 Companion - Proceedings of the 2019 Genetic and Evolutionary Computation Conference Companion).

Evolutionary Optimisation of Fully Connected Artificial Neural Network Topology

Bird, J. J., Ekárt, A., Buckingham, C. D. & Faria, D. R., 23 Jun 2019, *Intelligent Computing - Proceedings of the 2019 Computing Conference*. Arai, K., Bhatia, R. & Kapoor, S. (eds.). Springer, p. 751-762 12 p. (Advances in Intelligent Systems and Computing; vol. 997).

High Resolution Sentiment Analysis by Ensemble Classification

Bird, J. J., Ekárt, A., Buckingham, C. D. & Faria, D. R., 23 Jun 2019, *Intelligent Computing - Proceedings of the 2019 Computing Conference*. Arai, K., Bhatia, R. & Kapoor, S. (eds.). Springer, p. 593-606 14 p. (Advances in Intelligent Systems and Computing; vol. 997).

Accent classification in human speech biometrics for native and non-native english speakers

Bird, J. J., Wanner, E., Ekárt, A. & Faria, D. R., 5 Jun 2019, *Proceedings of the 12th ACM International Conference on PErvasive Technologies Related to Assistive Environments, PETRA 2019*. ACM, p. 554-560 7 p.

Social Action in Socially Situated Agents

Barnes, C. M., Ekart, A. & Lewis, P. R., 1 Jun 2019, *Proceedings - 2019 IEEE 13th International Conference on Self-Adaptive and Self-Organizing Systems, SASO 2019*. IEEE, Vol. 2019-June. p. 97-106 10 p. 8780530. (2019 IEEE 13th International Conference on Self-Adaptive and Self-Organizing Systems (SASO)).

A Study on Mental State Classification using EEG-based Brain-Machine Interface

Bird, J., Manso, L. J., Ribeiro, E. P., Ekárt, A. & Faria, D., 8 May 2019, *9th International Conference on Intelligent Systems 2018: Theory, Research and Innovation in Applications, IS 2018 - Proceedings*. Martins, J., Jotsov, V., Bierwolf, R., Mendonca, J. P., Jardim-Goncalves, R. & Marques, M. (eds.). IEEE, p. 795-800 6 p. 8710576. (2018 International Conference on Intelligent Systems (IS)).

Smart Cyber-Physical System applications in production and logistics: special issue editorial

Ilie-Zudor, E., Preuveneers, D., Ekárt, A. & Hohwieler, E., 4 May 2019, In: *International Journal of Computer Integrated Manufacturing*. 32, 4-5, p. 327-328 2 p.

Preface

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Tired of Choosing? Just Add Structure and Virtual Reality

Easton, E., Bernardet, U. & Ekart, A., 27 Mar 2019, *Computational Intelligence in Music, Sound, Art and Design - 8th International Conference, EvoMUSART 2019, Held as Part of EvoStar 2019, Proceedings*. Castro Pena, M. L., Ekárt, A. & Liapis, A. (eds.). Springer, Vol. 11453. p. 142-155 14 p. (Lecture Notes in Computer Science (including subseries Lecture Notes in Artificial Intelligence and Lecture Notes in Bioinformatics); vol. 11453 LNCS).

A Deep Evolutionary Approach to Bioinspired Classifier Optimisation for Brain-Machine Interaction

Bird, J., Faria, D., Manso, L. J., Ekárt, A. & Buckingham, C. D., 13 Mar 2019, In: *Complexity*. 2019, 14 p., 4316548.

Disobedience as a mechanism of change

Burth Kurka, D., Pitt, J., Lewis, P. R., Patelli, A. & Ekart, A., 15 Jan 2019, *Proceedings - 12th IEEE International Conference on Self-Adaptive and Self-Organizing Systems, SASO 2018*. IEEE, Vol. 2018-September. p. 1-10 10 p. 8613714. (2018 IEEE 12th International Conference on Self-Adaptive and Self-Organizing Systems (SASO)).

Modelling enduring institutions: The complementarity of evolutionary and agent-based approaches
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Emotion Recognition using Spatiotemporal Features from Facial Expression Landmarks
Golzadeh, H., Faria, D., Manso, L. J., Ekárt, A. & Buckingham, C. D., 26 Sept 2018, *Proceedings of the 9th International Conference on Intelligent Systems*. 6 p.

Partially Lazy Classification of Cardiovascular Risk via Multi-way Graph Cut Optimization
Fathalla, K. M., Ekárt, A. & Gherghel, D., 28 Aug 2018, In: *Procedia Computer Science*. 126, p. 576-585 10 p.

Learning from Interaction: An Intelligent Networked-Based Human-Bot and Bot-Bot Chatbot System
Bird, J. J., Ekárt, A. & Faria, D. R., 11 Aug 2018, (E-pub ahead of print) *UK Workshop on Computational Intelligence*. Springer, Vol. 840. p. 179-190 (Advances in Computational Intelligence Systems; vol. 840).

Self-adaptive crossover in genetic programming: The case of the tartarus problem
Griffiths, T. D. & Ekárt, A., 4 Jun 2018, *Parallel Problem Solving from Nature – PPSN XV - 15th International Conference, 2018, Proceedings*. Springer, p. 236-246 11 p. (Lecture Notes in Computer Science (including subseries Lecture Notes in Artificial Intelligence and Lecture Notes in Bioinformatics); vol. 11101 LNCS).

Improving the effectiveness of genetic programming using continuous self-adaptation
Griffiths, T. D. & Ekárt, A., 19 Apr 2018, (E-pub ahead of print) *Artificial Life and Intelligent Agents - Second International Symposium, ALIA 2016, Revised Selected Papers*. Springer, Vol. 732. p. 97-102 6 p. (Communications in Computer and Information Science; vol. 732).

Synergies between reinforcement learning and evolutionary dynamic optimisation
Soni, A., Lewis, P. R. & Ekárt, A., 19 Apr 2018, (E-pub ahead of print) *Artificial Life and Intelligent Agents - Second International Symposium, ALIA 2016, Revised Selected Papers*. Springer, Vol. 732. p. 91-96 6 p. (Communications in Computer and Information Science; vol. 732).

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Fitness and novelty in evolutionary art

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Evolving ambiguous images

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Two-B or not two-B? Design patterns for hybrid metaheuristics

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Women@GECCO 2014

O'Reilly, U-M., Esparcia, A., Auger, A., Doerr, C., Ekárt, A. & Ochoa, G., 31 Dec 2014, *GECCO Comp '14 : proceedings of the 2014 conference companion on Genetic and evolutionary computation companion*. New York, NY (US): ACM, p. 1487-1488 2 p.

Cloud adoption: prioritizing obstacles and obstacles resolution tactics using AHP

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Patients with early age-related macular degeneration exhibit signs of macro- and micro-vascular disease and abnormal blood glutathione levels

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Hierarchical case-based reasoning to support knitwear design

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Stability analysis of tree structured decision functions

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A data structure for improved gp analysis via efficient computation and visualisation of population measures

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Using genetic algorithms for improved discrete sequence prediction

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Activities

AI for Visual Art

Aniko Ekárt (Speaker)
15 Feb 2021

9th International Conference on Computational Intelligence in Music, Sound, Art and Design (EvoMusArt)

Aniko Ekárt (Participant)
15 Apr 2020 → 17 Apr 2020

Genetic and Evolutionary Computation Conference

Aniko Ekárt (Participant)
2020 → 2021

Natural Computing (Journal)
Aniko Ekárt (Editorial board member)
2020 → 2021

Artificial Intelligence for Visual Art
Aniko Ekárt (Speaker)
10 Dec 2019

8th International Conference on Computational Intelligence in Music, Sound, Art and Design (EvoMusArt)
Aniko Ekárt (Participant)
24 Apr 2019 → 26 Apr 2019

Humanizing social learning
Aniko Ekárt (Speaker)
2019

7th International Conference on Computational Intelligence in Music, Sound, Art and Design (EvoMusArt)
Aniko Ekárt (Participant)
4 Apr 2018 → 6 Apr 2018

Genetic and Evolutionary Computation Conference 2012
Aniko Ekárt (Chair)
2012 → ...

IEEE Transactions on Evolutionary Computation (Journal)
Aniko Ekárt (Editorial board member)
2012 → ...

Neural Computing and Applications (Journal)
Aniko Ekárt (Editorial board member)
2012

Evolutionary Computation (Journal)
Aniko Ekárt (Editorial board member)
2011 → ...

Projects

50117 - FP7 - STREP - ICT - (ADVANCE) Advanced predictive-analysis-based decision-support engine for logistics
Ekárt, A. & Buckingham, C.
1/12/11 → 16/01/14