

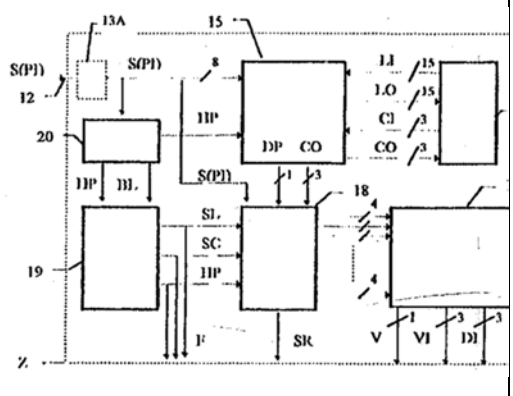
[logo:] PCT

WORLD INTELLECTUAL PROPERTY ORGANIZATION

[logo]

International Office

INTERNATIONAL APPLICATION PUBLISHED IN THE PATENT COOPERATION  
TREATY

<p>(51) International Patent Classification <sup>6</sup> : <b>G06T 7/20</b></p>	<p><b>A1</b></p>	<p>(11) International publication number: <b>WO 98/05002</b> (43) International publication date: February 5, 1998 (05.05.98)</p>		
<p>(21) International application number: PCT/FR97/01354 (22) International filing date: July 22, 1997 (30) Priority data: July 26, 1996 (07.26.96) FR (71) Applicant (for all designated states except US): CARLUS MAGNUS LIMITED [-/-]; Victoria House, Main Street, Gibraltar (GI). (72) Inventor; and (75) Inventor/Applicant (US only): PRIM, Patrick [FR/FR]; 56, rue Patay, F-75013 Paris (FR). (74) Representative: LE BRUSQUE, Maurice; Cabinet Harle &amp; Phelip, 21, rue de la Rochefoucaud, F-75009 Paris (FR).</p>	<p>(81) Designated countries: AL, AM, AT, AU, AZ, BA, BB, BG, BR, BY, CA, CH, CN, CU, CZ, DE, DK, EE, ES, FI, GB, GE, HU, IL, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MD, MG, MK, MN, MW, MX, NO, NZ, PL, PT, RO, RU, SD, SE, SG, SI, SK, TJ, TM, TR, TT, UA, UG, US, UZ, VN, ARIPO patent (GH, KE, LS, MW, SD, SZ, UG, ZW), Eurasian patent (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), European patent (AT, BE, CH, DE, DK, ES, FI, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE), OAPI patent (BF, BJ, CF, CG, CI, CM, GA, GN, ML, MR, NE, SN, TD, TG).</p> <p><b>Published</b> <i>With international search report.</i> <i>With amended claims and declaration.</i></p>			
<p>(54) Title: METHOD AND DEVICE FOR REAL-TIME DETECTION, LOCATION AND DETERMINATION OF THE SPEED AND DIRECTION OF MOVEMENT OF AN AREA OF RELATIVE MOVEMENT IN A SCENE</p>				
<p>[Bilingual text]</p>				
<p>(57) Abstract</p>				
<p>A method and device for real-time detection, location and determination of the speed and direction of movement of an area of relative movement in a scene, are disclosed. According to the method, the digital video input signal S(Pi) is subjected to a time-based processing step wherein changes in the value of each pixel between one frame and the corresponding previous frame are used to generate a binary signal DP representing a significant change or the lack thereof, and a digital signal CO representing the degree of change; and to a spatial processing step wherein both signals are distributed over a matrix for a single frame passing therethrough, and the relative movement to be sensed as well as the parameters thereof are deduced from the resulting matrix distribution. For this purpose, the device comprises a time processing unit (15) combined with a memory (16) and a spatial processing unit (17) combined with a delay unit (18). Clock (20) and control (19) units are provided for clocking the operation of units (15) and (17).</p>				
<p>(57) Abstract</p>				
<p>[Bilingual text]</p>				

***FOR INFORMATION PURPOSES ONLY***

Codes used to identify States that are a party to the PCT, on the cover pages of brochures publishing international applications under the PCT.

<b>AL</b> Albania	<b>ES</b> Spain	<b>LS</b> Lesotho	<b>SI</b> Slovenia
<b>AM</b> Armenia	<b>FI</b> Finland	<b>LT</b> Lithuania	<b>SK</b> Slovakia
<b>AT</b> Austria	<b>FR</b> France	<b>LU</b> Luxemburg	<b>SN</b> Senegal
<b>AU</b> Australia	<b>GA</b> Gabon	<b>LV</b> Latvia	<b>SZ</b> Swaziland
<b>AZ</b> Azerbaijan	<b>GB</b> UK	<b>MC</b> Monaco	<b>TD</b> Chad
<b>BA</b> Bosnia and Herzegovina	<b>GE</b> Georgia	<b>MD</b> Republic of Moldova	<b>TG</b> Togo
<b>BB</b> Barbados	<b>GH</b> Ghana	<b>MG</b> Madagascar	<b>TJ</b> Tajikistan
<b>BE</b> Belgium	<b>GN</b> Guinea	<b>MK</b> Former Yugoslav Republic of Macedonia	<b>TM</b> Turkmenistan
<b>BF</b> Burkina Faso	<b>GR</b> Greece	<b>ML</b> Mali	<b>TR</b> Turkey
<b>BG</b> Bulgaria	<b>HU</b> Hungary	<b>MN</b> Mongolia	<b>TT</b> Trinidad and Tobago
<b>BJ</b> Benign	<b>IE</b> Ireland	<b>MR</b> Mauritania	<b>UA</b> Ukraine
<b>BR</b> Brazil	<b>IL</b> Israel	<b>MW</b> Malawi	<b>UG</b> Uganda
<b>BY</b> Belarus	<b>IS</b> Iceland	<b>MX</b> Mexico	<b>US</b> United States of America
<b>CA</b> Canada	<b>IT</b> Italy	<b>NE</b> Niger	<b>UZ</b> Uzbekistan
<b>CF</b> Central African Republic	<b>JP</b> Japan	<b>NL</b> Netherlands	<b>VN</b> Vietnam
<b>CG</b> Congo	<b>KE</b> Kenya	<b>NO</b> Norway	<b>YU</b> Yugoslavia
<b>CH</b> Swiss	<b>KG</b> Kyrgyzstan	<b>NZ</b> New Zealand	<b>ZW</b> Zimbabwe
<b>CI</b> Côte d'Ivoire – Ivory Coast	<b>KP</b> People's Democratic Republic of Korea	<b>PL</b> Poland	
<b>CM</b> Cameroon	<b>KR</b> Republic of Korea	<b>PT</b> Portugal	
<b>CN</b> China	<b>KZ</b> Kazakhstan	<b>RO</b> Romania	
<b>CU</b> Cuba	<b>LC</b> St. Lucia	<b>RU</b> Russian Federation	
<b>CZ</b> Czech Republic	<b>LI</b> Liechtenstein	<b>SD</b> Sudan	
<b>DE</b> Germany	<b>LK</b> Sri Lanka	<b>SE</b> Sweden	
<b>DK</b> Denmark	<b>LR</b> Liberia	<b>SG</b> Singapore	
<b>EE</b> Estonia			

**WO 98/05002 PCT/FR97/01354**

1

METHOD AND DEVICE FOR REAL-TIME DETECTION, LOCATION AND  
DETERMINATION OF THE SPEED AND DIRECTION OF MOVEMENT OF AN  
AREA OF RELATIVE MOVEMENT IN A SCENE,

5

The purpose of this invention is a process and device for identifying and localizing an area in relative movement in a scene and for determining the speed, and oriented direction of this relative movement, in real time.

10 Relative movement means a movement of said area (which may be composed of an «object» in the broadest sense of the term including a living being or a portion of a living being, for example a hand) in an approximately motionless environment, or more or less complete immobility of said area (or «object») in an environment that is at least partially in movement.

15 The invention relates to the processing of a digital video output signal from an observation system composed of an optical input system or objective capable of forming an image of the observed scene, and by an optoelectronic conversion system or sensor capable of converting said image that it receives into a digital output signal.

20 In general, the observation system is composed of a video camera or comescope that observes the scene to be monitored (said digital output signal then being composed of the digital video signal output by a camera with a digital output or of the output of an analog/digital converter, the input of which is connected to the output of a camera outputting an analog video signal.

The observation system may also be composed of the objective of an optical instrument (binoculars, sighting refracting instrument, view-finder), from which at least a portion of the outgoing light beam is sampled and by a photoelectronic sensor, for example of the CCD or CMOS type, with the normal associated electronic system, sensor receiving the image formed  
5 by said portion of the light beam and converting it through the associated electronic system into a digital video output signal.

The invention consists mainly of processing the digital video output signal from an observation system, particularly a video camera, with a digital output to determine signals signaling the existence and localization of an area in relative movement in said scene, and the  
10 speed and oriented direction of the displacement if said area is actually moving in said scene relatively to an approximately motionless environment, in real time.

The best system yet developed for identifying and localizing an object in relative movement and for determining its speed and oriented direction of displacement is animal or human sight, for example a hunter in his hide localizing the displacement of an animal, and the  
15 direction and speed of this displacement.

Prior art surveillance devices like artificial retinas, either analog (Giocomo Indiveri et al, in Proceedings of MicroNeuro'96 pp 15 to 22), or digital (Pierre-Francois Rüedi in Proceedings of MicroNeuro'96 pp 23 to 29), have been proposed, but the first article deals with detectors and analog units with complex structures, and the second article deals with  
20 means of identifying the edges of an object; furthermore, very fast and high capacity memories are used in the devices described in order to operate in real time, and limited information is

# Explore Litigation Insights

Docket Alarm provides insights to develop a more informed litigation strategy and the peace of mind of knowing you're on top of things.

## Real-Time Litigation Alerts



Keep your litigation team up-to-date with **real-time alerts** and advanced team management tools built for the enterprise, all while greatly reducing PACER spend.

Our comprehensive service means we can handle Federal, State, and Administrative courts across the country.

## Advanced Docket Research



With over 230 million records, Docket Alarm's cloud-native docket research platform finds what other services can't. Coverage includes Federal, State, plus PTAB, TTAB, ITC and NLRB decisions, all in one place.

Identify arguments that have been successful in the past with full text, pinpoint searching. Link to case law cited within any court document via Fastcase.

## Analytics At Your Fingertips



Learn what happened the last time a particular judge, opposing counsel or company faced cases similar to yours.

Advanced out-of-the-box PTAB and TTAB analytics are always at your fingertips.

## API

Docket Alarm offers a powerful API (application programming interface) to developers that want to integrate case filings into their apps.

## LAW FIRMS

Build custom dashboards for your attorneys and clients with live data direct from the court.

Automate many repetitive legal tasks like conflict checks, document management, and marketing.

## FINANCIAL INSTITUTIONS

Litigation and bankruptcy checks for companies and debtors.

## E-DISCOVERY AND LEGAL VENDORS

Sync your system to PACER to automate legal marketing.