COURSE OUTLINE: FUNDAMENTALS OF DIGITAL AND COMPUTATIONAL DEMOGRAPHY

Course coordinator: Emilio Zagheni

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Location: Max Planck Institute for Demographic Research (MPIDR), Rostock, Germany

Start date: Dec. 2, 2019

End date: Dec. 13, 2019

Course Description

Rapid increases in computational power and the explosion of Internet, social media and mobile phone use have radically changed our lives, the way we interact with each other and our behavior, including demographic choices and constraints. The digitalization of our lives has also led to the so-called "data revolution" that is transforming social sciences.

Data science tools offer social scientists the opportunity to address core demographic questions in new ways. At the same time, demographic and social science methods enable researchers to make sense of new and complex data sources for which novel approaches and research designs may be needed.

The main goals for this course are:

1) To introduce students to core demographic and social science methods that are essential to interpret digital trace data;
2) To introduce students to core data science methods that are key to advance our understanding of population processes in the context of the increasing heterogeneity of data sources useful for demographic research.
3) to introduce students to recent substantive advances in the field of Digital and Computational Demography, with emphasis on fostering critical thinking about modern demographic analysis and (big) data-driven discovery.
4) To help students identify research questions in their own area of substantive interest that could be addressed with innovative data sources, and support them in the process of devising an appropriate research plan.

Organization

The class will meet each morning for two sessions (one lecture and one hands-on lab) for two weeks. Afternoons will be dedicated to homework assignments, readings, as well as one-on-one interaction with the instructors.

Diversity of Student Backgrounds

Students in this course have different backgrounds. Some students may have strong computational and statistical skills, some others may not. Some students may be very familiar with demographic methods, some others may only have basic knowledge of population processes. To accommodate the range of backgrounds, the instructors will emphasize substance, and key statistical, mathematical, computational and demographic concepts. There will also be different types of homework assignments. Some of them will involve computing and coding. Some others will be critical reflections about the readings. In short,

we facilitate and encourage the participation of students who do not have extensive background in statistics, or computational methods, but are eager to learn.

Course prerequisites

Students should bring their laptops with R/RStudio and Python (Anaconda) installed. Instructions on how to download and install R can be found in "A (very) short introduction to R" by Torfs and Brauer (2014):

https://cran.r-project.org/doc/contrib/Torfs+Brauer-Short-R-Intro.pdf

We expect some familiarity with R/Rstudio. If you have never used R before, we recommend that you go over the whole tutorial tutotial by Torfs and Brauer (2014) and complete the exercises before the course starts.

Python (Anaconda) can be downloaded from the following webpage:

https://www.anaconda.com/distribution/

One afternoon lab session will be dedicated to a tutorial on "getting started with Python".

Examination

There will be no final exam at the end of the course. Students will be graded based on completion of all assignments and active participation in class.

General readings

To be announced

Tuition

There is no tuition fee for this course. Students are expected to pay their own transportation and living costs. However, a limited number of travel grants will be available on a competitive basis for outstanding candidates who would visit the Lab of Digital and Computational Demography at MPIDR while taking the course.

Recruitment of students external to the IMPRS-PHDS network

A maximum of 5 students external to MPIDR and the "Population, Health, and Data Science" network will be admitted.

Applicants should either be enrolled in a PhD program (those well on their way to completion will be favored) or have received their PhD. Applications from advanced masters students will also be considered.

The selection will be made by the MPIDR based on the applicants' scientific qualifications.

How to apply

- Applications should be sent by email to the MPIDR. Please begin your email message with a statement saying that you apply for course PHDS – Fundamentals of Digital and Computational Demography. You also need to attach the following items integrated in *a single pdf file*: (1) A curriculum vitae, including a list of your scholarly publications. (2) A one-page letter from your supervisor at your home institution supporting your application. (3) A one-page statement of

your research and how it relates to the course. Please include a short description of your knowledge of the programming language R and/or Python.

- Send your email to Samin Aref (digital@demogr.mpg.de).
- Application deadline is 15 October 2019.
- Applicants will be informed of their acceptance by 31 October 2019.