

New model management tool leads to better productivity

September 29 2021



Credit: Pixabay/CC0 Public Domain

In complex multi-domain systems, like robots, experts from different fields combine several models to develop or improve the system. Model management can reduce inconsistencies, and therefore Ph.D. student

Wesley Torres built a tool called XAMÃ, in which the users can identify which models can be affected by a change of another model. Engineers from the TU/e Robotics Team "Tech United" tested his tool, and Torres observed that XAMÃ can be used as an ally to improve productivity. He successfully defended his Ph.D. thesis at the department of Mathematics and Computer Science on September 21.

Managing models that belong to the same [domain](#) might not be a complex task because of the features provided by the available development tools. However, managing interrelated models from different domains is challenging. A robot is an example of such a multi-domain system. To develop it one might need to combine models created by experts from mechanics, electronics, and software domains. These models might be created using domain specific tools of each domain, and a change in one [model](#) of one domain might impact a model from a different domain causing inconsistency in the entire system.

Torres aimed at facilitating the evolution of the models in this multi-domain setting. One of his goals was to identify relationships between models from different domains. To obtain the models, and the relationships between those models, he collaborated with TU/e robotics team Tech United. The literature suggests that making explicit the [relationship](#) between models from different domains can support the models maintenance, making it easy to recognize affected models because of a change.

As a next step, Torres investigated the suitability of optical character recognition (OCR) for extracting textual elements from models from different domains. The results were used to create an infrastructure that can store the identified relationships in a structured manner making it easier to maintain the consistency of an entire system. This tool, XAMÃ, is composed of four main parts: text extraction from images of models, post-processing [optical character recognition](#) (OCR) output to improve

the accuracy of the text recognition, relationships identification between models from [different domains](#), and multi-domain model management.

Two aspects of the usability of this tool were tested in collaboration with Tech United. The first aspect was whether users believe that a tool can enhance their job performance, the second whether users think a tool is easy to use. As a result, XAMÃ helps in finding the relationships between the model elements faster and with better precision and recall. It was qualified as good in terms of usefulness and ease-of-use and above all, it could improve job performance or productivity. However, as this is only one aspect of this promising [tool](#), more validation studies and further evaluations are necessary.

Provided by Eindhoven University of Technology

Citation: New model management tool leads to better productivity (2021, September 29)
retrieved 28 April 2024 from <https://techxplore.com/news/2021-09-tool-productivity.html>

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