IEEE ICDM Contest:
TomTom Traffic Prediction for Intelligent GPS Navigation

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Key Words

ICDM

Previous Challenges by ICDM

- **2001: (Started)**
- **2007: (first) Indoor Location Estimating Using WiFi Data**
- **2008: Radioxenon monitoring for verification of the Comprehensive nuclear-Test-Ban Treaty**
- **2009: Pittsburgh Brain Competition Brain (PBC) Connectivity Challenge**
- **2010: Road Traffic Forecasting and Intelligent GPS Navigation**

Contents

Data Mining

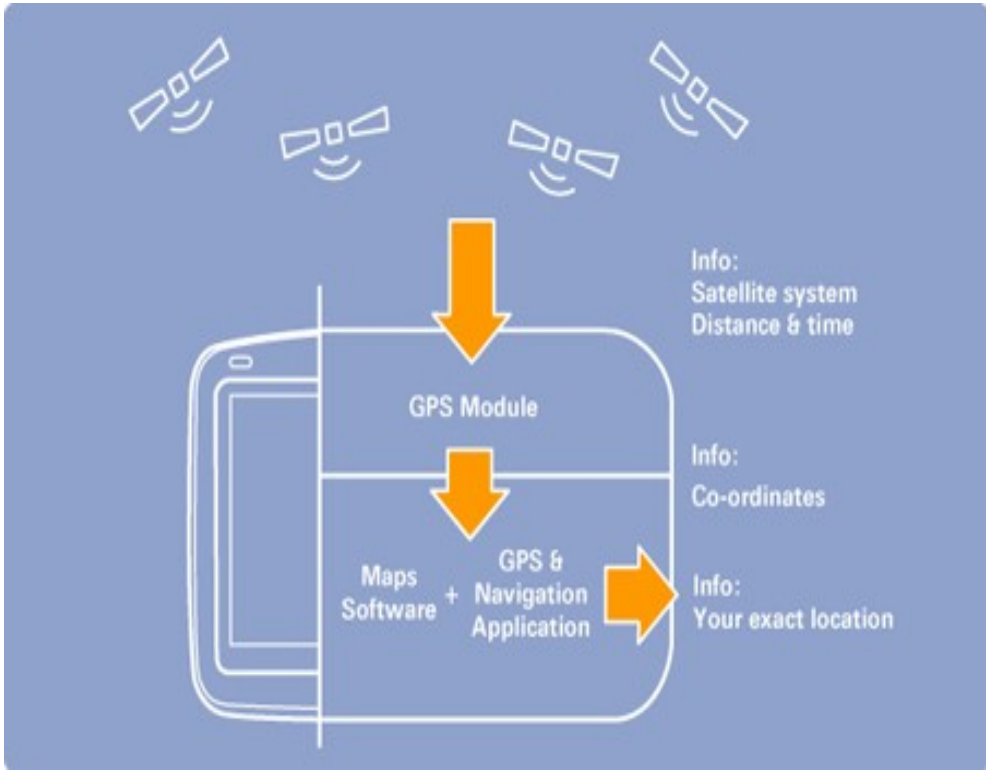
- Different Dimension of Data Analysis
- Data, Information and Knowledge
- Major Elements of Data Mining (Extract, Store, Data Access, Analysis and Presentation)
- Data Mining Techniques (i.e. KNN, K-Mean, Cluster, Decision Tree, Rule Induction etc.)
- Example: Baby Diaper and Beer relation

GPS (Global Positioning System)

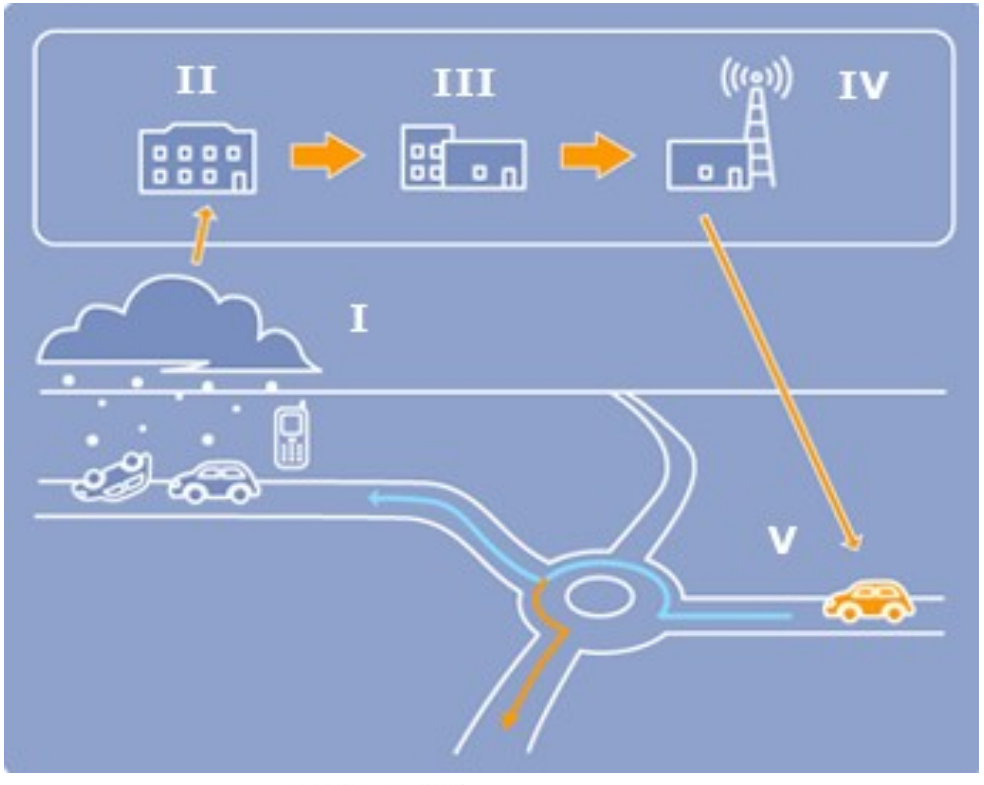
- Network of 24 different satellite
- 12,000 miles above, 7000 miles/hour and twice a day
- Tenure of 1978~1994. Publicize around 1980s
- 2,000 pounds, 17 feet across and 50 watt approx.
- L1 Radio signal of 1575.42 MHz in UHF band
- Location calculation with signal and time

TOMTOM (Intelligent GPS System)

Inside the Device

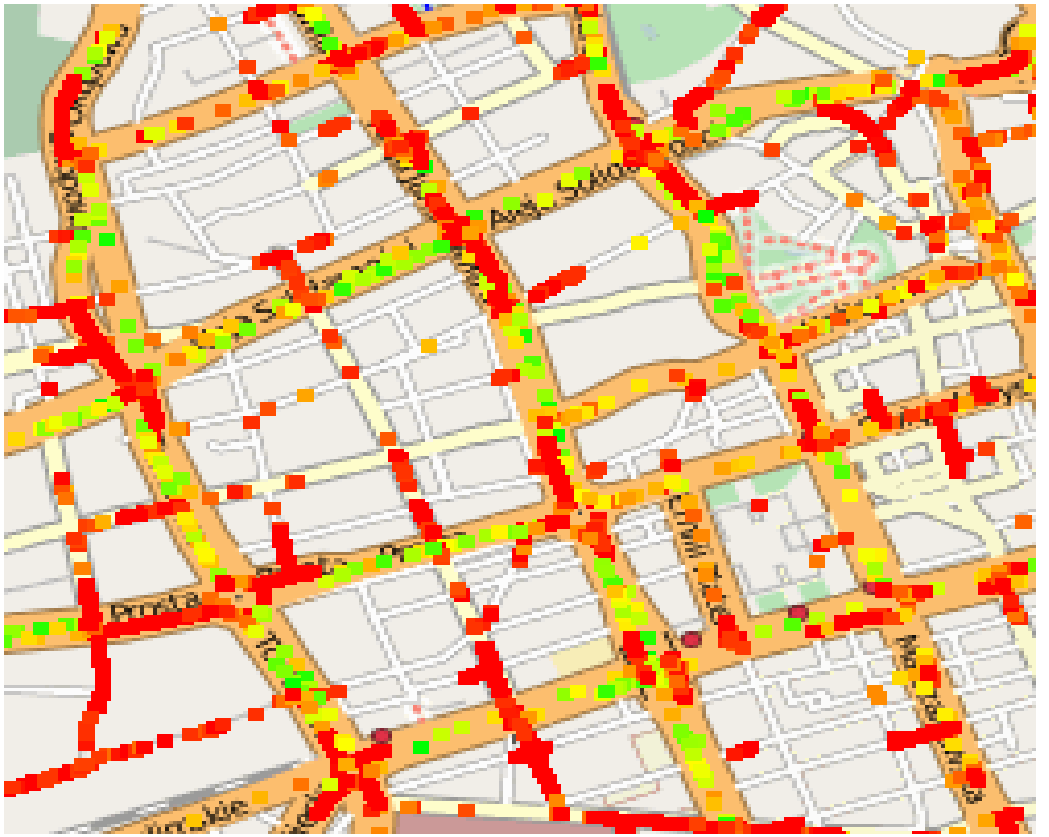


RDS-TMC

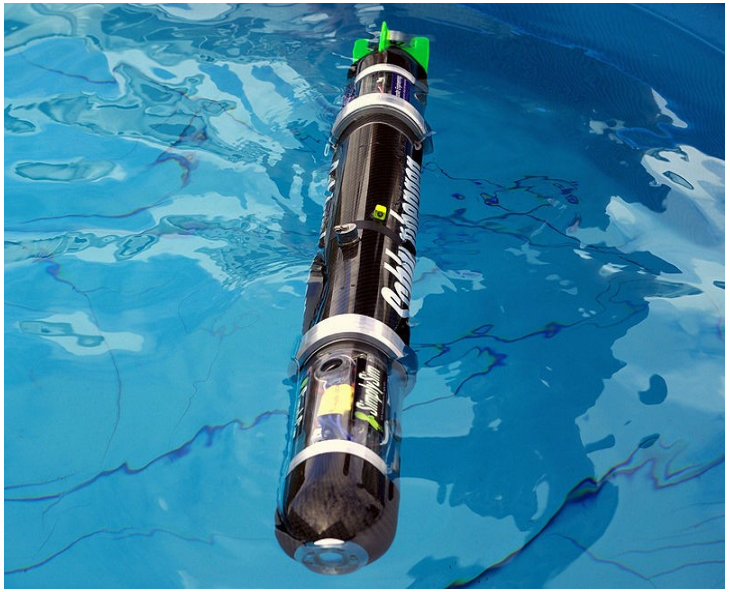


Traffic Simulation Framework (TSF)

- Product of University of Warsaw
- 3.5 .NET Framework
- Free for non-commercial purpose



Vehicle Automation



Contest Overview

- **Organizer: IEEE ICDM**
- **Venue: Sydney, Australia**
- **Number of problems: 3**
- **Schedule:**
  - **Challenge started: Jun 22**
  - **Challenge ended: Sep 07**
  - **Solution submission: Sep 13**
  - **IEEE ICDM conference: Dec 14-17**
- **Participants: 575**
- **Solutions: 1-3121; 2-1298; 3-388**
- **Sponsor: TOMTOM**

Problems

- **Traffic-** congestion prediction
- **Jams**- Modeling the process of Traffic
- **GPS**- Traffic reconstruction based on real time information

Traffic

1	2	11	10	15	12	7	12	5	8	18	3	20	18	14	27	14	7	37	7
35	7	53	1	41	33	15	38	12	2	26	1	23	27	22	36	30	12	36	10
3	8	53	9	60	56	24	10	25	20	42	26	8	22	15	62	66	45	11	15
75	17	33	5	72	41	27	9	10	3	25	2	19	6	5	48	58	17	33	9
11	14	51	33	30	79	24	6	46	62	25	16	10	19	7	16	66	61	15	17
66	13	18	6	73	71	25	23	30	9	18	6	11	7	1	7	64	15	17	6
13	26	48	35	27	82	27	8	43	71	34	24	21	19	10	22	69	59	2	13

- ATR
- Data Information
- Prediction

Jam

32049370_32049364 32597785_32599710 251856122_224814449 260152955_260152954 255309049_254340652
35967065_27166981 254021308_29169080 254021581_32320961 31897831_33242043 39970958_39971093 32572261_32596658
26458751_32049137 261045414_34677996 35147446_35147448 255309057_255309060 251963192_32124420
255309060_26195424 26118695_33242035 254518066_34520362 255309065_30901480 247808874_32528888
32892128_39970973 259568213_29169145 251962144_32675842 261213357_34555066 33124985_190472433
255309042_39970811 261030665_190490777 31897791_31897838 33739743_26308848 32528263_32572234
34556051_252342699 32597787_254518066 254513587_31884818 32597424_35966361 31917350_33242046
261212962_34675202 32627804_254700145 33124280_255443778 261212885_34675219 29274141_32049226
260816784_29274122 247807129_31928710 34676550_34676551 32892177_32892162 30902339_32594632
251855379_32528891:261042514_31158821 91818051_83522652 251852558_34522515 32594460_32594638
260816775_26195346 34469776_31897793 54094212_32572885 31917348_33242040 255067845_32528294 254513589_31884821
254513583_33242040 218095740_34819979 32022062_32022014 34551129_255582548 261212913_34555068
32329852_32329851 254515314_32572234 179870584_32629262 38454254_34555550 32600369_31156745 26485608_32676777
32676778_34816529 254721431_26485608 35147450_35147444 247810703_32022067 260816785_260816784
34533196_32551935

- MAP
- Data Information
- Prediction

GPS

360	32528267	224797838	48.3
360	34815617	34815611	46.5
360	32892129	32892130	53.8
360	32892142	32553129	41.2
360	258495255	258495254	61.6
360	32022057	251907279	64.1
360	34556056	34556058	57.8

10	1	10	52.1746	20.9109
10	2	0	52.2986	21.0128
10	3	0	52.2546	21.0686
10	4	0	52.2589	21.1299
10	5	37.7	52.1443	21.0959
10	6	54.4	52.3178	20.9743
10	7	15.1	52.1933	20.9957

- Self GPS positioning
- Data Information
- Prediction

Street Graph

Nodes:

Node_id	Latitude	Longitude
26063726	52.1528	21.0174
26063729	52.1424	21.0176
26063848	52.1576	20.9913
26063849	52.1581	20.9920
26063850	52.1586	20.9922
26063851	52.1589	20.9923
26063852	52.1595	20.9923

Edges:

Node1_id	Node2_id	Distance(km)	Nr_of_lanes	Avg_max_velocity
26405552	26063726	0.022	2	70
26083922	26063726	0.028	1	60
252026170	26063729	0.124	2	70
258495258	26063848	0.039	1	60
26083906	26063848	0.061	1	60
258495259	26063848	0.053	1	60
26063850	26063849	0.053	1	60

Further Works

- **Solution of the Challenge**
- **Post-challenge**

THE END

Q & A Please ???