Application of Artificial Intelligence in Wireless Sensor Network Training Teaching

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Abstract. As an important part of the teaching activities of science and engineering, combining artificial intelligence technology, face detection, biopsy detection, text and voice recognition technology are applied to the practical teaching, and presented in different ways in the pre-class supervision, in-class assessment and after-class evaluation stages, so as to make the practical teaching more automated and intelligent. APP also gets good feedback in the application stage.

Keywords: Artificial intelligence · Training teaching · Internet of Things

1 Sketch

As an important part of Applied Technology Teaching of Internet of Things in Higher Vocational colleges, practical teaching aims to internalize knowledge in theoretical classroom into skill points through students' hands-on practice. Its goal is to consolidate and strengthen existing skills, digest and absorb new skills points. In the new period, it advocates "learning by doing" in practical teaching of Higher Vocational colleges, especially in the competence competition of teachers in Higher Vocational Colleges in 2018, It clearly puts forward the concept of learning by doing in practice teaching [1], which requires students to do as much as possible in practice class, and more information-based means to assist students in learning.

Taking the core course of Internet of Things 《Wireless Sensor Network Technology and Application》 as an example, this paper elaborates on introducing artificial intelligence technology into practical teaching, forming a three-dimensional "learning by doing" system with supervision before class, assessment in class and evaluation after class.

2 Supervision Before Class

Due to the limitation of the environment, the demonstration of practice operation in class can not be accurately understood by every student, and the details can not be clearly demonstrated, which are all painful points difficult to solve in traditional practice teaching [2]. It also causes long training time, but the effect is not good. Artificial Intelligence changes the mode of teachers' demonstration once and students'

demonstration once in traditional practice teaching, and records the key steps of teachers' operation into short videos, which are play backed the operation details. Publishing preview tasks before class requires students to watch short videos. In view of the poor autonomy of higher vocational students in learning and the phenomenon of brushing classes, we use Baidu artificial intelligence platform's "biopsy + face verification" technology to supervise students' learning. When there are non-self-watching or no one watching, the videos will automatically withdraw, and the data will be recorded in the background. According to the frequency and effect of students watching videos, the pre-class evaluation is carried out.
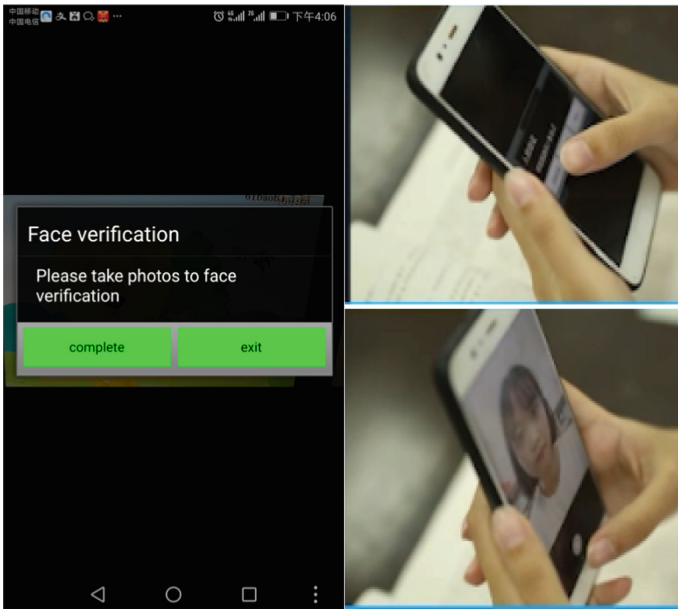
Fig. 1. Face verification and result recording effect map

Taking the practical training link of 《Basic Installation and Debugging of Wireless Sensor Networks》 (excerpted from the second section of Chapter 4) as an example, [3] Before class, the key skill points are the installation and wiring of electrical parts, the generation and debugging of firmware, and the operation links of these contents are recorded into short videos for students to watch before class. The key skill points that are the installation and wiring of electrical parts, the generation and debugging of firmware, are recorded for students to watch before class.

3   Assessment in Class

The practical training class is the stage of students' practice, and also an important moment for students to internalize skills. In order to achieve the goal of internalized skills, we need to make full preparations before class and closely integrate with orderly practical operation in class. In the process of practical classroom teaching, grouping is usually carried out due to the limitation of the number of experimental equipment, so real-time feedback and participation of students are very important.

In order to solve the problem of untimely feedback in class, taking the "firmware generation and debugging" part as an example, students need to establish an understanding of the meaning of firmware parameters before class, set and operate firmware parameters in the training class, and download and debug firmware. The key to solving the problem is to give the assessment and evaluation of the practical process in time. In traditional training teaching, it is very difficult for teachers to guide and evaluate each group at the same time. This paper adopts the image recognition technology of Baidu artificial intelligence platform to extract parameters and modify the keywords of the page and compare them with background data. According to the similarity level, the teachers can give timely reminders according to the errors. The keywords extracted from the picture are shown in Fig. 2.
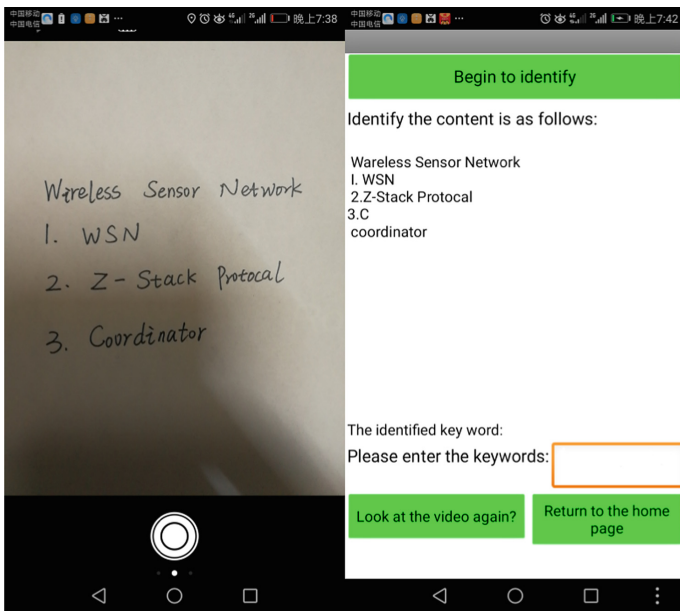

Fig. 2. The results of image recognition

In order to solve the problem of students' participation and fully mobilize their enthusiasm, a camera is installed on the experimental platform, and the image is

collected once every 30 s. According to the face recognition technology of artificial intelligence platform [4], the information of the operator in the front desk is obtained. According to this information, the classmates who are not in front of the experimental platform for a long time are reminded. The installation position of the camera and the marking of the image recognition result are shown in Fig. 3.


Fig. 3. Camera on the experimental platform and face recognition record

4 Evaluation After Class

It is necessary to review the content of practical training course in time after class and expand the extension of practical training content so as to let students know the useful place of learning. In view of this goal, On the one hand, breakthrough game in APP are set up to review the training content, and students are required to complete the corresponding game, mainly including the operation process in the training practice and the specific application scenario of the training content, which are used to motivate students by the scoring system. On the other hand, the scene is selected from the school-enterprise cooperation, and VR video related to the training content is produced for students to watch. Then the students are asked to submit the related pictures and voices in the form of casual shooting and recording after class, and score them according to the results of picture and speech recognition.

5   Conclusion

Integrating information technology and artificial intelligence technology into vocational education is the future development direction of vocational education [5]. In this paper, Baidu artificial intelligence platform technology is used to penetrate into all aspects of wireless sensor network training and teaching, which plays a very good role in mobilizing students' learning enthusiasm and stimulating learning motivation. The key technologies used in each aspect are shown in Fig. 4.
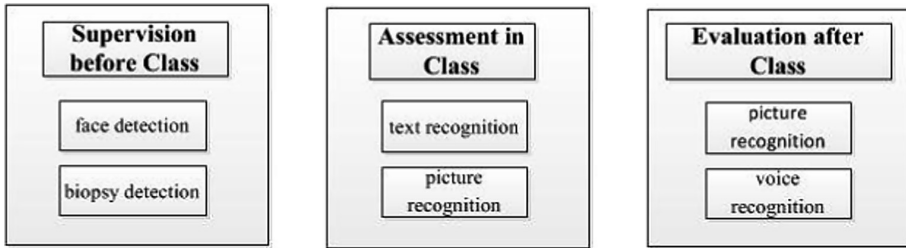
Fig. 4.   Artificial intelligence technology applied in "Learning by Doing" APP

Introducing artificial intelligence technology into the training process can make higher vocational students experience more fun about hands-on. Timely evaluation can make students have a clear understanding of their abilities. At the same time, teachers can be freed from the repetitive and miscellaneous supervision and evaluation work and concentrate more energy on the construction of curriculum content, which is of great benefit to both students and teachers.

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