Open Source in Environmental Sustainability

2023
Project by

OPEN CORRIDOR

SUBAK

prototypes

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Environmental Sustainability

Requires:
The intelligence and intention to understand, predict and manage the stability of natural resources.

Turbulent eddies in water vapour from a 3 km horizontal resolution using the Exascale global atmosphere model SCREAM
What enables Open Source Software in Environmental Sustainability?

2,409 codebases in total were audited by Synopsys in 2021, of which 97% contained open source.
Environmental Technology


Simulating the performance of photovoltaic energy systems with **pvlib**

**PyPSA** is an open source toolbox for simulating and optimising modern power and energy systems
Methodology

Compilation and curation of all active projects that primarily aim at environmental sustainability

Automated collection of repository metadata and targeted interviews with developers

Collaborative report cross-validation between qualitative and quantitative insights
Overview on the dataset

<table>
<thead>
<tr>
<th>Dimension</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total number of projects</td>
<td>1339</td>
</tr>
<tr>
<td>GitHub projects</td>
<td>1187</td>
</tr>
<tr>
<td>GitLab projects</td>
<td>27</td>
</tr>
<tr>
<td>Other platforms</td>
<td>125</td>
</tr>
<tr>
<td>Number of projects in personal namespace</td>
<td>547</td>
</tr>
<tr>
<td>Number of projects in community namespace</td>
<td>792</td>
</tr>
<tr>
<td>Total stars of all projects</td>
<td>126568</td>
</tr>
<tr>
<td>Total contributors in all projects</td>
<td>14628</td>
</tr>
<tr>
<td>Active GitHub projects</td>
<td>995</td>
</tr>
<tr>
<td>Inactive GitHub projects</td>
<td>192</td>
</tr>
<tr>
<td>Projects with contribution guide in %</td>
<td>30.58</td>
</tr>
<tr>
<td>Projects with code of conduct in %</td>
<td>13.98</td>
</tr>
<tr>
<td>Projects accepting donations in %</td>
<td>3.71</td>
</tr>
<tr>
<td>Median number of commits</td>
<td>481</td>
</tr>
<tr>
<td>Median stargazers</td>
<td>42</td>
</tr>
<tr>
<td>Median stars last year</td>
<td>11</td>
</tr>
<tr>
<td>Median Development Distribution Score</td>
<td>0.3043</td>
</tr>
<tr>
<td>Median number of contributors</td>
<td>6</td>
</tr>
<tr>
<td>Median closed issues last year</td>
<td>8</td>
</tr>
<tr>
<td>Median commits last year</td>
<td>23</td>
</tr>
<tr>
<td>Median age in years</td>
<td>4.45</td>
</tr>
</tbody>
</table>
Popularity

38,851 Projects with more than 1000 ⭐ on GitHub

3 project in this ecosystem
License and Language
Origin and Form of Organisation
Projects and Topics

Biosphere, Climate Science and Energy sector leading in project numbers.

Remarkably few projects in topics like: Sustainable Investment, Carbon Offsets, Carbon Capture and Hydrogen.
Sustainable Rating and Investment

United Nations Principles for Responsible Investment
Corporate Sustainability Assessment

- Corporation
- Sustainability Report
- News about Corporation
- Sustainability Sentiment
- Sustainability Assessment
- Sustainability Rating
"Addressing ESG rating divergence requires one to understand how the data that underpin ESG ratings are generated."

Carbon Offsets and Credits

94.9m carbon credits claimed
5.5m real emissions reductions

Revealed: more than 90% of rainforest carbon offsets by biggest provider are worthless, analysis shows, The Guardian
Safety Critical Decision Making

Open science in the creation of knowledge on the state and predictions of natural resources

Open science in the decision making and assessment of sustainable investment

Global Mean Surface Temperature prediction with Pangeo, an open source development environment for the earth science.
#FreeTheModels

Traceability and Uncertainty of Environmental Information

Open Data with Uncertainties → Open Execution → Open Results → Open Discussions → Conclusions with Uncertainties

Open Source Models and Tools

Propagation of uncertainties
Openness as key Indicator for Sustainability

By providing open data and open source models on sustainable intelligence, actors demonstrate their sustainable intention.

Cedalion standing on the shoulders of Orion from Blind Orion Searching for the Rising Sun by Nicolas Poussin 1658
Spatial Finance

Using Earth observation to measure the environmental impact and geolocation of business activity and supply chain.
Open Sustainability in Investment

Openness as key measure of traceability and uncertainty in sustainability rating.

- Earth observation → Validated and measure the environmental impact
- Corporation → Sustainability Report → Open Source Sustainability Assessment → Sustainability Rating with Uncertainties
- News and databases on Corporations → Sustainability Sentiment
Open Source – The most underestimated climate strategy

Let's build a free and open operating system for global environmental sustainability together.

Read the full report: https://report.opensustain.tech/