Autonomous Development of Online Assignments Supported by the Large Language Models Related to Mathematics, Computer Science, and Engineering

Andrew Pownuk[1] and M.V. Rama Rao[2]

[1]Department of Mathematical Sciences, University of Texas at El Paso, ampownuk@utep.edu

[2]Department of Civil Engineering, Vasavi College of Engineering, Hyderabad, India, dr.mvrr@gmail.com

To improve quality of education it is possible to use a properly constructed set of online assignments which are related to appropriate knowledge described in academic textbooks. Academic education may be related to all scientific subjects known today and new research topics. In many cases for a given scientific topic it is possible to create related computer code which simulates some aspects of given scientific phenomena. Online assignments can be viewed as distributed programs which run in parallel on many electronic devices (computers, phones, tablets etc.) and communicate with the server. Students can interact with online web-applications and study related scientific topics. Instructors can constantly improve the quality of assignments and examples.

May aspects of the development of online assignments can be fully automated and improve in autonomous way. Regular PC can type several thousands of pages of code/text per-second and can speed up development of online assignments related to mathematics, computers science, engineering, and possibly many other scientific subjects. The presented approach has already been tested on selected scientific topics in the framework of existing online learning system developed by the author of this presentation.

For many typical scientific questions large language models may deliver high quality answers and related code. Code and text description delivered by large language models (if correct) may speed up development of online learning systems. Examples related to mathematics, computers science, and engineering will be presented.

The presented approach may be extended to autonomous development scientific results in different areas of science and engineering.