Methods and Tools for Data Science: Applications to Economic Research
Dr. Thomas Fackler and Dr. Nadzeya Laurentsyeva
Department of Economics
Sommersemester/summer semester 2020

Title: Methods and Tools for Data Science: Applications to Economic Research

The aim of this course is to provide the participants with the practical skills for managing and analyzing big data. Our target group are interested PhD students, as well as advanced (2nd year) Master and MQE students who anticipate using big data in their research projects or for work outside academia.

We plan to cover methods related to different stages of processing and analyzing big data for economic research: getting big data (e.g. web scraping, google BigQuery), organizing and storing data (basics of databases), analyzing big data using machine learning techniques, visualizations. We will also discuss recent economic papers that use big data and apply corresponding methods to answer their research questions.

All lectures and tutorials will be hands-on. Therefore, we expect participants to bring their own laptops for our lecture/tutorial sessions in order to successfully follow class exercises. The main programming language of the course is Python. We do not expect deep knowledge of Python (we will cover the basics in the first lectures). Yet, some familiarity with the basics of coding (in any programming language) will be helpful. Participants should also have good knowledge of applied microeconometrics and be motivated for working with big data.

This course consists of two parts. In the first weeks of the semester there will be blocked lectures and tutorials covering the following topics:

1. Basics of data analysis in Python (e.g. Pandas). Version control.
2. Basics of databases (e.g. SQL)
3. Web-scraping, API
4. Google Cloud (e.g. BigQuery)
5. Analyzing big data using Python (e.g. ML techniques, scikit learn)
6. Visualization

Lectures will be blocked in two weeks and will take place at ifo Institute on May 4-7 and May 11-14, from 14:00 to 18:00. All the lecture materials and practice codes will be available online.

In the second half of the semester there will be a seminar focusing on applications of Data Science methods and tools for economic research. In this part, students present and discuss their own applied projects based on analysing big data with methods learned in class.

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<th>Studiengang:</th>
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**Termin Vorbesprechung (tt.mm.jjjj):**
*Date of preliminary meeting (dd.mm.yyyy):*
February 6, 2020
Kaulbachstr. 45, Room 003

**Bearbeitungszeitraum für die Hausarbeit:**
*Working period for term paper:*
any four weeks from 01.05.2020 to 01.07.2020

**Seminartermin:**
*Seminar date:*
July 7-8, 2020

**Veranstaltungsort:**
*Venue:*
LMU Munich

**falls außerhalb: Kostenschätzung:**
*if out of Munich: estimated costs:*
- €

**Sprache:**
*Language:*
English

**Empfohlene VorKenntnisse:**
*Recommended courses:*
Applied Microeconometrics

**Methodischer Schwerpunkt:**
*Methodological background:*
Applied Microeconometrics, big data analysis

**Grundlagenliteratur:**
*Basic references:*
Provided during the introductory meeting

**Kontakt:**
*Contact:*
Dr. Thomas Fackler
Dr. Nadzeya Laurentsyeva

* Optional (falls schon bekannt) / optionally (if already known)