Toward Sports training service with the interactive learning platform

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Abstract

In recent years, sports population has increased by health-oriented and improvement of sports environment . We propose a platform that leaders and learners are able to share the training content with Interactive training and can be feedback to leaders. The platform is intended to create the learning result jointly by the leaders with the learners and leaders to update the learning content. The proposed solution helps to get the skills on a desired sport even in absence of a real trainer by analysis of video data..

Keywords:
Computer vision , Form analysis , e-learning ,VR, Sport training

1 INTRODUCTION

In recent years, the World competition and Olympic Games contributed to increase the population interested in sports and that aim to practice one. The sports population has increased by health-oriented and convenient-to use sports environment . However, the increase in popularity of different disciplines and the increase of the Learners, make the access of professional trainer difficult for time or area limits. For learners who has limited resources, since the training under a leader guidance requires a long time, and the location is often limited, the training instruments are from the WEB site (YouTube, etc.) and books. Such approach gives usually limited results and drives to mistakes and misunderstanding. We propose a platform that leaders (provider) and learners (recipient) are able to share the training content with Interactive training and can be feedback to leaders. The platform is intended to create the learning result jointly by the leaders with the learners and leaders to update the learning content. The technology of platform is based on the robotics constituting from computer vision and data database and Internet and the control. The platform is possible to comparison and analysis of the training content with a combination of computer graphics and real image . Level of understanding than the training of only normal text and movie can be improved. Therefore, it is possible to prevent injury or failure due to incorrect operation. The platform can be selected variously learning opportunities and locations for running on WEB. At the moment,We can measure the biometric during sport with smartphone by the development of wearable sensors . Measurement data is sequentially transmitted by Bluetooth to the smartphone. Data will be saved in the smartphone, or is recorded in the server on the network. The service providers is very difficult to to detect the needs of users.Therefore, in some cases, the service supply is delayed. Thus, a technique for constructing a network by the service media[1] have been proposed. t is also possible to understand that assess the needs of users early with using this platform. In this paper we aim to give a virtual guidance to the user taking advantage of the most advanced communication technologies. The proposed solution helps to get the skills on a desired sport even in absence of a real trainer by analysis of video data.
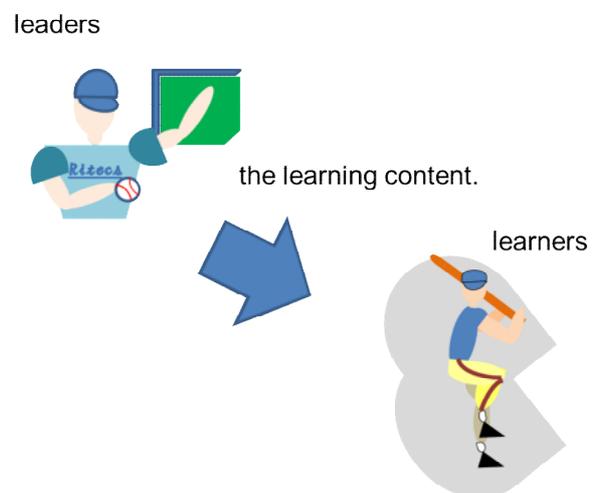
leaders

the learning content.

learners

Fig.1 Provide learning contents

2 CONSTITUTION

Platform is composed of a dedicated application and server and advisor application .The dedicated application running on the camera-equipped terminal .The server storing the learning content .The service advisor application is support the analysis and content building. Sports learning is possible anywhere if meet the conditions. Leaders and learners carry out the creation of imaging and analysis, and content by camera-equipped terminal. A few years ago, it was necessary to shoot with a dedicated camera to obtain an image for sports training. Current the camera-equipped terminal is possible to obtain an image necessary for sports training. Recording time was longer by the capacity increase of memory. However, the memory capacity to perform image recording to the server with streaming technology because there is a limit. It is also possible to perform sports learning by video call application. Learners can be efficiently learning , because interact directly. Learning by the video call application such as Skype have been carried out in such as English conversation. However, sports learning by video call application is required time adjustment. It is because there is a need to be connected simultaneously. Sports learning is difficult to choose from unspecified number of leaders like English learning. Sports learning has many kinds Unlike English learning. Another way there is a video learning. Learners will learn to look at the "YouTube" and video was created by leaders. Learner hope to be able to sport learning anytime, anywhere. This way , it is necessary to learners to understand yourself the intent of the leaders. If the

learner is a mistake, progress is slow or physical failure occurs . Because they can not be leaders and dialogue, the learner need to interpolate the content that has been omitted by the leader. This interpolation can be learners progress is fast. Terminals and servers are connected via a network at all times. Learning content is stored on the server. Learning content is stored in a database from such learning records and guidance content. Learning content can be search by such date. Service advisor application is an application running on the server. Service advisor app presents the guidance content and leaders to learners from the contents of the sport to learn.
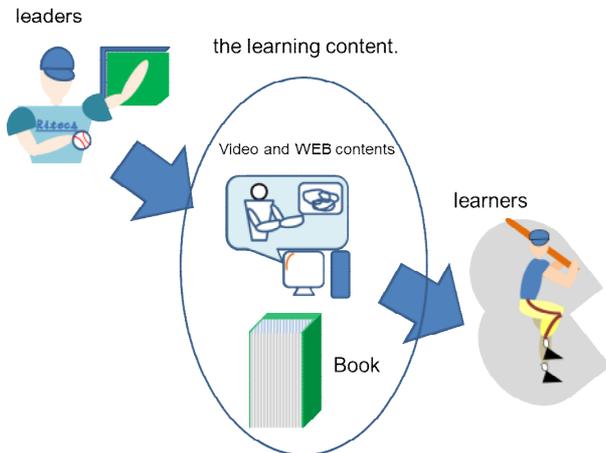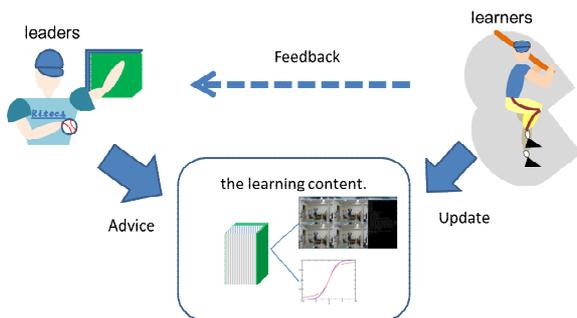

Fig.2 Supplies the content

Fig.3. Update the learning contents with Platform

3   FORM ANALYSIS

Learning by the video is believed to be effective in sports learning. This is different from the process used in the image inspection device of the production line.

It is also different from the process as a suspicious individual detected by the monitoring camera. Here, we do the visualization and data of the action from the video by computer vision. We use the form image as the action video. Typically, it is often used to the compare images or multi-motion in order to visualize the operation image. There are many applications for visualizing the operation image by the development of the camera with the terminal. Method of Video comparing is play multiple images at the same time in the display . Method of comparing the video can visually compare it to yourself and others in order to display the operation at the same time. Multi-motion generates an image by sequentially updated only video part with using a motion vector.It is effective in multi-motion form analysis.

3.1   The video comparison

Image comparison is a video to play at the same time by adjusting the playback start timing of the plurality of images. This approach is to show the your form and the model form of leaders on the same screen. And updates the learning content by comparing the form. In 1998 Nagano Olympics used in the video of the speed skating

competition [2]. We became possible to see the time difference between competitors in speed skating visually. The following compares the form video in squat.

Fig.4 The compares the form video in squat.

3.2   The multi-motion

Method of multi-motion is a special image that is generated by the combined tension by extracting the active part in the form image. It is possible to continuously analyze for visualization by afterimage effect form. Sporting event is finished the motion in a moment. Continuity of the foam can not be visualized to be played in slow the form image. Continuously visualized form with multi-motion [3] in gymnastics. Kato et al. [4] have used in golf and baseball form analysis.

3.3   Analysis by skeleton model image

Image comparison and multi-motion is analyzed with a video playback. However, since there is no feature point in the video only, the learner it is difficult to grasp the learning point. Recently, application of learning by using the skeleton model image synthesizing human skeleton model image by using an RGB-D sensor is also presented. We have synthesized a skeleton model that generate from the form video .[5][6]

Fig.5 skeleton model image-1

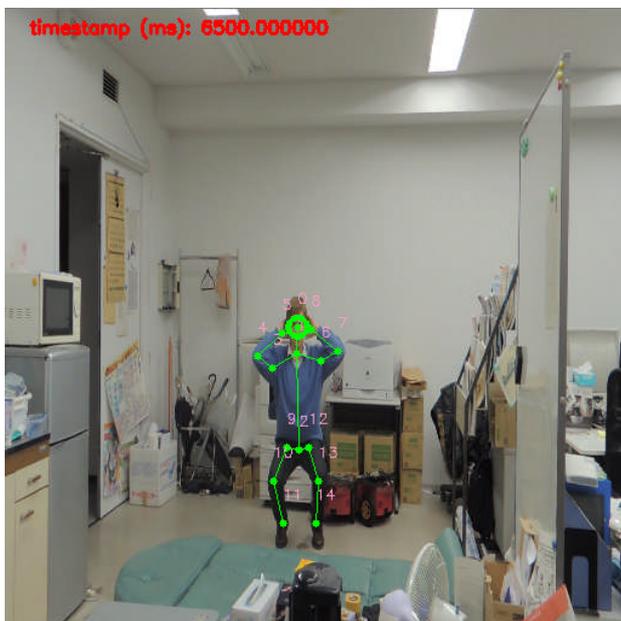Fig.6 skeleton model image-2

Fig.7 stand of skeleton model
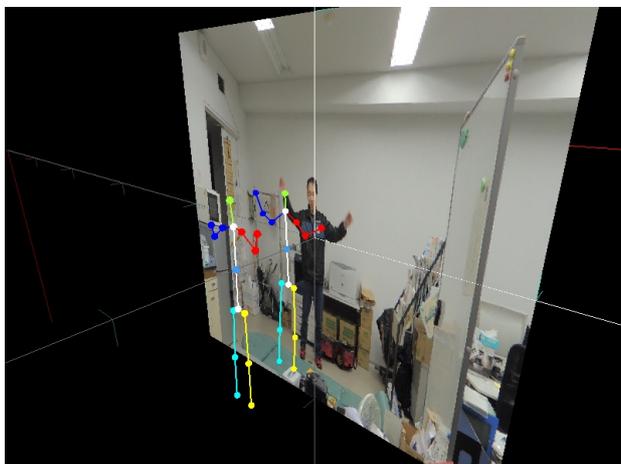

Fig8 skeleton model image in squat

Fig.9 create skeleton model

3.4 Learning content

Normally, the content of sports learning creates by leader for an unspecified number of learners. Learner performing learning to understand the description of the leaders. In this case, leaders satisfied with the learning content, but learner is not satisfied unless growing yourself. If the learner is not satisfied, leaders do not provide service. We were able to build a content that suits his by the learner to update the content using the analysis results with the form image. If the learner is satisfied advice leaders, the learner may incorporate the content of the leaders in the learning content. Also improved leader of satisfaction by the feedback to leaders the built-in events in the learning content. The event contains the evaluation factor. Currently, this platform cannot measure the level of satisfaction. Evaluation of satisfaction in this platform is carried out by the evaluation factor. Learning content is stored on the database. Learning content is being constructed to link the video and data in the a text that serves as a base. Database are managing learning content and learning history. In the platform is able to display the history list was learned by the search function. Sports learning is performed repeatedly until a satisfactory result by changing the learning method (content). This is a feedback loop. Learner is not only mind and feel, can be evaluated and analyzed by past history data. Even if I feel that baseball is the pitcher is throwing in the same form, there is a case the form is slightly different. In that case, in order to change the form by physical changes or conditions, past and present data comparison is important. Necessarily have to return to the previous form is not the purpose, the learning content is updated daily. Service advisor app advise with the accumulated data.
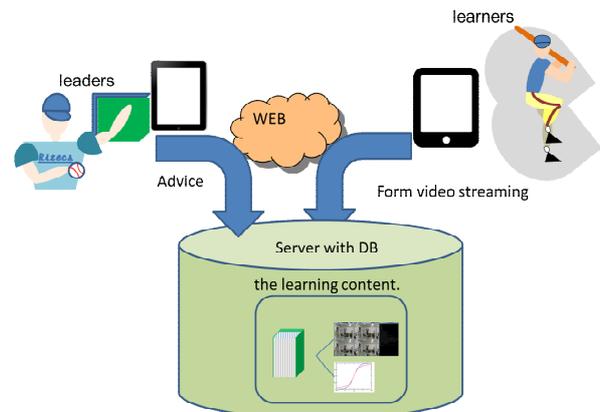

Fig.10 Learning contents with Platform

4 CONCLUSION

We learn by the video and leaders and learners has been described platform to create a learning content jointly in sports learning. Sports learning is necessary to correspond to the learner individual content and theory .

Theory of various sports is possible learning in books and video today. However, in order to learner is satisfied with the individual has to be to update the learning content by learners and leaders. Rather than build a system individually a combination of existing products leaders and learners, is more efficient that was learned on the basis of the platform. Learning content further scalability, promote research to improve flexibility . Currently, our platform, cannot be measured for satisfaction. We expect that the sports to improve by the good service with the present platform for many children. In the future, we will

proceed with the service advisor app of intelligence and form analysis on the WEB by attention to the research [7] of satisfaction measurement.

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