Title: ASSESSING ROAD TRAFFIC CONDITIONS USING DATA FROM MOBILE DATA SOURCES

Abstract: Techniques are described for assessing road traffic conditions in various ways based on obtained traffic-related data, such as data samples from vehicles and other mobile data sources traveling on the roads, as well as in some situations data from one or more other sources (such as physical sensors near to or embedded in the roads). The assessment of road traffic conditions based on obtained data samples may include various filtering and/or conditioning of the data samples, and various inferences and probabilistic determinations of traffic-related characteristics of interest from the data samples. In some situations, the inferences include repeatedly determining traffic flow characteristics for road segments of interest during time periods of interest, such as to determine average traffic speed, traffic volume and/or occupancy, and include weighting various data samples in various ways (e.g., based on a latency of the data samples and/or a source of the data samples).
Published:
— with international search report

Date of publication of the international search report: 6 December 2007

For two-letter codes and other abbreviations, refer to the "Guidance Notes on Codes and Abbreviations" appearing at the beginning of each regular issue of the PCT Gazette.
**INTERNATIONAL SEARCH REPORT**

**A. CLASSIFICATION OF SUBJECT MATTER**

**INV. 60861/09**

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)

6086 601D

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

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

EPO-Internal

**C. DOCUMENTS CONSIDERED TO BE RELEVANT**

<table>
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<tr>
<th>Category*</th>
<th>Citation of document, with indication, where appropriate, of the relevant passages</th>
<th>Relevant to claim No.</th>
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Further documents are listed in the continuation of Box C.

See patent family annex.

* Special categories of cited documents:

* 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

Data of the actual completion of the international search

30 August 2007

Data of mailing of the international search report

07/09/2007

Name and mailing address of the ISA/Authorized officer

European Patent Office, P.B. 5818 Patentlaan 2 NL-2280 HV Rijswijk Tel. (+31-70) 340-2040, Tx. 31 651 epc nl, Fax: (+31-70) 340-3016

Wagner, Ulrich
<table>
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<td>X</td>
<td>WO 2004/021305 A (ITIS HOLDINGS PLC [GB]; BURR JONATHAN CHARLES [GB]; GATES GARY [GB]; S) 11 March 2004 (2004-03-11) abstract page 14, line 21 - line 32 page 18, line 1 - line 16</td>
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<td>A</td>
<td>US 5 590 217 A (TOYAMA MASAKAZU [JP]) 31 December 1996 (1996-12-31) column 2, line 13 - line 34</td>
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The applicant's attention is drawn to the fact that claims relating to inventions in respect of which no international search report has been established need not be the subject of an international preliminary examination (Rule 66.1(e) PCT). The applicant is advised that the EPO policy when acting as an International Preliminary Examining Authority is normally not to carry out a preliminary examination on matter which has not been searched. This is the case irrespective of whether or not the claims are amended following receipt of the search report or during any Chapter II procedure. If the application proceeds into the regional phase before the EPO, the applicant is reminded that a search may be carried out during examination before the EPO (see EPO Guideline C-VI, 8.5), should the problems which led to the Article 17(2) declaration be overcome.
INTERNATIONAL SEARCH REPORT

Box 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.: 26
   because they relate to subject matter not required to be searched by this Authority, namely:
   see FURTHER INFORMATION sheet PCT/ISA/210

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:
   see FURTHER INFORMATION sheet PCT/ISA/210

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 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 all searchable claims.

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

3. X 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.:

   1-25, 27-41, 106-144, 197-261, 272-310

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.:

   □ The additional search fees were accompanied by the applicant's protest.
   X No protest accompanied the payment of additional search fees.
This International Searching Authority found multiple (groups of) inventions in this international application, as follows:

1. claims: 1-25, 27-41

   A computer implemented method, medium and computing system in a traffic central for attributing weights to the data samples to increase their accuracy.

2. claims: 42-105,

   Method, computer implemented method, medium and computing device for a vehicle for acquiring data samples at predefined times, storing the data and sending or providing the data.

3. claims: 106-144, 197-261, 272-310

   A computer implemented method, medium and computing device for receiving data samples reflecting speed of vehicles, and for eliminating outlier or unrepresentative or unreliable values from the samples.

4. claims: 145-196

   A computer implemented method, medium and a computing system for probabilistically estimating traffic flow.

5. claims: 262-271

   A computer implemented method for comparing current data readings with average historical data readings and replacing unreliable data readings.
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<tr>
<th>Patent document cited in search report</th>
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