

Development of Computer Learning Environment for Beginners Using Model Railway Layout

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1. Introduction

The best way to learn abstract knowledge in the initial phase is to liken it with some concrete illustrations. For example, we start acquiring literacy by using a picture storybook. Children notice the correspondence between the picture and the shape of the characters beside it first, and acquire literacy step by step. In this research, we aim to develop a new methodology and its supporting technologies for beginners to learn about computation and programming using the same step.

In this paper, we describe technical subjects for this system and build the 1st trial system.

2. Computer learning Environment for beginners using model railway layout

Today's widely used computer systems are designed based on the von Neumann-type computer. This kind of computer carries out stored programs step by step. Similarly, trains travel on a track according to a pre-defined timetable and traffic control system. This indicates that a computer process can be compared to

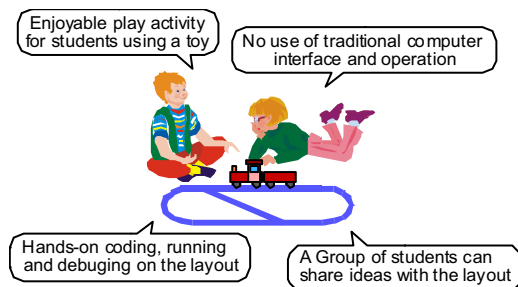


Fig. 1 The concept and advantage of proposal system

the operation of a train. We focused on this formal relatedness, and designed a model railway toy. The user can arrange layouts that is corresponded to some basic programming exercises, such as loop, classification, mathematics and so on. However, from the point of beginner's view, the most important point is that these exercises should look just a toy train action on the layout, and learner should be able to contract layouts as they want at will. The concept and advantage of this system is shown in Fig. 1.

3. The 1st trial system

The 1st trial system is shown in Fig. 2. This figure is 'Classification' layout using the developed 1st trial system. The layout consists of one 'Load unit', two 'Unload units' and one 'Point unit' which are simple function units. We designed these layout pieces that were reconfigurable individually.

In the future, we develop the system into more flexible for user as same as railway toy, and perform evaluation of a proposal system.

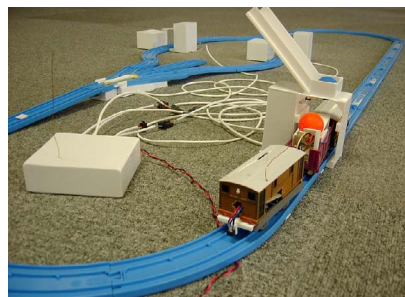


Fig. 2 Computer learning environment for beginners using model railway layout