Lifelong Classifier Learning – Tasks and Challenges

Abstract

Lifelong Machine Learning (LLML) can overcome the limitations of statistical learning algorithms that need many training examples and are suitable for isolated single-task learning. Key features that need to be developed within such systems to benefit from prior learned knowledge include feature modeling, knowledge retaining from past learning tasks, knowledge transfer to future learning tasks, previous knowledge updates, and user feedback.

Also, the concept of task that appears in many formal definitions of lifelong ML models seems hard to define in many real-life setups because it is often difficult to distinguish when a particular task finishes and subsequent starts.

One of the main challenges is the stability and plasticity dilemma, where the learning systems have to trade-off between learning new information without forgetting the old one. It is visible in the catastrophic forgetting phenomenon, defined as a complete forgetting of previously learned information by a neural network exposed to the new information.

The talk will focus on the main approaches to Lifelong Machine Learning from the classifier learning perspective. It will also discuss the open challenges and limitations in this domain.