Proposal of Presentation Training System in the Context of Knowledge Science

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Abstract. As a popular means of knowledge expression and communication, PowerPoint based presentation is widely used in education, scientific research, business and other fields. However, in a random survey of 522 students in Grade 1–2 from a Chinese university on presentation, more than 90% of the students were dissatisfied with their presentation ability, and there was a problem of inefficiency in the daily presentation practice process. This paper discusses presentation as a model theory of skill learning in knowledge science from the perspective of knowledge science. And aiming at the nonverbal expression in presentation, a presentation training system composed of sensors and information technology is proposed to improve the training efficiency.

Keywords: Presentation Skill · Training System · Knowledge Science · SECI Model · JTB Theory

1 Introduction

1.1 Knowledge Science

Knowledge science refers to the scientific realm of knowledge. The scientific nature of knowledge lies in its truth. The original intention of creating the theory of Knowledge Science is to emphasize the core and foundation of positive knowledge, from which various applied knowledge can be derived. At the same time, as a scientific means, it can regulate, restrict and control the quality of positive knowledge. Hence the theory of knowledge science is a kind of managerial knowledge for scientific management [1].

1.2 JTB Theory and DIKW Model

JTB (justified true belief) theory of knowledge is an idea that if people have evidence to justify their belief, then their justification makes that belief true. It is broken down into three necessary conditions: truth, belief and justification. Certainly, there are discussions about this theory [2].

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DIKW model shows people how data is transformed into information, knowledge and wisdom step by step. It integrates data, information, knowledge and wisdom into a pyramid like hierarchical system. The original observation and measurement obtained the data, and the analysis of the relationship between the data obtained the information. The application of information in action produces knowledge, and wisdom is concerned about the future. The theory also has different views [3].

1.3 SECI Model

SECI model was originally proposed by Nonaka and others for knowledge creation and knowledge management in Japanese enterprises. Now, it has been up-graded to the trans-formation and creation of various kinds of knowledge. The process of "socialization", "externalization", "combination", and "internalization" of the SECI model on the mutual transformation of "tacit knowledge" and "explicit knowledge", there is a "field" at each stage of completing a spiral rise. In SECI model, knowledge is constantly transformed and innovated with the practice, collaboration, interaction and learning of users. This process should be regarded as a continuous, dynamic and knowledge vortex. In recent years, the applicability of this model is closely related to the organization and national culture. SECI model is the core of knowledge trans-formation theory in knowledge management, which is attractive to almost all cultures [4].

Tacit knowledge refers to the knowledge that is difficult to describe with the symbol system. It originates from personal experience, and is closely related to personal beliefs, perspectives and values. Explicit knowledge refers to clear knowledge that can be fully expressed in a symbolic system, including concepts, views, principles, norms, processes, essentials, etc. It is external to the organization group.

2 Presentation Training

2.1 Presentation

Presentation is the interaction between the presenter and the listener. It is difficult for many listeners to concentrate on interacting with the presenter in the whole process. The presenter gives the listener certain information timely during the presentation, such as eye contact, nodding and other body language, or makes the listener laugh or make other responses through humorous language. It is easy to arouse the interest of the audience, so as to better understand and identify with the content of the presentation.

2.2 Knowledge in Presentation

Presentation ability is a communication skill. The starting point of skill and skill transmission is tacit knowledge, due to there are always some skills that cannot be described intuitively in words. Based on the above views, the inheritance of technology and skills becomes reasonable and effective.

Tacit knowledge refers to "knowledge that is difficult to express and difficult to describe". Because of the existence of tacit knowledge, technology and skill inheritance

become a difficult task. Explicit knowledge refers to "knowledge that is easy to express and can be described in language". The definition of "Skill" is shown in Formula 1.

$$\text{Skill} = \text{Knowledge} + \text{Execute} \tag{1}$$

3 Methods

3.1 System Structure

At present, the presentation ability is noticed as a means of communication which conveys information and knowledge. It's required as a necessary item, and the presentation ability is one of the communication skills required for many situations such as class, academic presentation, international conference, business [5, 6], etc. However, in a random survey of 522 students in Grade 1–2 from a Chinese university on presentation, more than 90% of the students were dissatisfied with their presentation ability, and there was a problem of inefficiency in the daily presentation practice process. It is known that nonverbal expression such as gestures, detonation, and gaze is not well managed [7]. In presentation, presenter's attitude is known to affect the audience [8, 9]. The expression elements are important for presentations [10]. Although nonverbal and emotional expression are very important for expression, due to cultural differences, nonverbal expression varies from country to country. Presentations in international conferences tend to follow the English speaking habits, and there is also an indication that the presentation of the oriental is not attractive because of the lack of gesture and speech intonation. In order to understand the nonverbal expression of people, it is necessary to implement enough training.

In the case of presenter communication with listeners, the interaction between facial expressions, gestures, gaze and movement of the body is treated as interaction. In order to understand the expression elements in presentation, the method of processing and understanding them is examined. In addition, anger, fear and sadness, heart rate, fingertip temperature, EEG, respiration, blood pressure and other biological information also help to understand the presenter's performance. In this study, nonverbal expression for effective presentation is focused (Fig. 1). And a system to support the understanding of the nonverbal expression is proposed (Fig. 2).

3.2 Skeleton Recognition Algorithm

Due to the proposal system focuses on structure and pose, the efficiency of skeleton recognition is important. Zeng et al. carried out a survey of lightweight two-dimensional human skeleton key point detection algorithms. And the lightweight human pose estimation methods based on neural networks in recent years were classified and summarized, and the two-dimensional skeletal key point detection methods were grouped into four categories according to the lightweight way of neural networks: lightweight feature extraction network, deep separable convolution, dense connection mechanism and lightweight bottleneck, and analyzed their advantages and disadvantages and lightweight means [11]. Aiming at the detection method of human skeleton key points based on lightweight

network in survey, the comparative experiments with PCK and AP as evaluation criteria were summarized on MPII and MSCOCO respectively. Through comparison, Zeng et al. found that although the accuracy of the human skeleton key point detection algorithm of the lightweight detection network is generally lower than that of the classical human posture estimation algorithm, the detection accuracy of the lightweight detection network on the MPII and COCO data sets is higher, and the amount of model parameters and computational complexity are relatively small, which has achieved good experimental results, and is more suitable for deployment to embedded devices and mobile devices for real-time detection.

The percentage of correct key points (PCK) is widely used in key point detection. The accuracy of the detected key points is determined by measuring the distance between the predicted key point position and the real key point position. If the distance is within the threshold range, it means that the detected key points are in the correct position. The higher the PCK value, the better the model performance. In MPII data set, the head length is used as the normalization reference, namely PCK_h, which can be expressed as

$$PCK_h = \frac{\sum_i \delta(d_i < kL_{head})\delta(v_i > 0)}{\sum_i \delta(v_i > 0)} \tag{2}$$

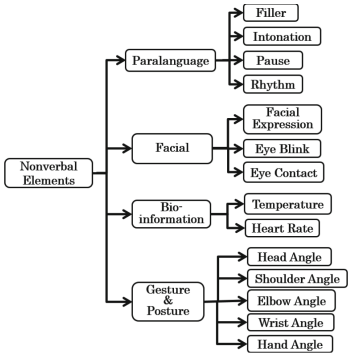

Fig. 1. Nonverbal Elements

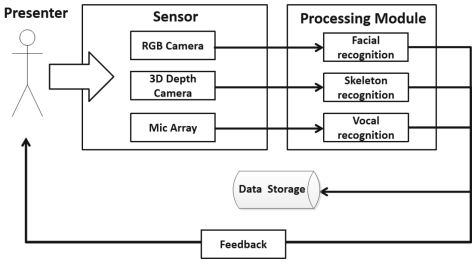

Fig. 2. Proposal System Structure

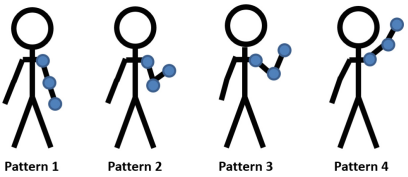

Fig. 3. 4 patterns setting

In formula (2): i is the key point number; d_i is the Euclidean distance between the ith key point in the current detection and the ith key point in the real value; kL_{head} is the head diameter of the current person as the scale factor, where k is the number of key points, and L_{head} is the head diameter; δ Is Kronecker function; v_i is the visibility of the ith key point.

3.3 Posture and Gesture Pattern Setting

The proposed system divides the shape of the arm of the presenter into four patterns shown in Fig. 3. Data is detected by detecting the right arm and the left arm. Since four patterns are identified in the left and right arms, 16 patterns can be distinguished. It is expected to be used for detecting whether a hand is moving well. In the actual processing, the three points of the shoulder, elbow and wrist are extracted from each model, and it is extracted into the following four patterns.

Pattern 1: The vertical coordinate of shoulder is higher than elbow and wrist.
Pattern 2: The vertical coordinate of shoulder is higher than the elbow, wrist and the vertical coordinate of wrist is higher than elbow.
Pattern 3: The vertical coordinate of wrist is higher than elbow, shoulder and the vertical coordinate of shoulder is higher than elbow.
Pattern 4: The vertical coordinate of wrist is higher than elbow, shoulder, and the vertical coordinate of elbow is higher than shoulder.

Based on the above pattern classification, the body expression in presentation can be quantitatively analyzed to help the presenter implement effective training.

4 Conclusions

With the development and progress of the knowledge society, PowerPoint based presentation is widely used in education, scientific research, business and other fields.

However, it is difficult for inexperienced speakers to improve their presentation skills. In the past, most of the evaluation criteria for presentation are based on experience rather than quantification. Therefore, the practice method for presentation is not clear, which leads to low practice effect. From the perspective of knowledge science, this paper discusses the presentation training as a knowledge science skill learning. And aiming at the nonverbal expression in presentation, such as eye contact, gesture, posture etc. A presentation training system composed of sensors and information technology is

proposed to improve the training efficiency. In the future, the composition and functions of the proposal system will be further improved, and a training system will be designed.

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