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

Action number:

Grantee name:

<u>Details of the STSM</u>

Title: A rethinking of a Prolog interpreter using Maude - Application

Start and end date: 21/07/2024 to 27/07/2024

<u>Description of the work carried out during the STSM</u>

Description of the activities carried out during the STSM. Any deviations from the initial working plan shall also be described in this section.

(max. 500 words)

During the STSM me and Santiago met several times. The initial meetings were trying to define the advantages, limitations and expectations of Maude. As an expert, Santiago was able to guide me through the details in a way that was directed towards the goal of implementing a three-valued interpreter for Prolog.

In the following meetings, we tried taking advantage of the features of Maude like narrowing and how those would apply to our case.

I also got to talk to several people working with Maude for similar and different subjects that gave a great perspective on all the possibilities of Maude.

<u>Description of the STSM main achievements and planned follow-up activities</u>

Description and assessment of whether the STSM achieved its planned goals and expected outcomes, including specific contribution to Action objective and deliverables, or publications resulting from the STSM. Agreed plans for future follow-up collaborations shall also be described in this section.

(max. 500 words)

We got to a detailed plan on several steps we will follow in order to have a useful interpreter of full Prolog, with several optimizations that are already implemented in most Prolog compilers. The benefit of this is that several features already available in Maude could then be applied to Prolog with no extra effort. Also, several more recent features lack formal specification and, by adding them to the interpreter, we would get clearer and more formal ways of thinking about these extensions.

Moreover, the goal would then be to highly simplify the interpreter by using all the mechanisms of Maude like folding variant narrowing in order to implement steps in the semantics instead of simulating them with some function defined *ad hoc*. This will greatly increase the efficiency of executing the interpreter.

In our expert opinions, several publication will arise from this collaboration, that explain all the steps we are going to go through as well as increase the interest from the logic programming community in Maude as a powerful and useful tool for program analysis.