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Discussion on Teaching Reform of Digital Image Processing Course

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ABSTRACT Compared to other computer science courses, although the digital image processing is a relatively young discipline, it is a professional information subject of the basic courses. The establishment of digital image processing courses has also an important supporting role on the computer image processing technology. The current study analyzes digital image processing courses that have been exposed to the problem. In general, it is necessary to carry out curriculum reform from these three aspects: defining the type of course, optimizing the teaching content, improving teaching methods. This paper aims to solve the existing problems of digital image processing teaching from these three aspects, which can further improve the quality of teaching, improve students' professional skills, and provide a strong professional talent to the community.

KEYWORDS : digital image processing, curriculum reform, course type, teaching content, teaching methods

THE PROBLEMS OF CURRICULUM TEACHING

Firstly, there are some deviations in the understanding of the types of digital image processing courses. Is this course a research course or an applied course[1]? The existing teaching has not been fully recognized on this issue. Some students want to engage in digital image processing after graduation, there are some students who intend to learn further digital image processing technology in the period of Master study. So how to accurately locate the type of the course, to further develop the relevant training content and teaching model through the type of curriculum positioning, which is a primary issue worth consideration.

Secondly, the digital image processing course is mainly based on theoretical teaching. The teaching contents include image basic processing, image transformation, image enhancement, image restoration, image coding, image segmentation, description and image feature extraction, etc.. On the one hand, these teaching contents are more complex and abstract. For example, there are various complex transformation methods in the explanation of image transformation, including Fourier transform, time domain transform, frequency domain transform, discrete Walsh Hadamar transform etc.. And the course of study involves a wide range of disciplines, including linear algebra, physics, geography, and so closely related courses. So learning the course may have a certain degree of difficulty for the basics of weak students, and they cannot solve the practical application of the problem. On the other hand, there are differences between the teaching content and the current technological development. There is no close combination of the development of emerging disciplines in the choice of teaching content. For example, in the case of artificial neural networks, artificial intelligence, pattern recognition and other new technology developments, only to explain the traditional method of digital image processing, there is no integration into the use of new areas of technology.

Finally, considering the development of modern intelligent information technology and the increasing demand for talent on the professional[2], the digital image processing technology is more and more widely used, such as medical image processing, the popularity of smart phones, intelligent wear of visual devices[3], and a series of applications. These practical applications propose higher requirements for digital image processing professionals. The traditional unilateral traditional teaching has been unable to meet the needs of the development of modern society. Combined with the

teacher push the principle of teaching methods on the blackboard, now digital image processing courses is mainly based on PPT electronic lesson plans, there are two drawbacks in this teaching way: Firstly, the teaching process is not centered on the students, but centered on Teachers' teaching, which cannot play the students' imagination and the substantive thinking of the problem. Secondly, the teaching method is boring, students face the various principles of explanation and the inverted formula in the course of lectures, it is still difficult to understand what they have learned. Once the above problems occur for a long time, students may be tired of learning about the course[].

THOUGHTS ON THE REFORM OF CURRICULUM TEACHING

Aiming at the above problems in the teaching of digital image processing, the general idea of reform comes from these aspects: course type positioning[5], accurate positioning of digital image processing courses of teaching types, according to the curriculum attributes and social development needs to develop the relevant training program. Teaching content closely integrated with modern technology. To understand the use of digital image processing knowledge appropriate to increase the modern technology in the traditional teaching of the foundation, and emphasizes important teaching content. Diversification of teaching methods, digital image processing theory is abstract and complex. It will be an effective example of the various abstract principles, so that students can clearly understand the technical application of the course. While using multi-angle teaching methods, to further deepen the students' understanding of the course and mastery.

SPECIFIC MEASURES OF TEACHING REFROM
Draw up the training program according to the curriculum attributes

To determine the attributes of digital image processing courses, to develop a reasonable training program, to find the curriculum research and application of the balance. From the perspective of applied learning, combined with software operations, programming exercises to teach students on the basis of the basic principles. For example, explaining the main functions of image processing on MATLAB and VC, performing a simple image processing by randomly selecting the picture, so that students can master the basic method of image processing. At the same time, students can be combined with the practical application of life or participate in the school's simple image processing project, including the basic transformation of the image, image enhancement, image

segmentation and so on. Students can understand and master the use of digital image processing skills from practical applications. From the perspective of research-based learning, besides explaining the basic principles of digital image processing, it is important to explain the deep content of the principle for a reasonable arrangement of school hours. For example, when explaining the discrete Walsh Hadamard transform and the principle of wavelet transform, this part of the content is more difficult. Not considering that some students will learn the deep part, some teachers are just a brief introduction. Therefore, teachers also do a detailed explanation. Students can choose to accept. This can meet the needs of some students in the future study of digital image processing technology for further study to pave the way. Therefore, we must grasp the balance of digital image processing. It is necessary to clear the positioning of the curriculum attributes and formulate a reasonable teaching plan. This satisfies the student's ability to learn about this course.

Optimize teaching content closely with modern technology development

Digital image processing is a relatively young discipline. So there is a lot of room for development in this technical field. Especially in recent years, digital image processing technology used in various fields, including artificial intelligence, pattern recognition, natural disasters, medical image recognition, etc. The enhancement of the content of the digital image processing course can be described in four words: increase, delete, change, check. We must first combine the development of digital image processing in recent years on the basis of traditional teaching content, including the representative digital image processing principles and the achievement of significant application value. Secondly, we remove contents that are almost obsolete. Due to the rapid updating of this technology, there is a lack of understanding of a particular principle. Therefore, it is necessary to supplement and correct the defective content. For example, the selection of modern materials combined with the textbook on the selection of teaching materials. While emphasizing important teaching content, the key content and non-key content points separated. For example, the active contour segmentation model and the target tracking method can be used as the selected content for students interested in learning. And we explain the details of the focus in the actual commonly used image processing technology image segmentation, detection, time domain frequency domain conversion etc.

Improving teaching methods with students as the center

Traditional digital image processing courses are mainly centered on teachers' explanation[6]. This teaching method is difficult to stimulate students' interest in learning and independent thinking ability. Therefore, we have improved from two aspects in the teaching methods: On the one hand, deepen the understanding of knowledge by the classroom actual presentation. For example, when explaining the basic processing of an image, we can use the main function program to instantiate the image of the basic processing by selecting the small size of the picture in MATLAB[7]. And compare the merits of some algorithms, we can write a small program in VC[8]. When explaining the various principles, we actually operate with the software platform in the classroom. This is a deep grasp of the contents of the study. On the other hand, we need to combine a variety of teaching methods, including teacher-student interaction, classroom questions[9]. For the thinking of the problem, let the students explore each other in groups. And the problem was established to see in the actual life of students. For example, students explain the picture of their own pictures, including the angle of these photos, hue and other issues. And we propose a solution to the problem by knowledge of digital image processing. This can fully mobilize the enthusiasm of learning and inspire their ability to think through this teaching. There is a little need to improve that is the teacher lectures of language art[10]. Not only can attract students' attention through the humorous language art, but also allows students to memorize the contents of the lectures. Invisible among the knowledge points "mosaic" into the memory of students.

SUMMARY

By the problems in the process of digital image processing, the paper proposes the teaching reform of the course by three aspects: curriculum type positioning, optimization of teaching content, and improvement of teaching mode. this paper aims to improve the efficiency of classroom teaching, to enhance students' understanding of the curriculum, and to further improve students' ability of autonomous learning based on the adoption of effective measures,. These reform measures can provide students with substantial assistance in their studies, so that students have the professional ability to meet the basic needs of the relevant professional talents.

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