

The Application of Physical Platform in the Course Teaching of Automation Technology and Application

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Abstract: This paper discusses the ways of using physical education platform to assist teaching in the course of automation technology and application. To set up the relevant curriculum task module, greatly enhance the students' learning interest, get the learning motivation, and the ability to solve practical problems in the completion of the task module.

Keywords: Task Driven Teaching Module, automation technology and application, teaching method

1. INTRODUCTION

Automation technology and application is a general education course, intended to broaden students' vision, improve students' interest in cross subject, increase the understanding of automation technology, and cultivate the ability to solve related problems. This paper discusses the use of small physical platform to complete the teaching task unit, to deepen students' understanding of the subject, to enhance students' interest in the subject. And this goal can be realized by setting up some task driving teaching module.

2. TEACHING TASK MODULE SETTING OF PHYSICAL PLATFORM

When designing the hardware platform, the students' level should be fully considered: Students understand the level of hardware platform is different; to achieve the task complexity is also different. Therefore, need to set up task difficulty task module ladder arrangement for for different levels of students. The students can generally be divided into three types:

(1) The students who don't know the physical platform. (2) The students who understand the physical platform, to be able to do the basic experiment. (3) The students who have studied the physical platform systematically. And teacher can easily know the students' level distribution by communicate with students through interaction and in break time in the first few

classes. Physical platform selected the self-tracking car spare parts developed by Dazzle Blue Technology and the self-balance car developed by mini Blance.

2.1 The teaching task module based on the physical platform of the tracking car

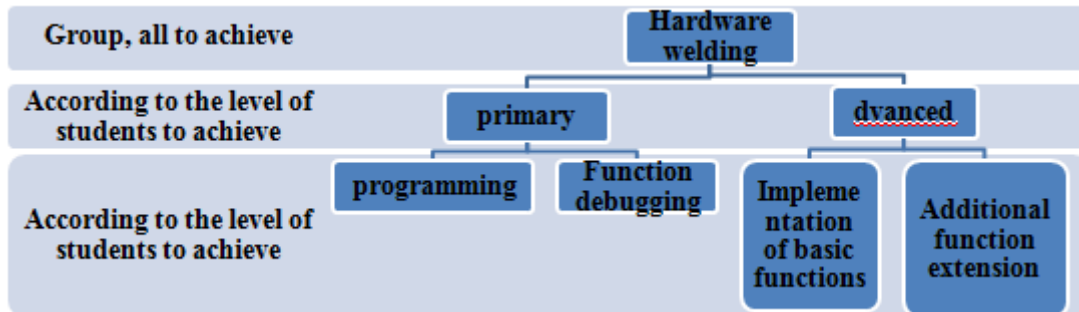


Fig. 1 Tracking car physical platform teaching task module

Figure 1 is the teaching task module based on the physical platform. In the beginning of the new curriculum, teachers can investigate the extent of the students to understand the physical platform, Combined with students' willingness and understanding degree, grouping reasonably. For different levels of students, take different progress and content of the teaching activities. In Fig.1 the primary practicality picture corresponding to Fig.2, Fig. 1 advanced practicality picture corresponding to Fig.3.



Fig. 2 Practicality picture of elementary teaching module

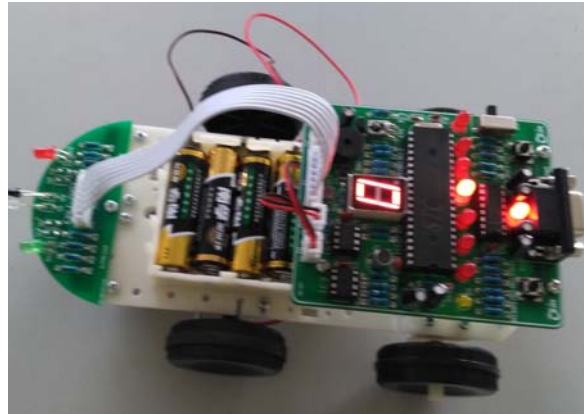


Fig. 3 Practicality picture of advanced teaching module

(1) Hardware assembling and welding

First of all, let the students understand the physical system operation principle, organize students welding by group. This step all the students have to complete. Through this part of the study, students can complete the hardware of the system hardware, grasp the principle of tracing the car. In this way, we can lay the foundation for the next two modules, at the same time, we can develop students' practical ability, obtain the corresponding circuit, and welding knowledge. Can greatly improve students' learning interest, get a sense of achievement.

(2) "Primary" teaching task module

This teaching task module is specially designed for the foundation of the students, the physical is (1) in the welding of the hardware. This teaching task module is specially designed for the foundation of the students to set up, choose the welded hardware in (1). This part of the need for students to learn more about the preparation of the most simple procedures, debugging, writing skills, etc.. This module all students have to complete the basic function of the car tracing.

(3) "Advanced" teaching task module

This teaching task module specifically set for students who have a certain basis, this part of the cost of hardware is higher, usually the teacher provide a physical system has been welded. The students to achieve a specific function of the program, as well as hardware debugging. These contents is from the shallower to the deeper. First of all, students need to be familiar with the corresponding ports of the circuit, such as signal input circuit, control circuit, the implementation circuit; Secondly, to understand the body forward and backward, turn left, turn right, obstacle detour, basic function obstacle and cliff port matching, and its basic principle; Finally, after programming debugging, realize the main function of the car.

2.2 Construction of teaching task module based on the hardware platform of self-balancing vehicle

This part is specially designed for the basis of good students, the physical system is provided by the teacher. In this module, students have been able to better complete the above teaching content, and there is a higher demand for knowledge. First of all, to guide students to learn the principle of self balancing car, including the mathematical model to build and the basic control method of learning. After a thorough understanding, to guide students to the corresponding functional programming, and in the physical system debugging. Using the physical system block diagram 5, to introduce of control theory related content, so that students can have more enthusiasm to learn automatic control technology.

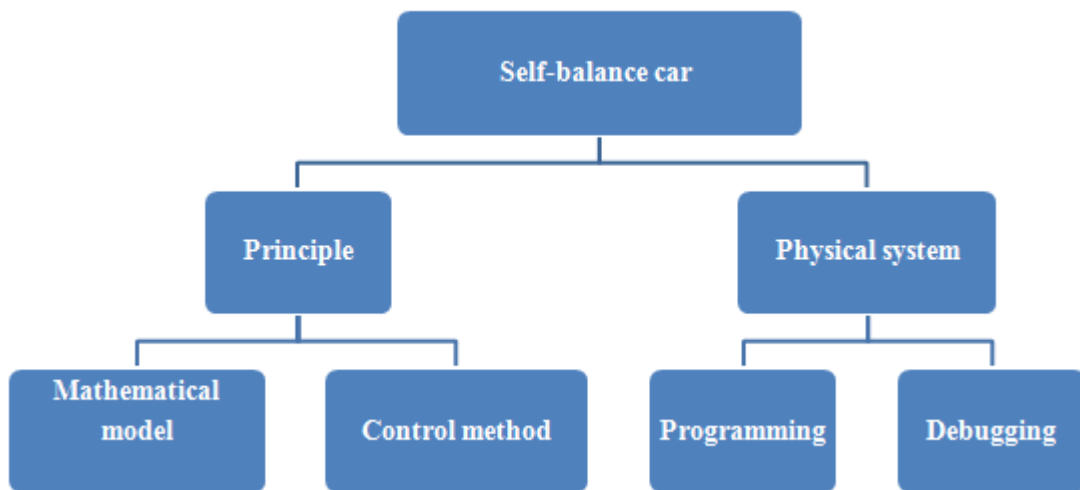


Fig. 4 Self balancing vehicle physical platform teaching task module

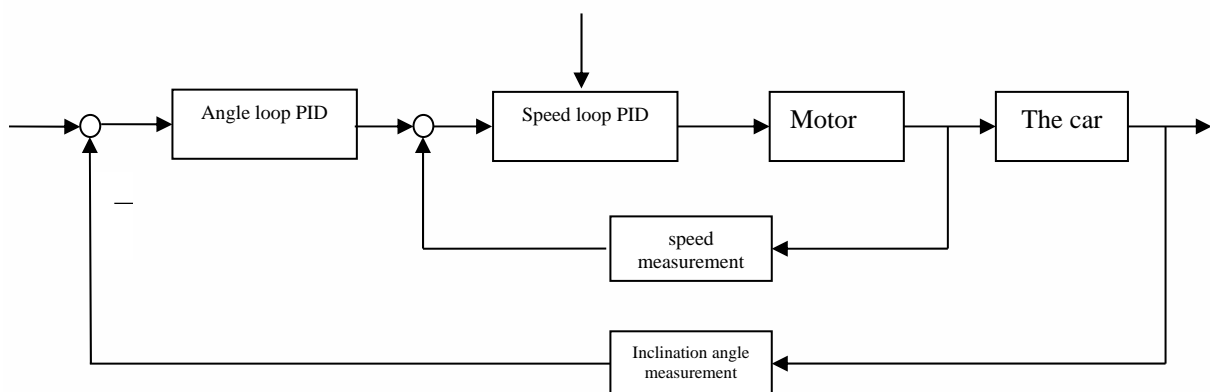


Fig. 5 Block diagram of self balancing vehicle physical system

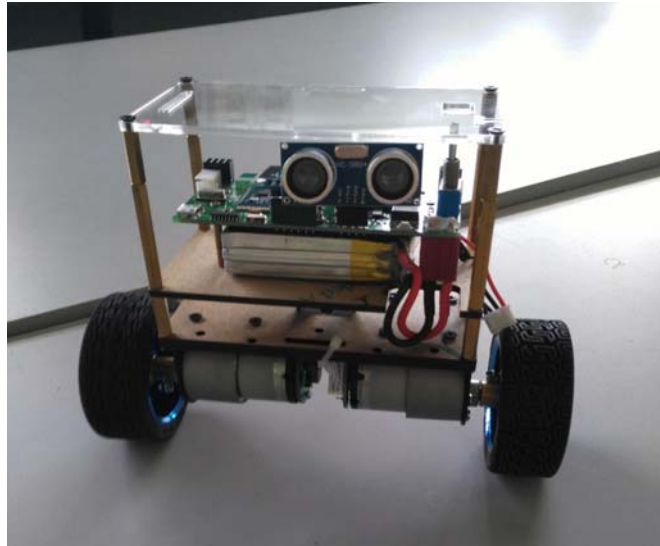


Fig. 6 Photo of self-balancing car

3. STUDENTS' COURSE SCORE EVALUATION MODEL BASED ON HARDWARE PLATFORM

The application of this part of the teaching content can be used as an important part of the course score evaluation of automation technology and application. According to the original student foundation is different, the study of different types of students to study and complete the situation, reasonable to give this part of the results. When set in the teaching module have been fully taken into account the different types of students the demand for knowledge, and each module can give students sufficient space for development, and thus eventually to more scientific and reasonable evaluation results. Specific rating scale reference standard as shown in Fig 7.

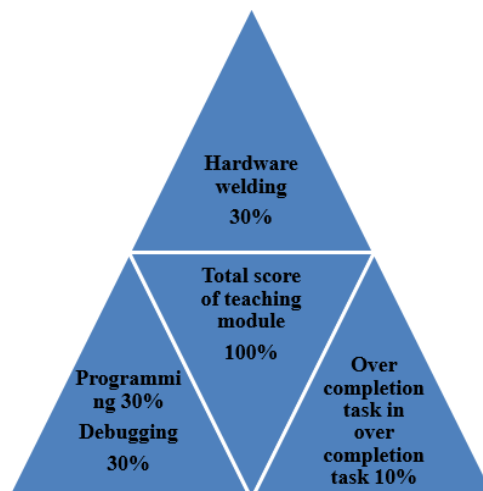


Fig. 7 Reference standard of rating scale

4. CONCLUSION

In this paper, we take the self-tracing car and balance car as an example, we can set up the teaching module in the course of automation technology and application. Through the study of these contents, students can learn from the basic contents of hardware welding knowledge, circuit knowledge, sensor applications, motor drives, etc. In addition, the better students can study the process of the design and implementation of the control system, the design of the controller and the parameter adjustment is more complex. The combination of theory and practice teaching mode can improve the students' learning interest and enhance the teaching effect.

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