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(54) Title: A METHOD, APPARATUS, SYSTEM AND COMPUTER-READABLE MEDIUM FOR INTERACTIVE SHAPE MANIPULATION

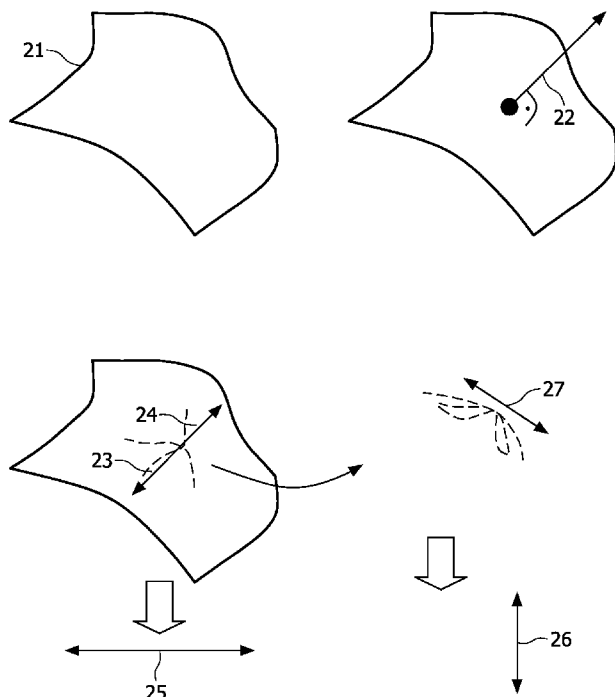


FIG. 2

(57) Abstract: A method and apparatus for interactively manipulating a shape of an object, comprising selecting an object to be manipulated and rendering the object in dependence of a manipulation type. The method provides a smart object adapted interaction, manipulation and visualization scheme in contrast to previous display driven schemes. The method allows efficient shape manipulation by restricting the degrees of freedom for the manipulation to the meaningful ones for a given object or object part, thus allowing to reduce e.g. a 3D interaction to a 2D interaction.

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A. CLASSIFICATION OF SUBJECT MATTER INV. G06T17/40				
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) G06T				
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, WPI Data, IBM-TDB				
C. DOCUMENTS CONSIDERED TO BE RELEVANT				
Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.		
X	ALLAN J B ET AL: "A METHODOLOGY FOR DIRECT MANIPULATION OF POLYGON MESHES" NEW ADVANCES IN COMPUTER GRAPHICS. PROCEEDINGS OF CG INTERNATIONAL, 27 June 1989 (1989-06-27), pages 451-469, XP008044110 abstract page 453, paragraph 2.2 page 458, paragraph 3.3 ----- -/--	1-11, 16-24		
<input checked="" type="checkbox"/> Further documents are listed in the continuation of Box C.				
<input checked="" type="checkbox"/> See patent family annex.				
* Special categories of cited documents :				
<table style="width: 100%; border: none;"> <tr> <td style="width: 50%; border: none; vertical-align: top;"> *A* document defining the general state of the art which is not considered to be of particular relevance *E* earlier document but published on or after the international filing date *L* document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified) *O* document referring to an oral disclosure, use, exhibition or other means *P* document published prior to the international filing date but later than the priority date claimed </td> <td style="width: 50%; border: none; vertical-align: top;"> *T* later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention *X* document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone *Y* document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art. *&* document member of the same patent family </td> </tr> </table>			*A* document defining the general state of the art which is not considered to be of particular relevance *E* earlier document but published on or after the international filing date *L* document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified) *O* document referring to an oral disclosure, use, exhibition or other means *P* document published prior to the international filing date but later than the priority date claimed	*T* later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention *X* document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone *Y* document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art. *&* document member of the same patent family
A document defining the general state of the art which is not considered to be of particular relevance *E* earlier document but published on or after the international filing date *L* document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified) *O* document referring to an oral disclosure, use, exhibition or other means *P* document published prior to the international filing date but later than the priority date claimed	*T* later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention *X* document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone *Y* document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art. *&* document member of the same patent family			
Date of the actual completion of the international search <p style="text-align: center;">28 November 2007</p>	Date of mailing of the international search report <p style="text-align: center;">22/09/2008</p>			
Name and mailing address of the ISA/ European Patent Office, P.B. 5818 Patentlaan 2 NL - 2280 HV Rijswijk Tel. (+31-70) 340-2040, Tx. 31 651 epo nl, Fax: (+31-70) 340-3016	Authorized officer <p style="text-align: center;">Zamuner, Umberto</p>			

INTERNATIONAL SEARCH REPORT

International application No

PCT/IB2007/052658

C(Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	DIRC ROSE KATRIN BIDMON THOMAS ERTL: "Intuitive and Interactive Modification of Large Finite Element Models" VISUALIZATION, 2004. IEEE AUSTIN, TX, USA 10-15 OCT. 2004, PISCATAWAY, NJ, USA, IEEE, 10 October 2004 (2004-10-10), pages 361-368, XP010903204 ISBN: 0-7803-8788-0 abstract page 363, paragraph 3.2 - page 364	1-11, 16-24
X	EP 1 622 086 A (SOLIDWORKS CORP [US]) 1 February 2006 (2006-02-01) paragraphs [0013] - [0016], [0022] - [0024], [0030] - [0034]	1-11, 16-24
X	MITSUNOBU H ET AL: "Claymore: augmented direct manipulation of three-dimensional objects" COMPUTER HUMAN INTERACTION, 1998. PROCEEDINGS. 3RD ASIA PACIFIC SHONAN VILLAGE CENTER, JAPAN 15-17 JULY 1998, LOS ALAMITOS, CA, USA, IEEE COMPUT. SOC, US, 15 July 1998 (1998-07-15), pages 210-216, XP010295047 ISBN: 0-8186-8347-3 page 210, paragraph 2 page 211, paragraph 3.1 page 212, paragraph 3.3 page 214, paragraph 3.6	1-4, 10, 11, 16, 19-21, 23, 24
X	CAGATAY BASDOGAN ET AL: "Virtual Environments for Medical Training: Graphical and Haptic Simulation of Laparoscopic Common Bile Duct Exploration" IEEE / ASME TRANSACTIONS ON MECHATRONICS, IEEE SERVICE CENTER, PISCATAWAY, NJ, US, vol. 6, no. 3, September 2001 (2001-09), XP011034339 ISSN: 1083-4435 abstract page 272, paragraph V.A page 273, paragraph V.C - page 274, paragraph V.C.1.A page 276, paragraph V.C.1.E	1-4, 7-9, 11, 17-24

INTERNATIONAL SEARCH REPORT

International application No.
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Box No. II Observations where certain claims were found unsearchable (Continuation of item 2 of first sheet)

This international search report has not been established in respect of certain claims under Article 17(2)(a) for the following reasons:

1. Claims Nos.:
because they relate to subject matter not required to be searched by this Authority, namely:

2. Claims Nos.:
because they relate to parts of the international application that do not comply with the prescribed requirements to such an extent that no meaningful international search can be carried out, specifically:

3. Claims Nos.:
because they are dependent claims and are not drafted in accordance with the second and third sentences of Rule 6.4(a).

Box No. III Observations where unity of invention is lacking (Continuation of item 3 of first sheet)

This International Searching Authority found multiple inventions in this international application, as follows:

see additional sheet

1. As all required additional search fees were timely paid by the applicant, this international search report covers allsearchable claims.

2. As all searchable claims could be searched without effort justifying an additional fees, this Authority did not invite payment of additional fees.

3. As only some of the required additional search fees were timely paid by the applicant, this international search report covers only those claims for which fees were paid, specifically claims Nos.:

4. No required additional search fees were timely paid by the applicant. Consequently, this international search report is restricted to the invention first mentioned in the claims; it is covered by claims Nos.:

1-11, 16-24

Remark on Protest

- The additional search fees were accompanied by the applicant's protest and, where applicable, the payment of a protest fee.
- The additional search fees were accompanied by the applicant's protest but the applicable protest fee was not paid within the time limit specified in the invitation.
- No protest accompanied the payment of additional search fees.

FURTHER INFORMATION CONTINUED FROM PCT/ISA/ 210

This International Searching Authority found multiple (groups of) inventions in this international application, as follows:

1. claims: 1-11,16-24

Manipulation of shape of digital objects interactively rendered in which the manipulation is limited to two degrees of freedom.

2. claims: 12-15

Manipulation of shape of digital objects interactively rendered in which the manipulated object is displayed using two view planes intersecting each other.

INTERNATIONAL SEARCH REPORT

International application No.
PCT/IB2007/052658

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
EP 1622086	A	JP 2006031715 A	02-02-2006