Transfer learning applied: Identify University-Industry Knowledge Transfer

Scope & Objectives

Today, universities are expected to contribute to innovation and development through knowledge and technology transfer. University-industry collaboration is an important aspect for today's knowledge driven companies. Furthermore, Universities, as recipients of public funding, are expected to transform these investments into innovations and inventions that contribute to the society [2, 3]. But how to measure and detect this contribution? How can we identify technologies and knowledge that have been created by a university and transferred to the industry?

Scholars, practitioners and policy makers have been seeking to understand this for decades. Until today they aim to identify and quantify the contribution of university research. Today's established methods include mainly econometric approaches [1] that use patenting activities and/or academic publications as indicators. This project shall contribute to the assessment of university research dissemination and knowledge transfer by developing a new automated approach that makes use of methods within the field of deep learning and in particular transfer learning. It will be practical, applied and shall investigate the concrete case of DTU. The goal is to use text data from the university as well as from relevant companies to detect technology/ knowledge transfer. In the concrete case of DTU several potential data sources are available and shall be used to reveal interesting patterns (data sources are described at the end of this document).

Frame

This project is supposed to be a continuation of an PhD project that is close to completion. So the project provides a rather clear frame, preliminary work and data in high quality for the respective student. It will be done in collaboration with the Management Department at DTU, which gives the student the unique opportunity to work interdisciplinary and evaluate the potential real life value of the project. Besides the technical aspects, the student will also need to work with real life implications. She/he is expected to (during the project) understand the main concepts from the domain of innovation research that will help to interpret the results in a broader context. Furthermore, the student will

be required to, as a part of the project, select the most relevant data sources. In this context, it should be considered that if data can be used in the designed model architecture and are sufficient to answer the research question.

Technically, the students for this project shall use machine learning, in particular transfer learning, as this approach is promising in this context. Students shall identify relevant models and tools and expand these appropriately depending on the potential of the chosen data. The students are expected to be able to evaluate the outcomes in a scientific manner. The interpretation and analysis of the results is going to be an important aspect of the project. This ensures not only the technical abilities of the students, but also the skills to translate the results into findings and draw valid conclusions. They are also expected formulate precise academic research questions and that they are equipped to defend their strategic approach and data choices on a theoretically founded basis.

Prerequisites

The student is expected to be familiar with deep learning and transfer learning in particular for text data (knowledge of recurrent neural networks is an advantage).

Supervisors

Main supervisor: Line H. Clemmensen, DTU Compute, lkhc@dtu.dk
Co-supervisor: Sabrina Woltmann, DTU Management, swol@dtu.dk

Potential Data

- More than $28,000$ websites from companies are available (not cleaned or pre-processed)

- More than $6,000$ full-text of academic publications

- More than $70,000$ abstracts of publications and meta-data

- $1,500$ patent full-descriptions

References

[1] Albert N Link and Donald S Siegel. Generating science-based growth: An econometric analysis of the impact of organizational incentives on university–industry technology transfer. *European Journal of Finance*, 11(3):169–181, 2005.

[2] Ammon J Salter and Ben R Martin. The economic benefits of publicly funded basic research: a critical review. *Research policy*, 30(3):509–532, 2001.

[3] Girma Zawdie and John Edmondson. *Knowledge exchange and the Third Mission of universities.* IP Publishing, 2010.