Research and Design of Wearable Video Fusion Interactive System for Field Operation Instruction

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Abstract. Based on the analysis and research of audio and video technology, this paper proposes a wearable video fusion interactive system scheme to meet the requirements of field operation guidance of wearable video fusion interaction. In addition to the traditional terminals, the system can use wearable terminals and browsers for real-time voice / video communications, which enhances ease of use and practicability, and provides the technology for the development of field operations guidance video services. Finally, this paper looks forward to the future of audio and video technology in promoting the development of field work.

Introduction

Traditional power grid operation flow (grid traditional infrastructure installation, grid inspection and maintenance, repair requirements of distribution station) has a high level of operation and strong processing capacity of an unexpected problem for the operator, and need to carry out cooperation work in the field of inspection and maintenance to solve the problem based on the guidance of video and interactive. In the field work, the person in charge of the work needs to understand the detailed operation of the members of the work and security risks, and needs to carry out video surveillance protection based on the current work tasks. With the development of intelligent hardware technology, the operator of the network will use the intelligent hardware terminal to collect field operation video. But the working environment of power field often lacks a wireless network environment, and lacks integration equipment of video, which leads to the video guidance and supervision are not carried out. So we need to provide a guide of wearable Video Fusion interaction for electric power field work, which adapted to set up a field operation wireless network, builds a video collaboration team based on job location adaptation, and meets video guidance of field operations and needs of surveillance protection.

SIP and WEBRTC

SIP Network Component

The SIP protocol adopts the client/server (C/S) control mode. The SIP system consists of two broad classes of components: User Agent (UA) and network server (Server). A user agent is a terminal system that represents the user to be added to the session, including the user agent client (UAC) and the user agent server (UAS) \textsuperscript{1-2}. The SIP server includes proxy servers, redirection servers, and registered servers. The user agent receives the request message and gives the response. In practical applications, the user agent acts as both the client and the server in a particular session\textsuperscript{3-4}, enabling the SIP to communicate with the end to end. The proxy server can be regarded as the router of the application layer. After receiving a request message, the proxy server determines the target user and implements the forwarding. For other network components, the request message is sent from the
proxy server, not from the start - end user. After the SIP request message is received, the redirection
server maps the address of the target user to one or more possible addresses and returns the
information to the originating client. The redirect server itself does not send SIP messages. The
registration server plays the role of a front-end server in the local network, store a local client through
"register" message to the address and other information, but also can provide positioning service,
proxy servers often need to consult the domain address to the client.

**WebRTC**

WebRTC is a real-time video and voice communications within the browser technology. Web
developers do not need to pay attention to digital signal processing of multimedia, who write a simple
javascript program [5-6]. The architecture mainly consists of three parts: voice module, video module
and transmission module [7].

**System Design and System Structure**

In order to meet the needs of power grid operation video guidance and supervision work, the
implementation of video collaboration tasks based on adaptive grid construction site, the paper
provides a guide for electric power field work wearable video Fusion interactive.

**The Scheme Adopts the Following Technical Scheme**

The scheme includes video fusion device, battery, touch control device, video server module,
communication module, positioning module, security encryption and decryption module, memory
module and display module; the video fusion device are respectively connected with the control
device, video server module, satellite positioning module security, encryption and decryption module,
amemory module and display module. The security of encryption and decryption module and
communication module is connected. The communication module adopts SIP network component for
video transmission. Video fusion device uses WebRTC for video fusion and overlay. The display
module uses HTML5 technology to display audio and video.

The satellite positioning module is used for obtaining position information of the job site. The
communication module is used for forming a field WIFI local area network, and the field operation
terminal is connected with the communication module through WIFI to form a field operation local
area network. The communication module interacts with the cloud server through the 3G/4G/WIFI.
The touch control device is used for inputting interactive information and controlling device
operation mode. The security encryption and decryption module is used for encrypting video
signaling, authority and video information. The video server module is used for decoding and
encoding video information. The video fusion device integrates the input multi-channel video into
one video output.

The video fusion device can update the video fusion rules by wireless communication mode and the
cloud server through the security encryption and decryption module and the communication module,
so as to meet the requirements of video fusion in different fields.

**Field Operation Terminal Technology**

The field operation terminal technology is based on browser fusion, JavaScript, HTML and CSS
technologies. The terminal browser and the server WebSocket proxy server session signaling
operation is achieved by JSEP control technology. The terminal invokes Web API through the
JavaScript to implement browser, audio, and video capabilities. The terminal passes the WebRTC
signaling message carried by the Web Socket through the JavaScript and the WebSocket proxy server.
The WebRTC signaling protocol uses SIP. The following is the scene fusion video fusion technology
program.
Conclusion

Compared with the prior proposal, the scheme has the following beneficial effects: The equipment developed in accordance with this program is easy to use. Site operators can adapt to the formation of field operation wireless network carrying the equipment. According to the power operation information stored in the device, such as personnel information, fusion model library, combined with field operations command, operations personnel can achieve the site video collaboration network based on task. The job fusion device interacts with the job terminal for video, which applies video interaction to form field operations instructions. The scheme supports on-site stacking equipment operation and guides the video information. It can effectively improve the work efficiency, reduce the security risk, and support the power field operation.

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