DISTRIBUTED PROCESSING OF MPEG-2 VIDEO ENCODING ON MICROSOFT WINDOWS PLATFORM

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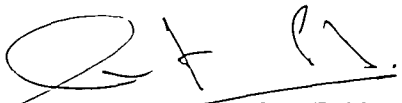
Signature : 

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For my beloved mum, sister and late father

DEDICATION

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PAPERS PUBLISHED ARISING FROM THIS WORK

1. C. C. Chew, Awtar Singh, Baharuddin Mohamed, Mun'im Ahmad Zabidi. (2002). "Distributed MPEG-2 Video Encoding on Microsoft Windows Platform." *Proc. of 2nd Student Conference on Research and Development (SCOReD 2002)*. Shah Alam, Malaysia: Universiti Teknologi MARA and IEEE. 502 – 504.

2. C. C. Chew, Awtar Singh, Mun'im Ahmad Zabidi. (2003). "Distributed MPEG-2 Video Encoding on Microsoft Windows Platform." *Colloquium KUiTTHO.*

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ABSTRACT

MPEG-2 Video standard is a high resolution digital video format developed by the Moving Picture Experts Group (MPEG) that specifies the coded bit stream for high quality digital video. MPEG-2 Video encoding is a heavy-duty task that needs a lot of processing power. The video encoding time depends mostly on the computer's CPU clock speed. To make the encoding process faster and better on existing Microsoft Windows (MS) platform (98/Me/2000/XP), distributed processing of MPEG-2 Video encoding (DPMVE) system can be implemented using TCP/IP with existing PCs on a 10/100 Mbps Local Area Network (LAN). The video encoding process can be distributed to all connected computers that are idle and fully utilize them. When each computer finishes the encoding process, the result will be returned and combined at the main computer that originated the job. Instead of doing the MPEG-2 Video encoding job alone, distribution of the MPEG-2 Video encoding process is better and faster by utilizing idle PCs. It also saves a lot of time over doing such heavy-duty processing with just one computer. Multiple experiments were carried out from one to fifteen PCs in the computer lab of Masters of Education, KUiTTHO. The results obtained from this research prove that the DPMVE system has met the DP feature, which is, the combination of a numbers of PCs to do MPEG-2 Video encoding at the speed of a super computer on MS Windows platform.

ABSTRAK

Kepiawaian video MPEG-2 merupakan sejenis video digital resolusi tinggi yang dibangunkan oleh *Moving Picture Experts Group* (MPEG). Kepiawaian MPEG-2 ini juga menentukan taraf bait yang berkod untuk video digital yang berkualiti tinggi. Pengekodan video MPEG-2 adalah kerja berat yang memerlukan banyak kuasa pemprosesan komputer. Masa yang digunakan untuk pengekodan video kebanyakannya bergantung kepada kelajuan jam pemproses (CPU) sesebuah komputer. Untuk mempercepat dan memperbaiki lagi proses pengekodan di dalam sistem operasi *Microsoft Windows* (MS 98/Me/2000/XP), pengekodan video MPEG-2 (*DPMVE*) boleh dilaksanakan dengan menggunakan kaedah pengagihan kuasa pemproses. Proses ini dilaksanakan dengan menggunakan *TCP/IP* dan rangkaian tempatan (*LAN*) berkelajuan 10/100 Mbps yang sedia ada. Proses pengekodan video boleh dibahagikan kepada setiap komputer yang sentiasa berada dalam keadaan lega dan menggunakan semua masa lega ini dengan sepenuhnya. Apabila setiap komputer ini telah menghabiskan proses pengekodan video, hasilnya akan dikembalikan kepada komputer utama dan digabungkan di situ untuk menghasilkan video MPEG-2. Kaedah ini dapat menjimatkan masa yang digunakan untuk proses pengekodan video di mana ia merupakan sejenis proses yang amat beban mengambil masa yang lama pada sesebuah komputer. Pelbagai eksperimen untuk satu hingga 15 buah komputer telah dijalankan di Makmal Komputer Sarjana Pendidikan, KUiTTHO. Keputusan yang diperolehi daripada penyelidikan ini membuktikan bahawa sistem *DPMVE* telah memenuhi ciri-ciri pengedaran kuasa pemproses, iaitu kombinasi beberapa buah komputer untuk melaksanakan kerja pengekodan video MPEG-2 pada kelajuan yang tinggi dalam sistem operasi *Microsoft Windows*.

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LIST OF ABBREVIATIONS

AAC	-	Advanced Audio Coding
AAL	-	ATM Adaptation Layer
API	-	Application Programming Interface
ARPANET	-	Advanced Research Projects Agency Network
ATA	-	Advanced Technology Attachment
ATM	-	Asynchronous Transfer Mode
ATS	-	Academic Technology Services
AVI	-	Audio-Video Interleave
CCIR	-	Consultative Committee for International Radio
CPU	-	Central Processing Unit
DC	-	Discrete Cosine
DCT	-	DC Transformation
DDR RAM	-	Double Data Rate Random Access Memory
DP	-	Distributed processing
DPMVE	-	DP of MPEG-2 Video Encoding
DVD	-	Digital Versatile Disc
DVI	-	Digital Video Interactive
e.g.	-	As an example
EBU	-	European Broadcast Union
etc.	-	etcetera
GoM	-	Group of Macroslices
GOP	-	Group of Pictures
GUI	-	Graphical User Interface
HDD	-	Hard Disk Drive
HDTV	-	High Definition Television
i.e.	-	Id est (that is).

IBM	-	International Business Machines
ICMP	-	Internet Control Message Protocol
IDCT	-	Inverse DCT
IDE	-	Integrated Device Electronics
IEC	-	International Electrotechnical Commission
IP	-	Internet Protocol
IS	-	International Standard
ISDN	-	Integrated Services Digital Network
ISO	-	International Organization for Standardization
ITU	-	International Telecommunications Union
ITU-RS	-	ITU-Radiocommunication Sector
ITU-TS	-	ITU-Telecommunications Standardization
JTC1	-	Joint Technical Committee 1
LAN	-	Local Area Network
MAC	-	Media Access Control
MB/s	-	Megabyte per second
Mbps	-	Megabit per second
MIMD	-	Multiple Instruction Multiple Data
MPEG	-	Moving Picture Experts Group
MPI	-	Message Passing Interface
MS	-	Microsoft
MS-DOS	-	Microsoft Disk Operating System
NTSC	-	National Television System Committee
OS	-	Operating System
PAL	-	Phase Alternating Line
PC	-	Personal Computer
RFCs	-	Requests for Comments
SATA	-	Serial ATA
SC29	-	Sub-committee 29
SDTV	-	Standard Definition Television
SECAM	-	SEquential Couleur Avec Memoire
SIF	-	Source Input Format
SIMD	-	Single Instruction Multiple Data
SMP	-	Symmetric Multiprocessor

SMPTE	-	Society of Motion Picture and Television Engineers
SPMD	-	Single Program Multiple Data
SVCD	-	Super VCD
TCP/IP	-	Transmission Control Protocol/Internet Protocol
TMC	-	Thinking Machines Corporation
TTL	-	time-to-live
UDP	-	User Datagram Protocol
US	-	United States
USD	-	United States Dollar
VB	-	Visual Basic
VCD	-	Video Compact Disc
VHS	-	Video Home System
WG11	-	Working Group 11

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