

Title	ハイブリッド処理を用いたフィンガープリント情報の 高速検索に関する研究
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Research on high speed retrieval of fingerprint information by hybrid processing

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1 Introduction

As a result, recognition to the copyright came to be attached to importance compared with the past. The technology etc. that can specify unique contents data are synthesized from the content of digital data, and it is called the digital copyright management technology. There is a fingerprint technology in this our one. This is a technology of which contents ID find the amount of the feature to the signal of the contents data, and this. An existing data base is retrieved, and detected ID is identified. It is clarified of high-speed treatable of the process detecting fingerprint ID with hardware. Processing with 314ms is possible according to Isonaga by making the process of detecting it hardware. When it starts achieving the fingerprint technology only with hardware, few of the number of retrieval tunes becomes a problem by the process of the retrieval. Moreover, when it starts achieving this only with software besides this, the retrieval time of software becomes a problem. In this research, the method for managing the copyright when contents circulate is devised by especially paying attention to this fingerprint technology.

2 Proposal technique

It aimed to supplement an insufficient each other, part as a proposal technique by using hybrid processing of software and hardware. The thing to increase the number of retrieval tunes maintaining short retrieval time is a purpose. The number of sales of the music of the reality was analyzed from the Oricon chart. It is understood music with high retrieval demand frequency is generated by the element of case observed at certain intervals of time, especially "Fashion". Therefore, music ID with high retrieval demand frequency is mounted on hardware as a retrieval target. In this case, it is made to be able to correspond by rewriting even when the retrieval object is changed with reconfigurable hardware (FPGA). Moreover, it was assumed that the detector of one music ID was mounted in parallel as a retrieval part in this process. This leads to the increase of the number of music that can be retrieved. As a result, it makes amends for the limitation of the retrieval time of the part of software.

It was assumed that it retrieved it with hardware once to use an excellent software, each hardware, part efficiently after music ID had been input as a composition of the entire system. It is because of high-speed treatable compared with software because of mounting the music retrieval part where the retrieval frequency is high as the reason. It is because retrieving completing music ID at an earlier stage leads to shortening the retrieval time. The result of obtaining by the analysis from the Oricon chart is used in the music retrieval part where the retrieval frequency is high when attaching to achieve which music detection on hardware. It proposes the system that can correspond to a flexible change in the retrieval demand by combining these hardware with software.

3 Evaluation

To show the effectiveness of the proposal technique, the obtained retrieval time of music ID only in software and the retrieval time only in hardware are evaluated respectively. How a parallel mounting is possible is evaluated in the made hardware. Moreover, the operation frequency at that time is evaluated. Next, each parameter when these are combined is evaluated. It

was assumed that the proposal system first retrieved it with hardware. It divides when it becomes retrieval completion and when music ID can be identified here and the retrieval processing is done in the following software part. It is thought that the identification probability in this hardware influences very much as a performance of the entire system. Therefore, it is evaluated how to give the identification probability in this hardware from the Oricon chart. Moreover in addition, the identification probability in this hardware evaluates it from acquired data by the passage of time the Oricon chart how it becomes it. The time that hangs to this rewriting is indicated because it composes with FPGA device that can rewrite hardware. Finally, it shows how to give it after the relation of the identification probability of frequency and the hardware of rewriting is described.

4 Summary and view in the future

In this text intended for the music file, a large-scale, high-speed agreement retrieval was achieved by using the hybrid system of hardware and software with the fingerprint of the contents identification technology as the theme.

Moreover, the circulation condition of the result contents that analyze the music that is circulating now has understood the thing that the element "Fashion" is controlled. The system that retrieves it at high speed was able to be produced by using this element "Fashion", and to confirm behavior. The technique for doing the agreement retrieval at high speed by using the device that was able to be composed again as hardware was able to be established by paying attention to this. In addition, hardware was made to be able to correspond to the variation in popular taste etc. flexibly. As a result, it is possible to detect the reference data of the frequency with hardware at high speed at the period at that time.

This was solved in this research though it was not possible to make to a large capacity because the retrieval data base size was limited from the limitation on hardware in the agreement search engine mounted on hardware usually by a flexible support with software.

When the music file transfer of 7.2MB is done with lines linked with 100Mbps, even music ID detection understands. If this is based, the retrieval room time becomes 250ms. The part where it takes the processing

time to the processing time of the entire system most becomes predominant because the hybrid system if it says from respect at the speed. However, if the identification rate in hardware is 73.29sec or less because the software retrieval time retrieves one million more than 996.59×10^{-3} the total retrieval time of the system that is the design intention can be put in 250ms or less. The identification rate in hardware should mount more than 996.59×10^{-3} on hardware the 1-290th in case of the Oricon chart total data on March 18-12 March, 2007 if it is necessary. Therefore, it can be said that a hybrid real-time search engine with hardware that mounts and software is useful if the number of retrieval titles is the 290th or more in this system.

If the identification probability in the hardware obtained from the analysis of the Oricon chart is assumed to be 0.9 if the time of the retrieval target is assumed to be 250msec or less by using the software retrieval time obtained from the actual experiment oppositely and the hardware retrieval time, the software retrieval time should be 2.5sec or less. If the software retrieval time obtained by the experiment is examined from this, the number of music that can be retrieved is understood from the experiment with about 36800.

It is related with an area problem of FPGA whether it is possible to mount on hardware. It can be said that this can be achieved by various methods of the going side by side operation of improvement of the integration of the chip, multichip operation, and host PC etc.

Moreover, there is a part not realistic in the method of storing the speed and the data base etc. , and this can become a problem in the future in the retrieval with the software used by the actual experiment.