Model visualization for e-learning
Kidney simulator for medical students

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The present paper introduces a recently developed tool for building web-based simulators called Bodylight.js. Simulators are applications composed of a mathematical model and a graphical user interface that allows the user to easily interact with the model and visualize the results. A modelica model is first exported to FMI with sources, transcompiled into JavaScript and WebAssembly and connected to a GUI, comprised of graphical animations created in Adobe Animate and elements that allow to control the input model such as sliders, buttons, etc.

A physiological e-learning application explaining the function of a nephron – the basic functional unit of kidneys – is presented later as a use-case. The model was developed primarily as a teaching aid for use in courses of physiology for medical students at our university.

Purpose of this work is to describe the new Bodylight.js tool and to prove its usability by building the medium-complex e-learning kidney simulator. The simulator helps medical students to better understand renal function at the very basic level.

Keywords: Modelica, JavaScript, WebAssembly, web technologies, physiology, kidney, e-learning