

Deep Continual Learning

Introduction

Deep continual learning topic is of increasing importance in foundational research and real-world applications of machine learning and artificial intelligence. In this learning paradigm, intelligent agents learn continuously, accumulate the knowledge learned in the past, and adapt it to help future learning. Facilitation of continual learning is paramount for AI system engineering, robotics, intelligent personal assistants, chatbots, and many other application domains. Our goal in this project is to increase our visibility in this important research area and help further community building.

Activities

Workshop

We organized an international workshop on continual learning at the IEEE International Conference on Data Mining (ICDM 2021). We had three talks by experts in the field: [Razvan Pascanu](#) (DeepMind), [Eric Eaton](#) (University of Pennsylvania), and [Vincenzo Lomonaco](#) (University of Pisa). The speakers presented new concepts and views for the continual paradigm, including the task agnostic view, composable representation for continual learning, and distributed continual learning. We also had three oral paper presentations. The authors presented interesting methods that studied the concept drift in non-stationary environments. More information can be found [here](#).

Seminar

Ghada Sokar gave a guest lecture in the continual learning [course](#) at the university of Pisa. The lecture was in a hybrid format with attendees offline and online participants. The lecture covers the core challenge in the continual learning paradigm, which is the stability-plasticity dilemma. We discuss the power of sparse neural networks and sparse representations in addressing this challenge. We also discuss how to build efficient continual learning agents considering the memory and computational costs. The recording of the lecture can be found [here](#).

Research Visit

Ghada Sokar went for a research visit to the University of Pisa, Italy. The research visit was hosted by [Vincenzo Lomonaco](#). The research focus of Vincenzo and his research team is on continual learning. During the visit, we held many discussions on open questions and challenges in the continual learning paradigm. Moreover, we had some events on broader machine learning research that had participants from different fields. The visit helps in outlining directions for collaboration between the three universities: Eindhoven University of Technology, University of Twente, and University of Pisa.

Acknowledgments

We thank the 4TU NIRICT research program for supporting this project and collaboration.

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