Development of Web-based instruction manuals through the use of the augmented reality technology

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POSTER ABSTRACT

In engineering education field, student experiment courses are very important practical lessons for confirming the theory studied. There are important for learners to improve their skill gradually from a rudimentary stage within a very limited classroom time. A tough condition that there are only a few teachers for more than hundred students must be presumed in just one class. Since students do not have enough chance to prepare and review the experiments practically, a sort of virtual experimental environment is very useful in some cases. For these reasons, technology that offers a virtual experimental environment that doesn't need real parts and tools has been widely researched. In this technology, an easily used learning environment can be offered widely due to the spread of cheap computers in educational areas. However, although software faithfully reflects the theory, unexpected difficulties can occur in the design of actual systems, resulting in a shortage of training for students. Therefore, experiments using actual electrical parts and apparatus are indispensable training for practicing engineers. In a class for more than over hundred students with a few teachers or instructors, the experiment manual plays a key role. To guide experimenters properly, refined theories and directive procedure must be described appropriately in these manuals. So, we developed a new learning environment for these courses and Web-based instruction manuals. We believe that it will lead to study by instruction with actual items for students. They will easily understand how to operate of experiment items by watching actual these than watching illustrated these. Therefore, we tried to import the picture of experiment items into our Web-based instruction manual. We recorded movies with Web-cam in a student booth and then make a composition Web page. But, this approach could not synchronize the movie with the instruction. It was insufficient for use as instruction manual. So, we focused attention on augmented reality to solve this issue. The Augmented reality technology is a term for a live direct view of an actual-world environment that is augmented with virtual image generated by computer. It can enhance one's current perception of reality. By using it, our Web-based instruction manuals will became tracking mark that uses simple black squares and then showing teacher by 3D computer graphics models with some instruction text.

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