Oriol Corcoll

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Research

I study how agents can make better decisions by understanding causal relations. I firmly believe that there is a significant leap towards understanding intelligence at the intersection of reinforcement learning and causality. Building agents that see the world from a causal lens can enable principled drug discovery, informed interventions on gene regulatory networks, and better decision-making for clinicians. In particular, I study how RL agents can discover, learn and exploit causal relations present in the world in an unsupervised manner.

- Explanatory World Models via Look Ahead Attention for Credit Assignment.
  O. Corcoll, R. Vicente. ongoing 2022.
- Quantifying reinforcement-learning agent's autonomy, reliance on memory, and internalization of the environment.
  A. Ingel, A. Makkeh, **O. Corcoll**, R. Vicente. Entropy 2022.
- Did I do that? Blame as a means to Identify Controlled Effects in Reinforcement Learning.
  O. Corcoll, R. Vicente. ICML Unsupervised RL 2021.
- Disentangling Causal Effects for Hierarchical Reinforcement Learning.
  O. Corcoll, R. Vicente. Conference on Causal Learning and Reasoning 2022.
- Attention Manipulation in Reinforcement Learning Agents.
  O. Corcoll, A. Makkeh, J. Aru, O. Theis, R. Vicente. Cognitive Computational Neuroscience 2019.

Work Experience

Research fellow - University of Tartu - Tartu Estonia (2020-present)

As a research fellow, I study how explanations can be used to discover causal relations. Additionally, I support teaching neural networks and organize a seminar on computational neuroscience.

Software developer engineer - Amazon Alexa - London UK (2016-2018)

As part of Alexa's multimedia team, I developed a scalable automated ingestion system of multimedia content to show high-quality images and videos on Alexa's Echo Show and Echo Spot devices. In particular, I built a deep learning-based semantic image cropping system. Additionally, I used deep learning to estimate how aesthetically pleasing an image is.

Software developer engineer - Amazon Video - London UK (2015-2016)

I built a high-traffic and highly available price engine to provide discounts and offers to Amazon Video customers.

Software developer engineer - Cash On Go - Tartu Estonia (2014-2015)

Redesigned and implemented a scalable loan engine.

Assistant researcher - Aalto University - Espoo Finland (2014)
Designed and implemented a prediction engine for DNA-based tile models in the Natural Computation research lab.

Software developer engineer - eConcept Solutions - Mallorca Spain (2007-2010)
As a consultant, I helped multiple companies to build better engineering solutions.

Education
Ph.D. Candidate (2018-2022): University of Tartu, Estonia.
Master (2016-2018): Big Data Science at Queen Mary University of London, UK.
Bachelor (2010-2014): Computer Science at Polytechnic University of Catalonia, Spain.

Tech
Data Science: Pytorch, Keras, TensorFlow, Pandas, Numpy, Jupyter, SciPy.
Languages: Python**,** Java, C#, Scala, PHP, C++, Javascript.
Engineering: Docker, AWS, Spark, Hadoop, Redshift, DynamoDB, Redis, Memcached.

Projects
Master Thesis: Semantic Image Cropping using Deep Learning.
Bachelor Thesis: Design Tools for Reinforced 3D DNA Nanostructures.
FHC: Compiler to translate a custom-made high-level programming language to FPGA compatible Verilog language.

Interests
Deep Learning, Reinforcement Learning, Causality, Neuroscience, and Compilers.

Languages
Spanish and Catalan: Native.
English: Working Proficiency.