Improving e-learning material quality with the aid of Deep Learning and workflow management

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Abstract

E-learning systems are available since decades, they became widely accessible and offered by most collages and universities. It has been recognized in recent years that the future of e-learning lies in crowd-sourced learning, where multiple users can contribute to the global knowledge base. However, in such systems, the the question of quality arises.

In the development of our e-learning system, one aim was to assure the high quality of the created contents. To achieve this goal, we have incorporated a workflow-engine, that is commonly used in business intelligence software, to manage business processes. We created a system that provides user interfaces for the definitions of state transitions and the corresponding user permissions. Thus, enabling versatile validation processes for the different types of materials, so that a newly created content can become an approved and verified learning object.

When we are talking about e-learning quality, we must not forget that this includes the aspects of accessibility. When we enable users to create new content in our system, we want to be sure that it is accessible. On the other hand, we do not wish to put the burden of image description entirely on the users. Therefore, we have incorporated a pre-trained "Show and tell" model to generate natural sentences describing an image, to annotate our image database. This not only improves the accessibility of the system, but also makes it possible for our elastic search engine to provide relevant search results, even when it comes to images. Deep learning emerged recently as a universal tool for machine learning tasks. Our used "Show and tell" model is one of such, a combination of a convolutional neural network (CNN) and a long short-term memory (LSTM) network.

In this paper we present the architecture of our e-learning system, highlighting the concepts towards quality assurance.