Inishell 2.0: Semantically driven automatic GUI generation for scientific models

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As numerical model developers, we have experienced first hand how most users struggle with the configuration of the models, leading to numerous support requests. Such issues are usually mitigated by offering a Graphical User Interface (GUI) that flattens the learning curve. This requires however a significant investment for the model developer as well as a specific skill set. Moreover, this does not fit with the daily duties of model developers. As a consequence, when a GUI has been created -- usually within a specific project and often relying on an intern -- the maintenance either constitutes a major burden or is not performed. This also tends to limit the evolution of the numerical models themselves, since the model developers try to avoid having to change the GUI.

To circumvent that problem, we have developed Inishell [1], a C++/Qt application based on an XML description of the inputs required by the numerical model that generates a GUI on the fly. This makes maintenance of the GUI very simple and enables users to easily get an up-to-date GUI for configuring the numerical model. The first version of this tool was written almost ten years ago and showed that the concept works very well for our own surface processes models. A full rewrite offering a more modern interface and extended capabilities is presented here.