UZH ML Workshop

Monday 16 November 2020 - Wednesday 18 November 2020

UZH Irchel, Zurich

Book of Abstracts

Contents

1

Introduction

Author: Vinicius Massami Mikuni[1]

[1] *Universitaet Zuerich (CH)*

2

Registration

4

Hands-on tutorial introduction

5

Workshop dinner

6

Workshop closing

Presentations / 7

Which shoes fit this dress? Using product images to infer "perfect pairings" across categories without supervision

Authors: Luca Gaegauf[1]; Markus Meierer[1]

[1] *University of Zurich*

Corresponding Authors: lucagaegauf@gmx.ch, markus.meierer@business.uzh.ch

Product recommendations are omnipresent and contribute significantly to the revenue of online retail businesses. Nevertheless, customers often complain about the quality of recommendations. A possible explanation is that the requirements of existing approaches are not always met. The increasing speed of product assortment changes challenges collaborative filter techniques, which are subject to the cold start problem. Alternative approaches such as preference- or content-based recommendations systems require detailed structured information (e.g., on product characteristics or previous customer purchase patterns), which is often not available. Addressing this challenge, the authors propose an unsupervised approach to infer recommendations across domains solely based on product images. With the increasing interest in deep learning techniques, convolutional neural networks have been used to infer single-domain recommendations based on the intrinsic information of product images (e.g., recommend alternative dresses based on the image of a dress). Albeit

promising, approaches to infer cross-domain recommendations are largely unexplored. Using generative adversarial networks and convolutional neural networks to leverage the implicit information in product images, the authors propose an unsupervised approach to make recommendations across product categories (e.g., recommend shoes based on an image of a dress). The performance of the approach is assessed by benchmarking to various empirical baselines as well as surveying potential customers on the perceived quality of the recommendations. Further, the authors discuss two extensions: (1) Making recommendations for multiple other domains based on a single product image as input and (2) making cross-domain recommendations based on multiple product images as input. Concluding, theoretical and managerial implications are discussed.

Presentations / 8

Autonomous quadrotors

Author: Antonio Loquercio[1]

[1] *UZH*

Corresponding Author: loquercio@ifi.uzh.ch

Autonomous quadrotors will soon play a major role in search-and-rescue and remote-inspection missions, where a fast response is crucial. Quadrotors have the potential to navigate quickly through unstructured environments, enter and exit buildings through narrow gaps, and fly through collapsed buildings. However, their speed and maneuverability are still far from those of birds and human pilots. Autonomous, vision-based agile navigation through unknown, indoor environments poses a number of challenges for robotics research in terms of perception, state estimation, planning, and control. In this talk, I will show how machine learning methods united with the power of new, low-latency sensors, such as event-based cameras, allow drones to achieve unprecedented speed and robustness by relying solely on the use of passive cameras, inertial sensors, and onboard computing.

10

Machine learning in quantum chemistry

Author: Michela Pauletti[1]

[1] *Universität Zürich*

Corresponding Author: michela.pauletti@live.it

In the past, potential energy functions for atomistic simulations have been derived using physical approximations whenever the direct application of electronic structure methods has been too demanding. For years people kept fitting potentials to develop new force field, cheap and reasonably accurate methods to carry out computer simulations.
Recent advances in machine learning offer new approaches for the representation of potential-energy surfaces by fitting large data sets from electronic structure calculations.
This talk wants to give an overview on this topic and some examples of applications as well.