Thesis work for the design and implementation of an open source pharmacometric model language translation tool

Background

The pharmacometrics research group at the department of pharmaceutical biosciences is developing mathematical models to understand drug and disease mechanisms and software tools needed for developing and evaluating these models. The models are described in various domain specific languages (DSLs) that are tightly connected to the modelling tools. A recent international collaboration between industry and academia (DDMoRe) has developed a set of new standard DSLs that are aimed to simplify the exchange of models between different software tools. Core to these new standard languages is the XML format PharmML.

The thesis work

The most widely used modelling tool in pharmacometrics is called NONMEM. It uses its own language, NM-TRAN, to describe models. There is currently no automatic way to translate between NM-TRAN and PharmML and such a translation tool would enable a big corpus of models being used by tools that know PharmML and it would also enable an easier transition to the new standard. This thesis work would be focused on writing a tool that can translate from NM-TRAN to PharmML and would consist of the following parts:

- Design and describe an architecture for the translation tool
- Decide on which type of parser to use for the source language
- Design algorithms for translations of different constructs in the source language using domain knowledge available in the pharmacometrics research group. The constructs range from descriptions of symbols, parameters, matrices, differential equations to mathematical formulae
- Implement the translation tool

As this goal is quite ambitious even a partial translation would be considered a success. It is also possible to accept more than one student for this thesis work. The language that will be used is C++ and some knowledge about lexing and parsing is a prerequisite. The results of the thesis work would be put under an open source license and would be of interest not only to our research group but also to other institutions and the industry. The starting time of this project is flexible. Please inquire for a more detailed description of the project.

More information

Our group: www.farmbio.uu.se/research/researchgroups/pharmacometrics
PharmML: pharmml.org
The DDMoRe Foundation: www.ddmore.foundation

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