

Ahmed AKAKZIA

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EDUCATION

ISIR - Sorbonne University

PhD in Artificial Intelligence

Title: Teaching Predicate-based Autotelic Agents: Learning Goal Representations through Social Interactions for Intrinsically Motivated Agents

Paris, FR

Sept 2019 - Nov 2022

École Polytechnique, Paris-Saclay University

MSc in Data Science

Top-tier French University. Main Subjects: Big Data, Bayesian Learning, Markov Decision Processes, Reinforcement Learning, Deep Learning

Paris, FR

2018 - 2019

ENSTA Paristech, Paris-Saclay University

MSc in Optimization, Operational Research and Control

Now ENSTA Paris, member of the Polytechnical Institute of Paris (IPP). Main Subjects: Optimization, Operational Research with Massive Data, Statistics, Machine Learning, Meta-Heuristics

Paris, FR

2016 - 2019

ENIT Tunis, Tunis University

MSc in Applied Mathematics

Head of Rankings in Tunisia. Main Subjects: Algebra, Functional Analysis, Probabilities, Markov Chains, Automatic and Control.

Tunis, TN

2016 - 2019

SCIENTIFIC PUBLICATIONS

Grounding Language to Autonomously-Acquired Skills via Goal Generation

Akakzia, A., Colas, C., Oudeyer, P-Y, Chetouani, M., Sigaud, O.

Goal-conditioned RL agents that automatically build a curriculum to organize and learn a diverse repertoire of skills, perform a language-grounding phase and follow instructions in natural language.

Link: arxiv.org/pdf/2006.07185.pdf

Remote

ICLR 2021

Language-Conditioned Goal Generation: a New Approach to Language Grounding for RL

Colas, C., **Akakzia, A.**, Oudeyer, P-Y, Chetouani, M., Sigaud, O.

A new approach to language grounding: conditioning parameterized generative models on language and training CVAE models in RL setups

Link: arxiv.org/pdf/2006.07043.pdf

Remote

ICML 2020 Workshop

Help Me Explore: Minimal Social Interactions for Graph-Based Autotelic Agents

Akakzia, A., Serris, O., Sigaud, O., Colas, C.

Couple social and intrinsically motivated learning to guide the exploration of goal-based RL agents.

Link: arxiv.org/pdf/2202.05129.pdf

Tübingen, DE

IMOL 2022 Workshop

Learning Object-Centered Autotelic Behaviors with Graph Neural Networks

Akakzia, A., Sigaud, O.

Investigate the effect of relational inductive bias in both the policy architecture and goal space design on the transfer capabilities of goal-based RL agents. Implement an instance of Actor-Critic methods using different types of Graph Neural Networks.

Link: arxiv.org/pdf/2204.05141.pdf

Montreal, CA

CoLLAs 2022

SCIENTIFIC PREPRINTS

Towards Teachable Autotelic Agents

Sigaud, O., **Akakzia, A.**, Caselle-Dupré, H., Colas, C., Oudeyer, P-Y., Chetouani, M.
A roadmap towards goal-based agents that can learn autonomously and with external assistance.
Link: arxiv.org/pdf/2105.11977.pdf

Delayed Geometric Discounts: An Alternative Criterion for Reinforcement Learning

Jarboui, F., **Akakzia, A.**
Generalize the discounted problem formulation in RL with a novel family of delayed objective functions. Derive optimal stationary solution and approximate the optimal non-stationary control/
Link: openreview.net/pdf?id=t3BFUDHwEJU

RESEARCH PROJECTS

PhD Projects

Sept 2019 - Nov 2022

Supervised by Pr. Olivier Sigaud and Pr. Mohamed Chetouani.

- **Theoretical Skills:** Reinforcement Learning, Policy Gradient Methods, Actor-Critic Methods, Variational Inference, Generative Models
- **Technical Skills:** Graph Neural Networks for RL, Transformers, Language-based Generative Models, worked with supercomputers.
- **Coding Skills:** Python, Pytorch, Tensorflow, LaTeX.
- **Doctoral Training:** Ethics, Foreign Languages (German), Monitor for Bachelor Students.
- See list of publications above.

Research Internship #2

April 2019 – Sept 2019

Title: Off-Policy Goal-Conditioned Meta-Reinforcement Learning.

Supervised by Pr. Olivier Sigaud and Pr. Mohamed Chetouani.

- **Theoretical Skills:** Reinforcement Learning, Off-policy Methods, Multitask Learning, Meta-Learning, Optimization, Generalization and Transfer.
- **Technical Skills:** Implement RL pipeline from scratch, test several replay strategies.
- **Coding Skills:** XML, OS, Python, Pytorch, Tensorflow, LaTeX.

MSc Project

Dec 2018 – April 2019

Data Camp: Solar Storms Detection and Classification

- Worked with the Rapid Analytics and Model Prototyping using Python (RAMP) ecosystem.
- Implement feature extraction methods.
- Building classifiers and optimizing the pipeline.

MSc Project

Oct 2018 – Nov 2018

Variational Inference - MCMC Methods

- Variational Inference in the Linear context.
- Comparison with the Empirical Bayes method.
- Implement the Metropolis Hastings and the Gibbs algorithms.

MSc Project

Oct 2018 – Nov 2018

Graphical Models: Gaussian Mixture Models - EM Algorithm

- Implement Generative Models with GMMs.
- Implement EM algorithm on simulated data.

Research Internship #1

Jan 2015 – May 2015

Title: Big Data and Learning Analytics: Frequent Pattern Mining

Supervised by Pr. Armelle Brun

- Worked on Data Stream Analysis.
- Implement Breadth/Depth first algorithms.
- Implement mining rules for Patterns extraction and classification.
- Implement Recommender System based on results.

TECHNICAL PROJECTS

- HME Interaction Protocol (github.com/akakzia/gangstr)
- Autotelic Learning with Graph Neural Networks (github.com/akakzia/rlgraph)
- DECSTR (github.com/akakzia/decstr)
- RL Environments with Perceptual Meaning Analysis (github.com/akakzia/gym-object-manipulation)

COMMUNICATION

- Poster and Presentation at ICLR 2021.
- Poster at ICLR 2022.
- Talk at IMOL 2022.
- Talk and Poster at CoLLAs 2022.
- Quality Manager at TAEP Junior Enterprise (ENSTA Paris, 2018)
- Co-Founder & VP at ENACTUS (ENIT, 2017)
- Partnership Committee Manager at ENIT Junior Enterprise (ENIT, 2016)
- OC of IEEE Day (ENIT, 2016)

OTHER SKILLS AND QUALIFICATIONS

- Python (proficient), LaTeX (proficient), R (proficient), C (proficient), MATLAB (medium), C++ (beginner).
- Arabic (native), French (fluent, 5 years in France), English (fluent), German (beginner), Spanish (beginner).