MSc Project Proposal

Imperial College London

Computational Methods in Ecology and Evolution

Placing UK Research within the International STEM Funding Landscape

Author:
Xuan Wang

Leading Supervisor:
Dr. Samraat S. Pawar

Other Supervisor:
W. D. Pearse

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1 Introduction and Proposed Questions

The funding strategy for STEM discipline differs among countries, leading to differences in their development and contribution to the world. Nevertheless, it is not uncommon that bias sometimes affects the distribution of research funding [Crudden (2022)]. Therefore, studying the base of bias in research funding could be beneficial to understand the current research funding distribution and gaining a more objective result.

In my project, we aim to find the answer to the question: Is there any bias within the international STEM funding landscape? In particular, the bias will be measured from the following aspects: [Wojick & Michaels (2015)]

- Gender bias
  As one of the most prevalent topics in the academic thing, gender disparities have drawn a lot of attention. A research of Romy Lee and Naomi Ellemiers [Van der Lee & Ellemers (2015)] has revealed the existence of a research funding gap between different genders, which leads to an underrepresentation of females in academia. Therefore, gender bias would be an essential scale to measure in our report.

- Avoiding risky projects
  Due to financial constraints, the "risk" of a proposal is usually a critical point in whether the project will be funded. The proposal reviewers are generally less likely to fund a project with some errors or an idea that seems too outlandish, while sometimes these projects can be a revolutionary piece of work [Franzoni et al. (2022)]. This raises the concern about the decreasing number of innovative and risky grant proposals [Severin & Egger (2021)], and therefore will also be included in our study.

- Racial bias
  Disparities among funding for different races and ethnicities have been a more "invisible" bias compared to the others. According to the data reported in 2013, around

23.3% of white applicants received funding from the National Institutes of Health (NIH), while the percentage for nonwhite applicants is 19.3% [Konkel (2015)]. A significant difference has persisted for the past few decades, reducing the diversity in science. This bias should be taken into consideration as well.

2 Methodology

Fine-scale data will be used for our project. Mallet will be applied for the Machine Learning procedure. As the countries with the highest GDP worldwide, we will use the data from Australia, Canada, China, European Union, India, New Zealand, the United Kingdom, and the United States of America. In addition to the existing data we have, the data from China needs to be collected, which can be retrieved from public resources of China such as the website of National Data: https://data.stats.gov.cn/index.htm. We will apply pre-processing to the raw data, and the clean fine-scale data will be used for the analysis. HPC could be employed if the data is too big; the results from different countries will be compared for the final analysis.

3 Anticipated outputs and outcomes

- The bias in research funding in a set of countries will be displayed concerning countries respectively;
- For each type of bias, the result for different countries will be taken into comparison;
- Analysis will be conducted regarding the potential reason and consequence of the biases.

4 Project Feasibility

The timeline for this project is displayed as follows:
The writing will be covered throughout most of the time. The aim is to complete the first write-up by early August, and then modify it for the rest of the weeks.

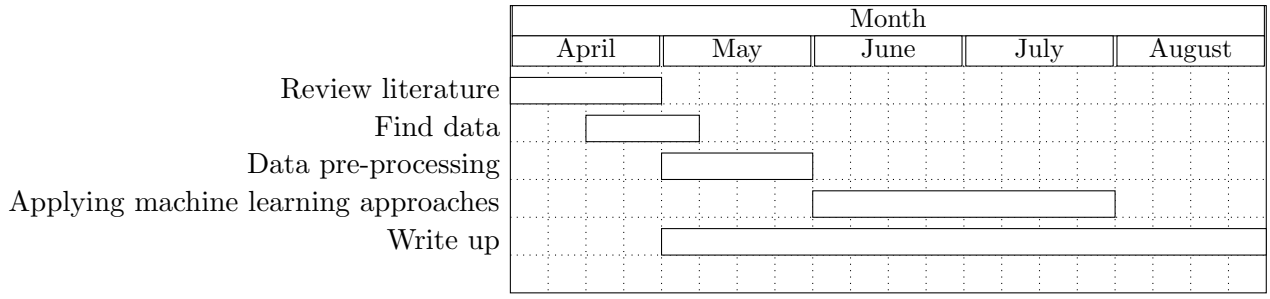

Figure 1: Gantt Chart

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