Using Activity Tree Structure to Edit Materials of the Multi-Touch eBook

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Abstract: A large number of learning systems have applied touch elements to fulfill their user experience. eBook, another well-known e-Learning material, has been developed quickly and plays an important role nowadays. Nevertheless, there are not any learning systems designed for editing an e-Book including multi-touch contents. This motivates us to find a novel approach to design hierarchical teaching materials of digital learning content and e-Book. Due to the multi-touch technology and activity tree structure applied in this paper, this proposed approach can significantly enhance the variety of teaching strategy and interactivity of students. The designed approach consists of two parts: editor and player. About the editor, instruction designers can load multimedia content on a haptic tree node, insert search pattern to the node, and then output it as a project. About the player, learners can load the project and then touch every node on the tree.

Keywords: eBook, multi-touch, material design, activity tree

Introduction

The touch technology has been applied on many devices such as smartphones and computer screens in the recent years. Touch screens emerged from academic or corporate research laboratories in the second half of the 1960s[1]. Actually, we have been using touch screens for a long time, such as Automatic Teller Machine (ATM) machines, retail settings, tourist attractions, and museums. There are some common technologies including resistive, surface capacitive, projected capacitive, infrared, surface acoustic wave (SAW), and optical imaging[2].

Based on the activity tree structure, we design an integration system to combine the concept of learning activity from e-Learning with the touch technology into a user experience environment. With the player, learners can interact with learning objects and achieve better learning effect by directly manipulating.

1. Material Design with Activity Tree

Only based on the conventional teaching materials including images and videos, most of teachers cannot do vivid teaching in the classroom. This leads to the situation in which their teaching progress falls behind the course progress. Although the problem has been solved in the interactive learning environment which learners can involve in situated learning, another problem is that the thoughtless learners or novices concentrate on the unimportant part of learning object or control casually the course progress. We extend the activity tree structure

to translate PowerPoint's content as a vivid package of multi-touch material [3]. In Fig. 1, an example is shown to present this Computers material structure created by this paper method.

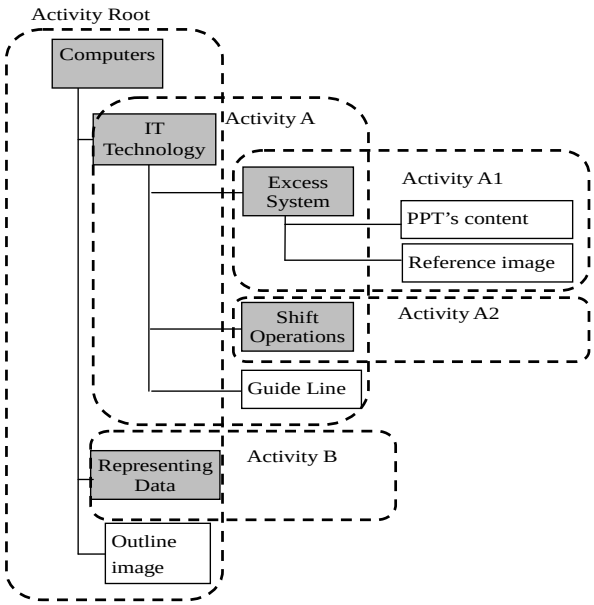

Fig. 1. A computer material structure created according to activity tree.

2. Editor Design

Multimedia learning has better learning effect than conventional method, but it is complicated to produce interactive learning objects. When facing numerous learning materials including videos, images and audios, our system can arrange these learning objects into a project or e-Book conveniently and then display it on a multi-touch screen for learners to manipulate and watch.

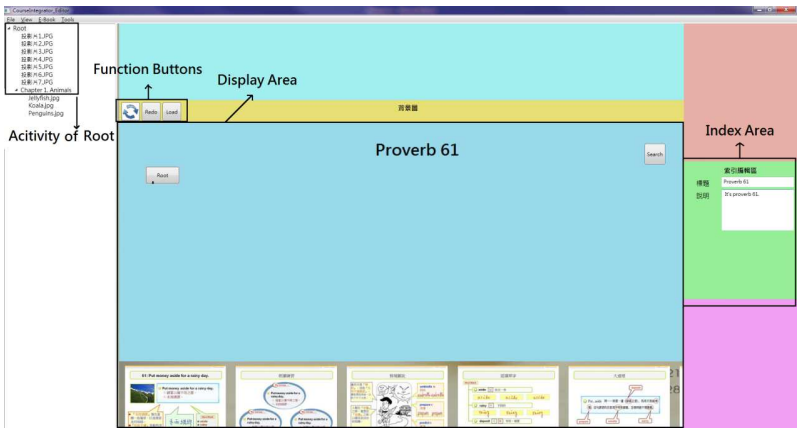

Fig. 2. User interface of root node display manager.

3. Player Design

The interface designs the multi-touch system to fit Natural User Interface (NUI) [4] with intuitive appearance and friendly interaction. Without using small display element and saving screen space for users to manipulate, the entire screen is a surface containing only two areas which are a manipulation area and a multimedia list area. The user interface of a sample project is shown in Figure 3 which is at branch node as well as a surface. To deserve

to be mentioned, all the nodes on the surface are touchable.

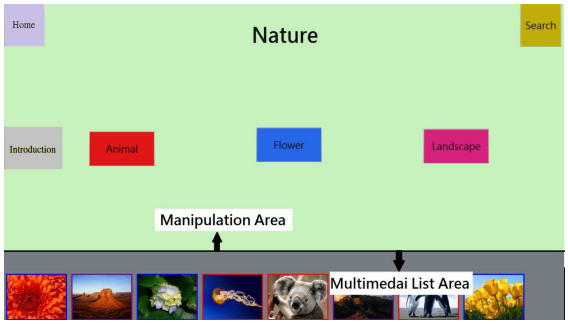

Fig. 3. User interface of a sample project.

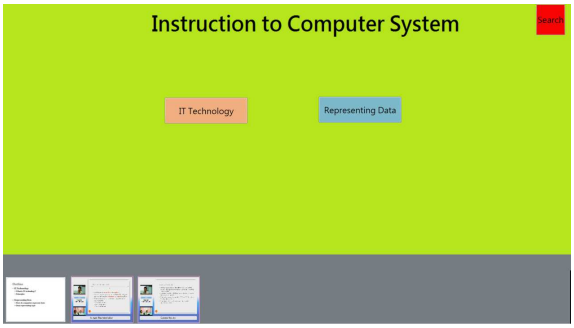

Fig. 4. Activity root of the computer material.

4. A New Design Concept for Teaching Material

We use the Editor to produce the package of multi-touch material according to book structure. In Fig. 4, this is activity root including cover, outline and guidance video of the course. The activity root provides leaf node button as activity A or B or more session of the course to link course activity for teacher teaching.

5. Conclusion and future work

By using screens supporting multi-touch, teachers can exhibit the touchable content either for student or for teachers themselves to manipulate the item, and students are easier to focus on their lessons and teachers are easier to interact with students because teachers have a lot of ways to display the teaching material. This paper has achieved the effect of learning such as interaction between teachers and students, easy navigation, and demonstration teaching method [5-7].

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