



Discussion on the Task Driven Method in the Teaching of Automation Technology and Application

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Abstract

General education curriculum is a curriculum and social development needs to adapt to the curriculum, represents the new direction of the reform of the curriculum system in colleges and universities. Automation Technology and Application is a general education curriculum for students with various specialty specialties, deeply welcomed by students. This paper attempts to introduce the task driven teaching method into the teaching of automation technology and application, effectively improve the learning interest of different professional students; combined with the variety professional characteristics of the professional students, improve students' ability to solve practical problems.

Key words: Task driven teaching method; General education curriculum; Automation technology and application

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INTRODUCTION

At present, there are mainly the teaching model of the course of automation specialty at home and abroad: network environment, research study, independent exploration, interactive collaborative learning, subject teaching, stratified teaching, based on problem based learning, etc.. Among them, "task driven" is a kind of

teaching mode which has received much attention in recent years. Domestic scholars put forward their own task driving teaching process: the Research Institute of modern education technology, Beijing Normal University, Professor Kekang He proposed "teaching goal analysis—Situation Creation—Information Resource Design—self study design—the design of cooperative learning environment design—the order of study effect evaluation and design; Fengping Ai of the Chengdu Institute of Education Science and the mode of "task driven, teacher and student discussion, task completion, effect evaluation, summary".

Since nineteenth Century Professor Packard (A. S. parkard) (Bowdoin College), linked the general education curriculum for the university education the first time, more and more people are eager to study and discuss it. Although people have different representations of the concept of general education, people can come to a consensus on the goal of general education. In the United States, from 1973 began, which lasted 5 years, the core curriculum has been successfully implemented; gradually introduced into China in twentieth Century. The goal of general education is to provide access to knowledge and values among different groups of people in modern pluralistic society (Harvard Committee, 2010). Automation technology and application are a general elective course for students of different majors in our school, the purpose is to allow students to master the knowledge of Automation Discipline, as a supplement to the existing narrow knowledge system of each specialty.

Task driving teaching thought can be traced back to the Chinese education originator Kong Fuzi in 2000 years ago, the idea of "learn in order to practise"; Its embryonic form is in the last century 50, 60 time in West Germany in the prevalence of "case teaching" model. "Task driven" is a kind of teaching method based on the theory of Constructivism teaching. Usually refers to in the process of study information technology, the students in the teacher's help, closely around a common task activity

center, in the strong problem motivation, through the active application of learning resources, to explore and learn with interaction, to complete the task at the same time, guide students to produce a learning practice.

Automation technology and application are a general education course involves a wide range, have the cross with the other professional courses, in different degrees and different angles; easy to arouse students' resonance. Introduce the teaching method of task driving in this course is more suitable for different professional students to understand the research methods and main ideas in the field of automatic control, comprehensive use of their own professional knowledge, solving the task problem of the automation technology and Application Course, effectively improve students' learning interest, improve the ability to solve practical problems.

1. EXAMPLE OF TASK DRIVEN TEACHING MODE FOR AUTOMATION TECHNOLOGY AND APPLICATION

1.1 Examples of Task Driven Method

In this section, several examples are given to introduce the task driven method in the application of automation technology and application course, and some of the students' works. Next, show automation technology and application of subject knowledge structure diagram the example relates to, then illustrate the implementation of the task driving method.

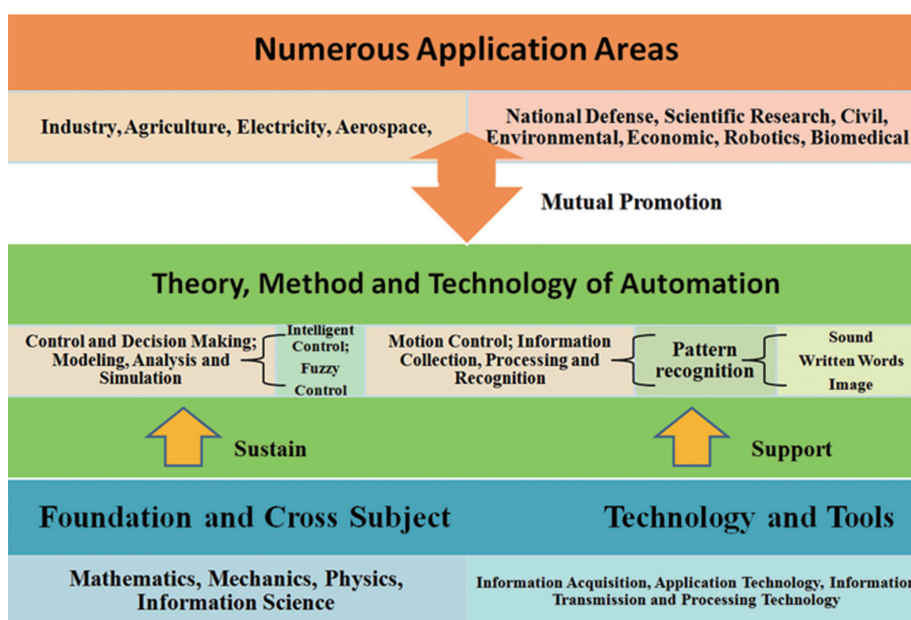


Figure 1
Involved Knowledge Structure of Automation Technology and Application

Figure 1 shows the task driven teaching method involved the knowledge structure of Automation Technology and Application. In this paper, we only give the task implement examples of face recognition which belongs to “Pattern recognition” and Fuzzy Control which belongs to “Intelligent Control”, as shown in Figure 1.

1.2 Face Recognition

As the general curriculum is different from professional courses, there are two ways to carry out the task. We can explain the principle used in the main, and then guide the students to complete the design of the part of the task. And we can also be used to stay for the main principle of thinking assignments to allow students to work, to add their own knowledge, the main idea in the classroom design, and show the results.

Face recognition technology is the use of a technology and means to identify people's identity, so as to identify the identity of people to achieve the purpose of supervision, management and identification of a technology. Automatic recognition of faces is considered as one of the fundamental problems in computer vision and pattern analysis, and many scientists from different areas have addressed it.

Let the students be familiar with the whole process of face recognition, the general structure of the face recognition as shown in Figure 2. The whole process includes: (a) face image acquisition, (b) face detection, (c) feature extraction, (d) based on the identity of the face image recognition, (e) based on the identity of the face image comparison verification, for each process to introduce.

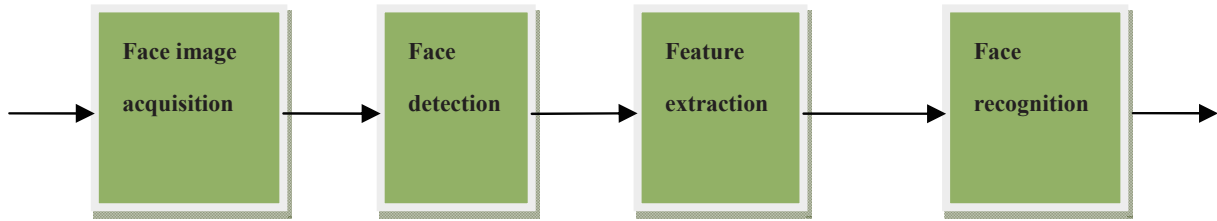


Figure 2
General Structure of Face Recognition System

As a more in-depth introduction, you can let the students in-depth understanding of some of the specific face recognition algorithm, here with the PCA algorithm as an example. Chellappa et al. (1995) presented a survey on several statistical-based, neural network-based and feature-based methods for face recognition (Rajkiran & Vijayan, 2004). At present, the principal component analysis can obtain good results in frontal face recognition. Figure 3 shows the overall process of the face recognition task based on PCA. PCA also known as the feature of the face image as a whole to encode, and not concerned about the eyes, mouth, nose and other single features, thereby greatly reducing the complexity of the identification. The main drawback of this method is that there is no fast algorithm for solving eigenvalue and eigenvector, and every new face is put into storage, and it is time consuming to calculate the eigenvalues and eigenvectors. But its content is very easy to understand, easy for the next design.

In the course of the lecture, we can show the whole process of face recognition to the students, and then let the students realize some functions. Such as face recognition based on PCA: We can use some of the international popular existing face database, the algorithm to show the process of face recognition; some specific algorithms or programs can make the students try to design and write. In the classroom, let the students compare the advantages and disadvantages of the algorithm.

To understand the basic content, we can let the students compare the advantages and disadvantages of the algorithm. Automation technology and application are a general education curriculum, as this reason, arrangement the task as simple as possible. At the same time, it is easy for students to master the contents of the course content of automation technology and application.

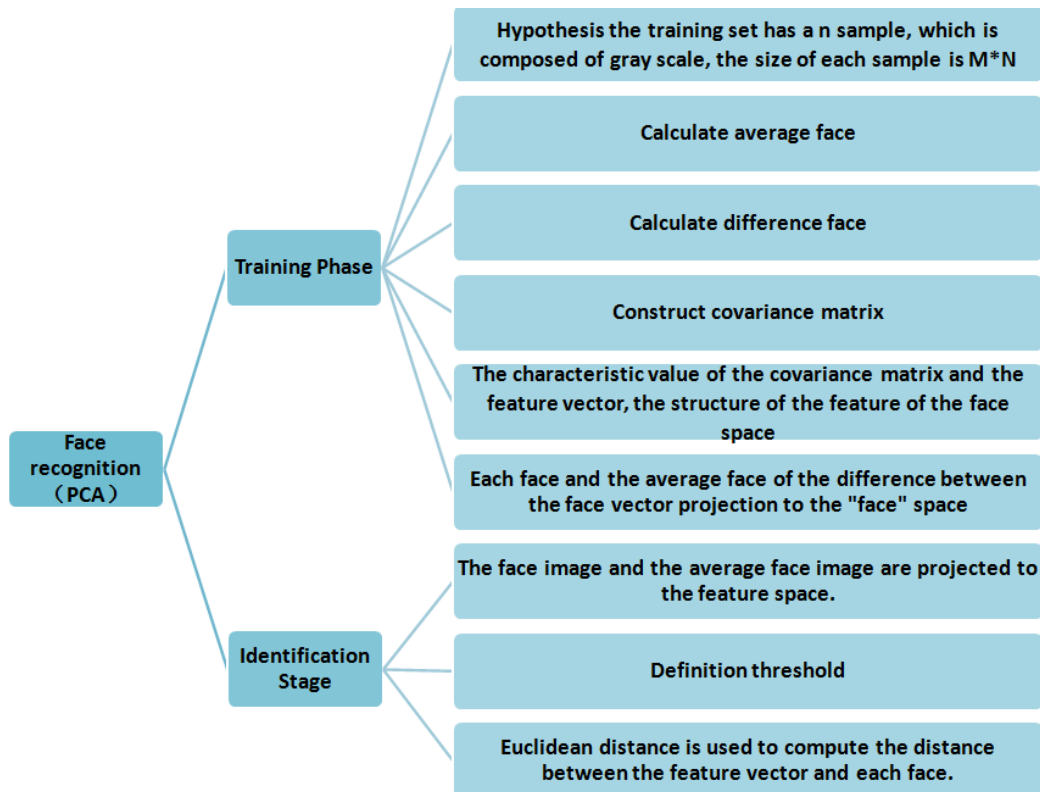


Figure 3
The Whole Process of Face Recognition Based on PCA

1.2.1 Intelligent Control

Here we select fuzzy control as a representative of intelligent control. Combined the example given in the Matlab Fuzzy-logic Toolbox User's Guide (Matlab Works, 2001), task situation: Let the students set up a fuzzy controlled system of restaurant tips. The students can add fuzz-rule themselves, comparison result, complete the process of the fuzzy control system. The whole process of the establishment of the restaurant consumption

accounting fuzzy control system is shown in Figure 3. Firstly, introduce the basic principle of fuzzy control and the use of the software, combined the Fuzzy Interface System of Matlab software, and then gives the specific requirements of the task. Design steps are as follows: a) service and food are two input variables, tip is the output variable; b) the membership function of the three variables; c) Input fuzzy rule; d) Observation results.

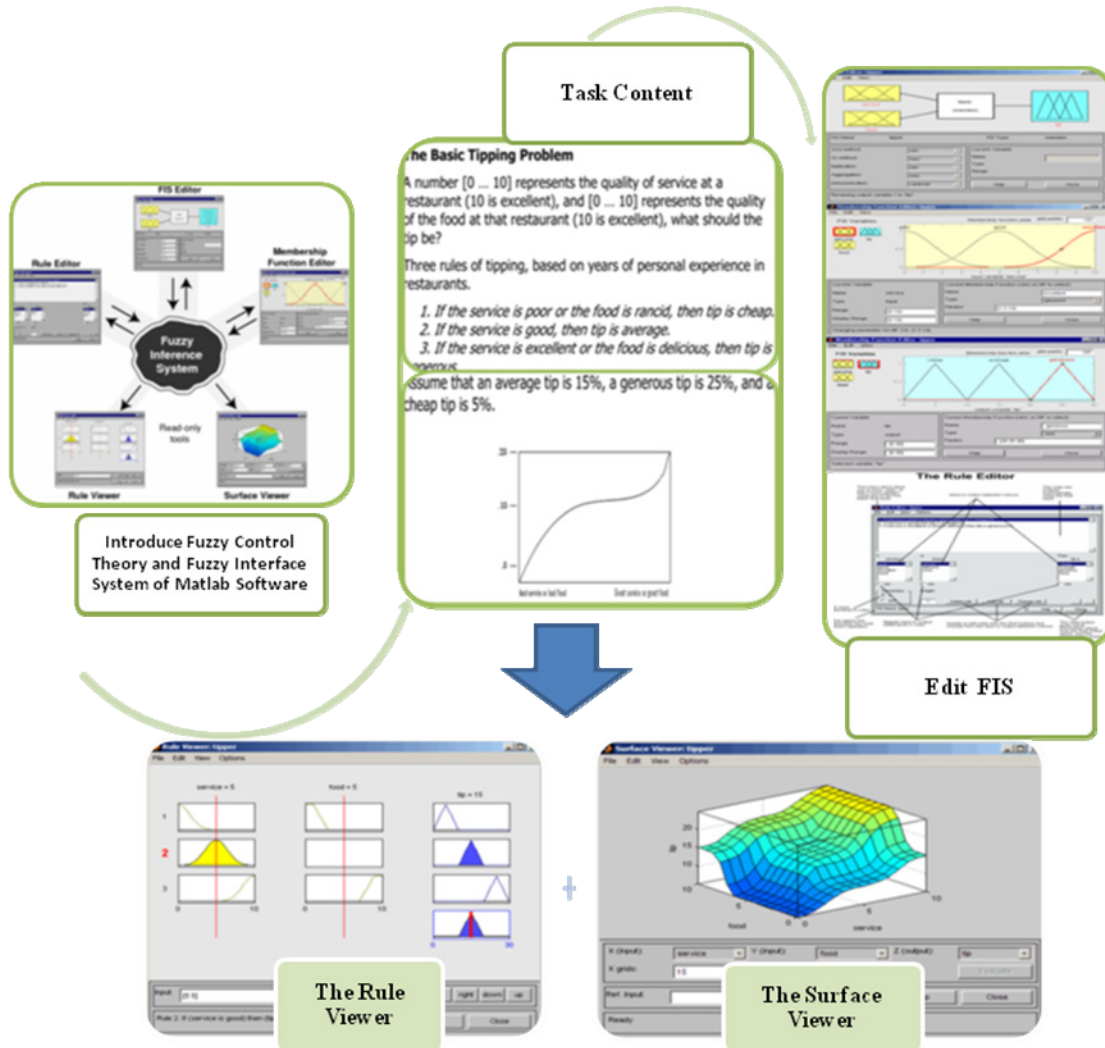


Figure 3 The Whole Process of Fuzzy System of Dinner Tip

1.3 Student Work Display

In the course of the teaching of Automation Technology and Application course, in addition to carry out quasi-open task driven teaching mode, it is also introduced in the course of the gradual open task driving mode. Let the students choose the task according to the characteristics of interest and professional characteristics, teachers according to the completion of the task to give the corresponding score, and the score is included in the total score. Teachers give the scores, and the results were included in the curriculum score. Select some outstanding

works of students, so that students in the classroom self demonstration. Such arrangement is welcomed by the students: On the one hand it can improve the students' interest in learning this course; on the other hand, it can mobilize the students to learn the professional course of interest. At the last class of the semester, outstanding volunteers can show their work. Practice has proved that outstanding students in this part of the performance of very active, willing to work with their own teachers, students to share, which also emerged a lot of good works. Many of the students are two grade students, although the

professional course knowledge is limited, but their works have been able to see the prototype of scientific research.

Figure 4 and Figure 5 show the excellent work of the students in the last year.

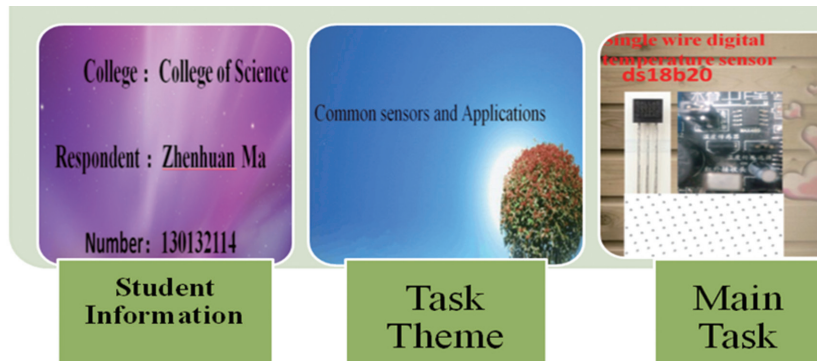


Figure 4
 Student's Work 1



Figure 5
 Student's Work 2

CONCLUSION

Task-driven, need to complete a number of tasks associated with the discipline to learn and develop skills. Task teaching method is very suitable for the specialized course teaching process of Automation Technology and Application. This paper expounds the process of implementing the task driving method in the Automation Technology and Application course teaching. Analyzing the relationship among the students' performance in the classroom, the completion of homework and the relationship between the results, the graduation and the entrance rate, the effectiveness of the method in the teaching of the course of automation specialty is verified. Task based teaching method is beneficial to the students' knowledge system of Automation Technology and Application. Facts have proved that the task driven teaching method can get better teaching effect.

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