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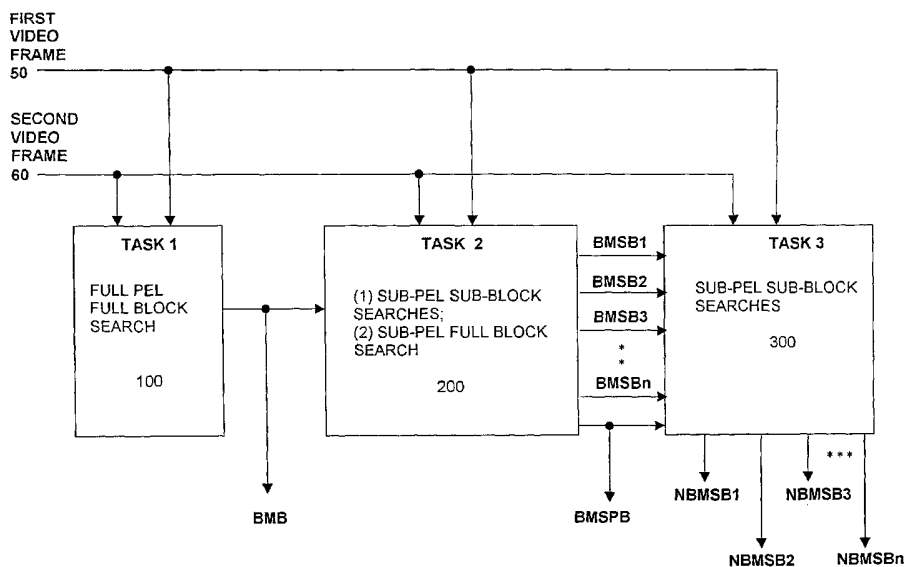
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(54) Title: METHODS AND APPARATUS FOR SUB-PIXEL MOTION ESTIMATION



(57) Abstract: The present invention provides methods and apparatus for sub-pel motion estimation of a block of pixels. Search points which are redundant between the various full pel and sub-pel searches during the motion estimation process of a block of pixels are disregarded. Matching costs for the block or sub-block at each such redundant search point are not calculated and therefore are not stored.

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INTERNATIONAL SEARCH REPORT

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A. CLASSIFICATION OF SUBJECT MATTER
IPC 7 H04N7/26

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)
IPC 7 H04N

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practical, search terms used)

EPO-Internal, INSPEC

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category °	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
Y	<p>EBRAHIMI T: "MPEG-4 VIDEO VERIFICATION MODEL VERSION 10.0" ISO/IEC JTC1/SC29/WG11 MPEG98/N1992, XX, XX, February 1998 (1998-02), pages 1-305, XP001074652 paragraph '3.3.2.2! paragraph '3.3.2.4! paragraph '3.3.2.5! paragraph '3.3.2.6!</p> <p style="text-align: center;">--- -/--</p>	1-64

Further documents are listed in the continuation of box C.

Patent family members are listed in annex.

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- *A* document defining the general state of the art which is not considered to be of particular relevance
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C.(Continuation) DOCUMENTS CONSIDERED TO BE RELEVANT		
Category °	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
Y	<p>WU A ET AL: "An efficient VLSI implementation of four-step search algorithm" ELECTRONICS, CIRCUITS AND SYSTEMS, 1998 IEEE INTERNATIONAL CONFERENCE ON LISBOA, PORTUGAL 7-10 SEPT. 1998, PISCATAWAY, NJ, USA, IEEE, US, 7 September 1998 (1998-09-07), pages 503-506, XP010366047 ISBN: 0-7803-5008-1 the whole document</p>	1-64
A	<p>BO-SUNG KIM ET AL: "VLSI architecture for low power motion estimation using high data access reuse" ASICS, 1999. AP-ASIC '99. THE FIRST IEEE ASIA PACIFIC CONFERENCE ON SEOUL, SOUTH KOREA 23-25 AUG. 1999, PISCATAWAY, NJ, USA, IEEE, US, 23 August 1999 (1999-08-23), pages 162-165, XP010371786 ISBN: 0-7803-5705-1 the whole document</p>	1-64
A	<p>LAI-MAN PO ET AL: "A new center-biased orthogonal search algorithm for fast block motion estimation" TENCON '96. PROCEEDINGS., 1996 IEEE TENCON. DIGITAL SIGNAL PROCESSING APPLICATIONS PERTH, WA, AUSTRALIA 26-29 NOV. 1996, NEW YORK, NY, USA, IEEE, US, 26 November 1996 (1996-11-26), pages 874-877, XP010236796 ISBN: 0-7803-3679-8 paragraph '0002!; figures 1,2</p>	1-64
A	<p>US 6 154 491 A (UETANI YOSHIHARU) 28 November 2000 (2000-11-28) column 2, line 55 - line 60 figures 4A,4B,6A,6B,10A,10B</p>	1-64
A	<p>INTERNATIONAL ORGANIZATION FOR STANDARDIZATION = ORGANISATION INTERNATIONALE DE NORMALISATION: "TEST MODEL 5" MPEG TEST MODEL 5. ISO-IEC/JTC1/SC29/WG11/N0400. CODED REPRESENTATION OF PICTURE AND AUDIO INFORMATION. DOCUMENT AVC-491B, VERSION 2: APRIL 1993, GENEVA, ISO, CH, 1993, pages 1-119, XPO01150695 paragraph '05.1!</p>	1-64

INTERNATIONAL SEARCH REPORT

Information on patent family members

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