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[AEA] Individual Paper Submission Received from Gizem Korkmaz

Conference Papers <confpapers@aeaweb.org> Mon, Apr 1, 2024 at 11:39 AM
To: gizem.korkmaz@gmail.com

Individual Paper Submission Confirmation

We have received your paper submission 'Attributing Credit and Measuring Impact of Open-Source Software Using Fractional Counting'. See the submission summary below. No corrections will be accepted until a decision is made about inclusion in the program.

Primary JEL Classification: O3 - Innovation; Research and Development; Technological Change; Intellectual Property Rights
Secondary JEL Classification: O5 - Economywide Country Studies

Submitting Author/Organizer:
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Would also like to be considered for a lightning round session: Yes

Would also like to be considered for a poster session: Yes

Paper title: Attributing Credit and Measuring Impact of Open-Source Software Using Fractional Counting
One sentence description
This paper uses data collected from GitHub and leverages methods used in bibliometrics and social network analysis to measure the development of open-source software by different countries and their impact.

Abstract
Open-source software (OSS) has become an essential in knowledge production and innovation in both academic and business sectors around the globe. OSS is developed by a variety of entities and is considered a “unique scholarly activity” due to the complexity of scientific computational tasks and the necessity of cooperation and transparency for research methodology. While the developers of OSS are thought to be very widespread, there remains many questions to be answered about who these contributors are, who are the largest contributors (countries, sectors, organizations), and how they influence each other.

Using data collected on Python and R packages from GitHub, we leverage fractional-counting methods to measure the exact contribution of each developer and use weighted counting based on the lines of code added by each developer to accurately sum the contribution of countries. We find that for both Python and R, developers from a small group of top countries account for a considerable share of code additions. Developers from the top 10 countries, which include the United States, Germany, United Kingdom, France, and China comprise of 76.1% of the total R repositories, and 66.6% of Python repositories.

Next, we use the dependency relationship between packages and study the pairwise connections between

countries to measure their respective impact, finding that the packages attributed to United States are most frequently reused by packages from Germany, Spain, Italy, Australia, and United Kingdom based on the total dependency fractions. In parallel, United States mostly uses packages from Germany, France, and Denmark.

Influential contributors to OSS can contribute heavily to the priorities and practices of scientific research when their work is widely used or built upon by other researchers. In this context, studying the global distribution, collaboration, and impact of the contributors is important to understanding the landscape of innovation in scientific research.

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