Report on the outcomes of a Short-Term Scientific Mission[1]

Action number: CA20111

Grantee name: Orestis Melkonian

Details of the STSM

Title: Machine-learned premise selection for Agda: the prover's infrastructure

Start and end date: 16/06/2023 to 21/06/2023

Description of the work carried out during the STSM

During the STSM, we concluded that it will ultimately be necessary to also capture the terms of each entry in the current scope/context, otherwise the performance of the resulting machine-learned predictor would be inadequate. And that is what I implemented during my visit: extending the format of the training data to also include terms, accompanied by an extension to the `agda2train` backend [1] to also produce these terms when extracting training data from an Agda project.

Secondly, we managed to construct training datasets for another two big Agda libraries (we had only Agda's standard library until now), namely UniMath [2] and TypeTopology [3], both concerned with the formalisation of univalent mathematics.

Alas, we did not manage to develop an automated web crawler to streamline the process of obtaining training data for arbitrary libraries; this is mainly due to the lack of a proper package manager for Agda, making it difficult to track down which Agda version and dependencies are used for each library.

Description of the STSM main achievements and planned follow-up activities

The two aforementioned goals we managed to achieve was to finalise the data format and associated extraction procedure, and produce datasets for two more libraries. This sets up solid ground for the other half of the project [4] to take off, where a machine-learned model will eventually be trained on said data. We do not have any astounding results just yet, but this part of the project is currently under way, after which we are confident to have interesting results to report in a paper at a public venue.

Apart from the specific goals of the project, this STSM visit was also an excellent networking opportunity for me, both by meeting with old friends and colleagues, but also making myself more visible to a community I care about, e.g. by presenting recent (unrelated) work of mine at the local weekly ProgLog seminar.

[1] https://github.com/omelkonian/agda2train/
[2] https://unimath.github.io/agda-unimath/
[3] https://www.cs.bham.ac.uk/~mhe/TypeTopology/
[4] https://europroofnet.github.io/_pages/stsm/kogkalidis-app.pdf

Host
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[1] This report is submitted by the grantee to the Action MC for approval and for claiming payment of the awarded grant. The Grant Awarding Coordinator coordinates the evaluation of this report on behalf of the Action MC and instructs the GH for payment of the Grant.