

# Research on Application of Embedded Video and Voice Playing System

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**Abstract:** With the rapid development of network artificial intelligence technology, the demand for voice and video surveillance system is increasing day by day. Therefore, the application research of video and voice playback system based on embedded technology is proposed. Through the design of voice and video monitoring system.

**Keywords:** Embedded Video; System; Voice Playback; Research

## 1. Introduction

As an important part of security system, video surveillance plays an important role in security, transportation, military, banking, construction and other fields. Video surveillance system has attracted more and more attention from related industries because of its intuitive, real-time, rich information content and easy management. In addition, in recent years, with the performance of computers and peripheral equipment becoming higher and the price becoming lower, video surveillance system has gradually moved from security departments to factories, mines, enterprises and even families. At the same time, the growing development of Internet and broadband network technology has provided strong platform support for the development of video surveillance business. The combination of demand and platform has made video surveillance business have a huge development potential [1-3]. At present, monitoring technology is developing towards digitalization, networking and intellectualization. In recent years, the digital network video surveillance system has been widely used in the field of security. It mainly uses the platform-based video server as the core to construct the surveillance network. This system has the advantages of good man-machine interface and conven-

ient media management, but it has strong dependence on the operating system, unstable performance and maintenance costs. High [4-5]. Under this background, the digital video surveillance system with embedded video server as its core has been increasingly favored by the relevant fields because of its good stability and real-time performance. Aiming at the problems existing in current video surveillance systems, such as poor real-time performance due to the large amount of video data, easy network congestion, and poor stability of platform-based video surveillance system, this paper designs an embedded network video surveillance system.

## 2. Embedded System

As far as the embedded video player is concerned, its development is only 10 years old. If we recall the first player in the world, in 2002, Ivy launched the world's first multimedia player, J U K ebox, which is a landmark multimedia player. Although it is very simple in terms of performance and appearance from the present point of view, its appearance was a shock to the electronics industry at that time. The appearance of J U K E B o x is shown in Figure 1.



Figure 1. First generation embedded video player JUKEBox

The fundamental difference between embedded system and ordinary computer system is that embedded system generally runs on the application platform that has been designated beforehand. Because the goal of the whole system has been determined, it is necessary to require its volume, power consumption and set. It has some degree of control to meet the specific needs of different application platforms, and can handle abnormal situations without any intervention. The software and hardware modules of the whole system need to be thoroughly optimized and tailored to remove the useless system functions and hardware structures, and to maximize their own resources utilization. Embedded technology is not a single technology, but a comprehensive product of technology in many fields. Therefore, in the design, embedded system has high cost, comprehensive technical requirements, wide range of fields, the overall system must have a certain robustness, can carry out certain technological updates, so R&D personnel are required to have a higher comprehensive ability. At the same time, because the operating environment of embedded devices is generally worse than that of ordinary P C, it requires that the program be robust when it is written. In addition, the embedded system has its own limitations, that is, it is often solidified in the memory module of hardware devices, and the system content cannot be changed generally. This is the fundamental reason for the "one-time development" feature of embedded systems, which requires that the program must be written in terms of service life, if you want to modify it, you can only clean up the system and redevelop it. How to minimize the development cost and maximize the system performance is an eternal topic of embedded development.

Embedded systems generally include three parts: application software layer, system software layer and hardware layer. Memories, processors, circuit boards and so on constitute hardware devices. The C P U processor of embedded devices is the core of each module of hardware devices. Compared with the CPU processor unit of ordinary household P C, the CPU processor unit of embedded devices is generally fixed. User groups are designed with special working environment. It usually combines many cards in general purpose processors in C P U chips for task processing, so as to facilitate in-depth volume optimization and tailoring in embedded system design, while taking into account its performance and performance. Robustness of its own operation. After decades of glory and obscurity, embedded processors in the market can be described as a dazzling variety, has thousands of models, dozens of different series of products to meet the needs of different fields.

### 3. Technology of Embedded Video Monitoring System

#### 3.1. Video compression technology

Video image data has strong correlation, that is to say, it contains a lot of redundant information. Compression technology is to remove redundant information from data. Video compression is generally lossy. It is based on the spatial redundancy of each frame of image and the correlation of adjacent pixel values. The temporal redundancy between adjacent frames is based on the correlation of consecutive frames in video images. Therefore, the main technologies used in video compression are time domain redundancy removal and spatial domain redundancy removal. Among them, time domain redundancy removal technology uses inter-frame coding technology to remove time domain redundancy information, mainly including motion compensation and motion estimation. Motion compensation is to predict and compensate the current local image through the previous local image. Image is an effective method to reduce redundant information of frame sequence. Motion estimation refers to the process of obtaining motion vectors by estimating the displacement of objects. Removal of time domain redundancy technology mainly uses intra-frame coding technology and Entropy coding technology to remove spatial redundancy information, mainly including transform coding, quantization coding and Entropy coding. Transform coding transforms spatial signals into another orthogonal vector space, which reduces the correlation and reduces data redundancy. Moisture coding is a lossless coding, which further compresses the coefficients and motion information obtained after transformation and quantization.

#### 3.2. Embedded technology

Embedded system is an application-centered, software and hardware can be tailored to meet the application system's strict requirements on functions, reliability, cost, volume and other performance of a dedicated computer system. Embedded system is mainly composed of embedded processor, related supporting hardware, embedded operating system and application software system, which can work independently. Hardware is embedded in devices in the form of chips, templates, components and controllers. Software is a real-time multi-task operating system and various application software, which is usually solidified in ROM or Flash memory.

### 4. Design of SD Card Port for Video Playing

SD card is used to copy operating system and LAMP software to Nand Flash of VOD, and also to store resources, mainly including audio and video, pictures and document text. There is no controller chip in SD card interface circuit, and SD card slot interface is used. There are 15 pins in the slot interface. In the circuit design, only 12 pins are used. In these pins, besides the power line and ground line, the other pins are connected with the smallest system of ARM11, and the DATA0-DATA1 pin is

the data line. It is responsible for the interaction between SD card and ARM11 minimum system data; CLK pin is the data clock line; command control pin CMD is used to control whether the processor reads data from SD card or writes data to SD card; WP pin has three states, when it is connected to VCC, the data in SD card can only be read, when it is connected to Vss, SD The data in the card is

readable and writable. When the pin is suspended, the data in the SD card can only be written. As shown in Figure 2, the seven pins are connected with a 10 K resistance between the 3.3 V power supply. These resistors are pull-up resistors, which are used to raise the voltage and increase the driving capacity.

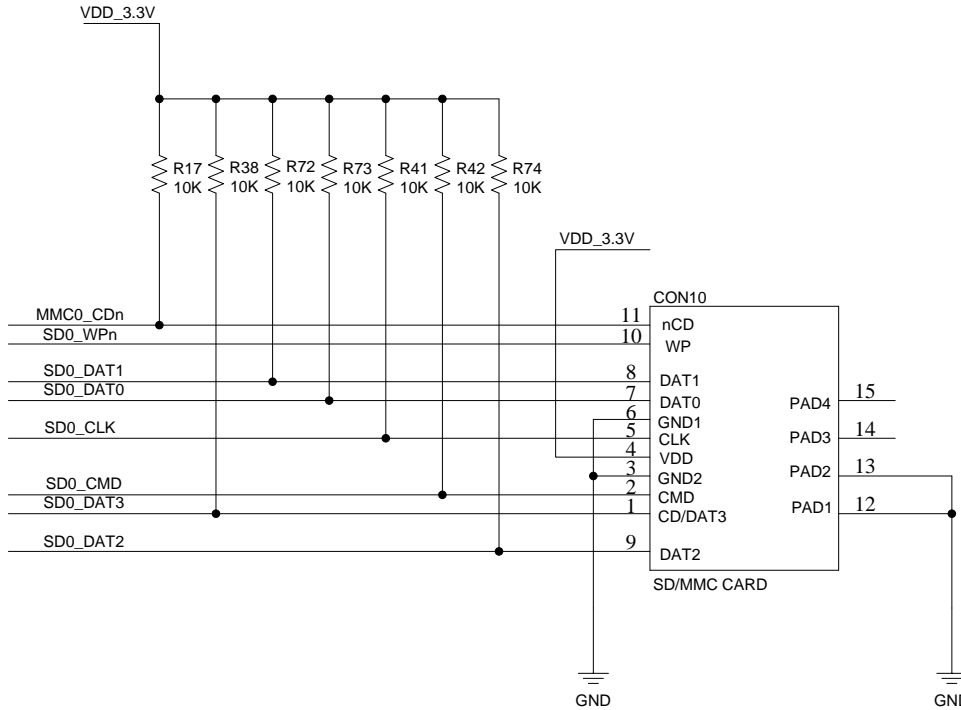


Figure 2. Interface circuit of video voice SD card

### 5. Workflow Design of Embedded System

The beginning of embedded system work is the start of development board mini I 2440. After that, the system parameters are initialized by bootstrap program, the kernel and root file system are loaded, and the UI interface between the device and the user is entered. At the end of the work of the device itself, the UI interface is opened. When a user has a task arriving, the system can distinguish between video or audio playing tasks and start the corresponding application module to process them according to the specific type of task. After the decoding work is completed, the result is transmitted to the user through LCD screen. At the end of this task, the system begins to judge whether all tasks have been completed. If all the tasks are terminated, the system will quit and clean up, otherwise it will return to the task. Waiting for the user's next instructions. Because this paper is doing embedded system development, it is quite different from ordinary software engineering development. The main reason is that the development of

embedded system has strong pertinence, specific function, stable performance, and requires the lowest cost. Later maintenance risk is small.

### 6. Concluding Remarks

With the continuous improvement of Internet technology, users' requirements for information service quality are getting higher and higher, and the popularization of high-speed broadband network, the application of VOD technology is more extensive, covering government, schools, hospitals, enterprises, shopping malls, families, automobiles, ships, aircraft and other different occasions. For example, in the school distance education and multimedia electronic reading room, students can watch multimedia teaching videos through video on demand, which can better improve learning efficiency and teaching quality. In the school multimedia electronic library, students can easily and quickly find rich multimedia materials on demand to improve reading. Read and broaden your horizons. The rapid development of embedded VOD applications has affected all aspects of our

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lives and will provide us with more comprehensive and high-quality services.

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