CATT LABORATORY

Transportation Data Visual Analytics

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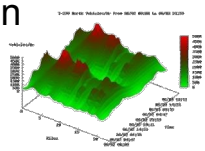
UNIVERSITY OF MARYLAND

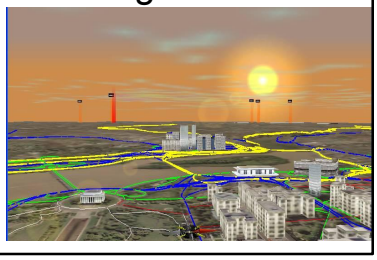
Who We Are…

- 35 Undergrad Student Developers
  - Civil Engineering
  - Computer Science
  - Mechanical Engineering
  - Aerospace Engineering
  - Computer Engineering
  - Geography & GIS
  - Telecommunications
  - Art
- 13 Graduate Students
- 7 Full-time Developers, Engineers, & Researchers

What We Do…

- Intelligent Transportation Systems
- Transportation Data Archiving
- Data Visualization Techniques
- User Interface Design
- Serious Games Development
- Data fusion, interpolation, and forecasting
- Incident Management
- Traveler Information





Our Challenge

- Our Challenge: Make ALL of this data easily accessible and understandable to end users…
- Our data comes from these and others:

SHA State Highway Administration · metro · VDOT · d. District Department of Transportation

- And it includes:
  - Traffic Detector Data
  - Event/Incident Data (very detailed) from transportation operations centers
  - Weather radar, forecasts, and alerts
  - Police Accident Reports (MD only)

Data Mining & Visual Analytics

- Transportation agency emphasis on data collection, standards, etc…

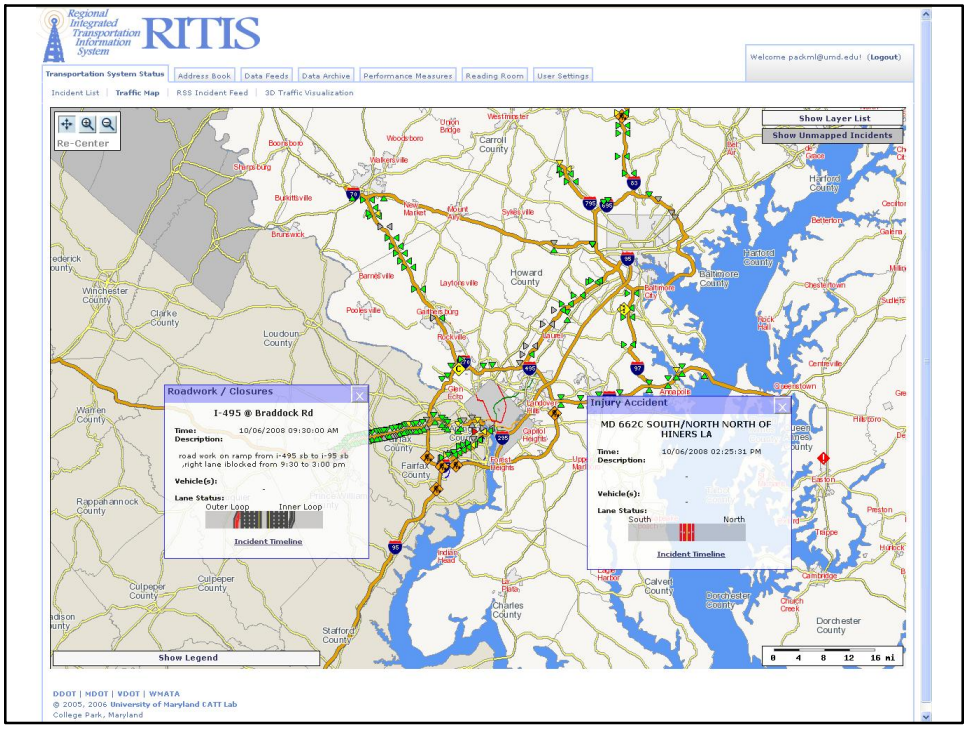
courtesy of Karl Petty, BTS

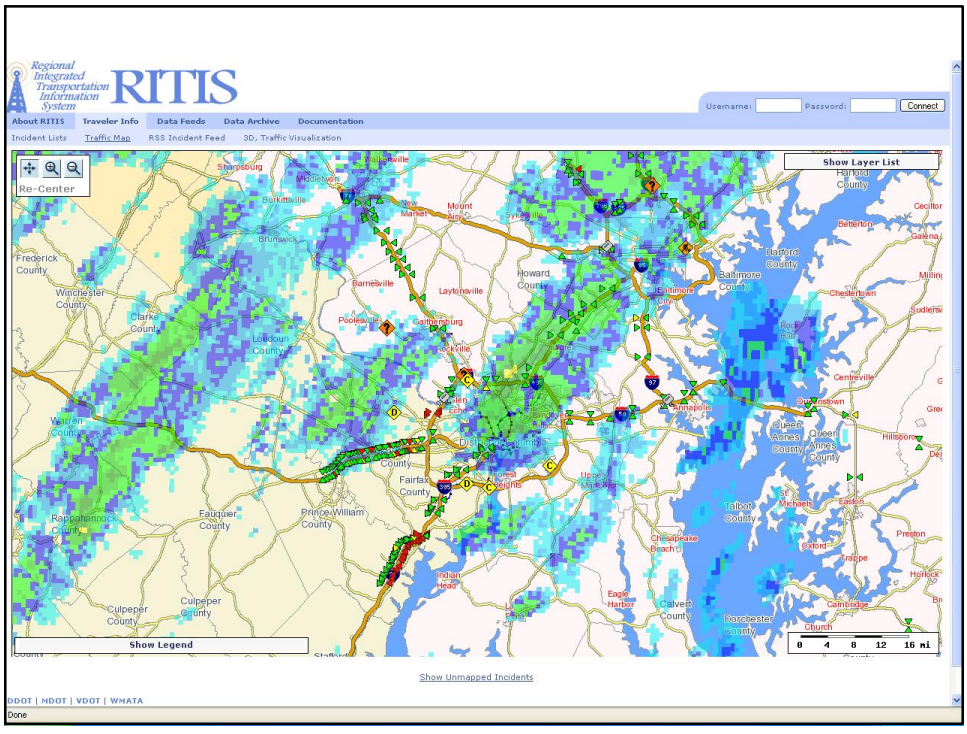
- Significantly less emphasis has been given to:
  - Data exploration
  - Data visualization
  - Representing data

Visualization & Visual Analytics

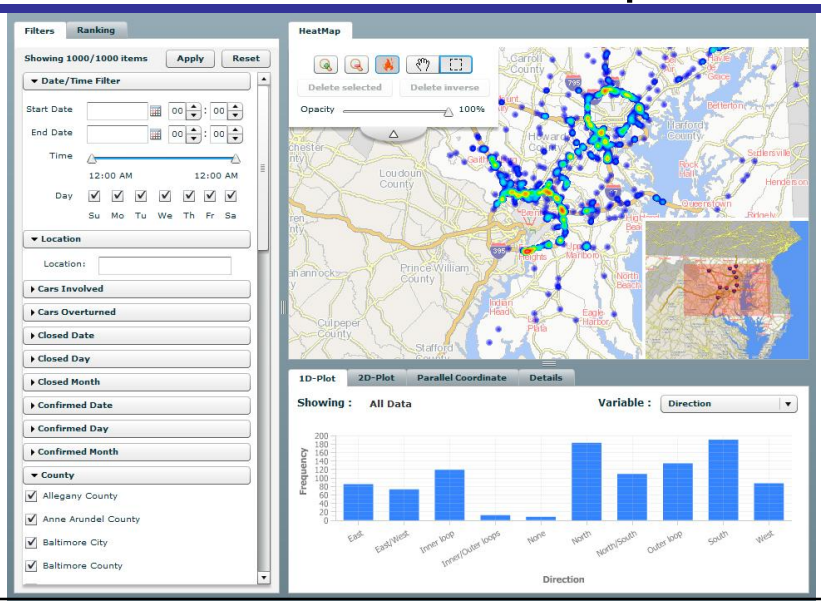
Our Design Mantra…

- Towards no user manuals..
- Visually pleasing…
- Web accessible…
- Afford freedom to explore…
- Follow the "Ben Schneiderman Mantra":
  - Overview, Zoom, Details on Demans

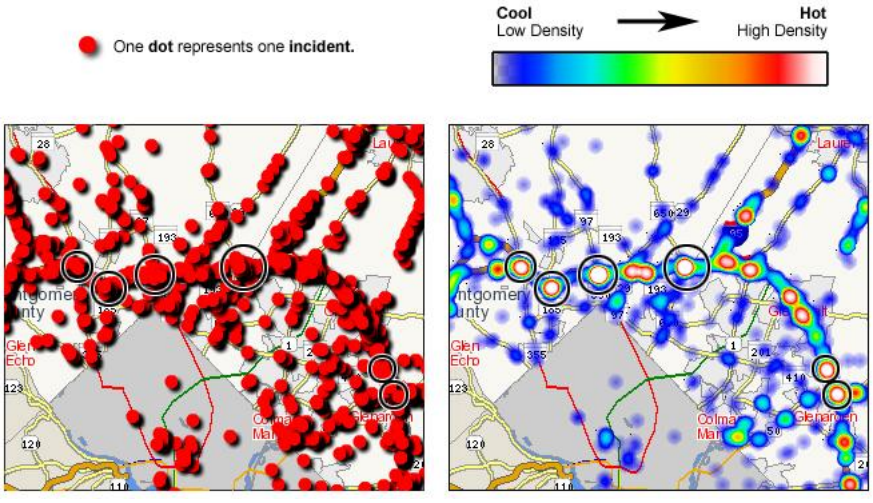

Regional Integrated Transportation Information System
RITIS
Transportation System Status
Address Book
Data Feeds
Data Archive
Performance Measures
Reading Room
User Settings
Incident List
Traffic Map
RSS Incident Feed
3D Traffic Visualization
Re-Center
Show Layer List
Show Unmapped Incidents
Roadwork / Closures
I-495 @ Braddock Rd
Time: 10/06/2008 09:30:00 AM
Description:
road work on ramp from i-495 sb to i-95 sb
,right lane iblocked from 9:30 to 3:00 pm
Vehicle(s):
Lane Status:
Outer Loop
Inner Loop
Incident Timeline
Injury Accident
MD 662C SOUTH/NORTH NORTH OF HINERS LA
Time: 10/06/2008 02:25:31 PM
Description:
Vehicle(s):
Lane Status:
South
North
Incident Timeline
Show Legend
DDOT | MDOT | VDOT | WMATA
© 2005, 2006 University of Maryland CATT Lab
College Park, Maryland


Regional Integrated Transportation Information System
RITIS
Username:
Password:
Connect
About RITIS
Traveler Info
Data Feeds
Data Archive
Documentation
Incident Lists
Traffic Map
RSS Incident Feed
3D, Traffic Visualization
Re-Center
Show Layer List
Show Legend
Show Unmapped Incidents
DDOT | MDOT | VDOT | WMATA
Done

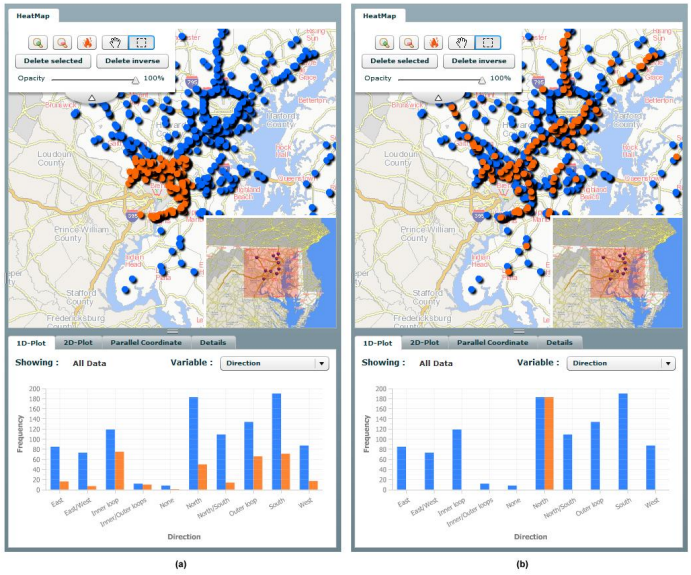
Incident Data Example



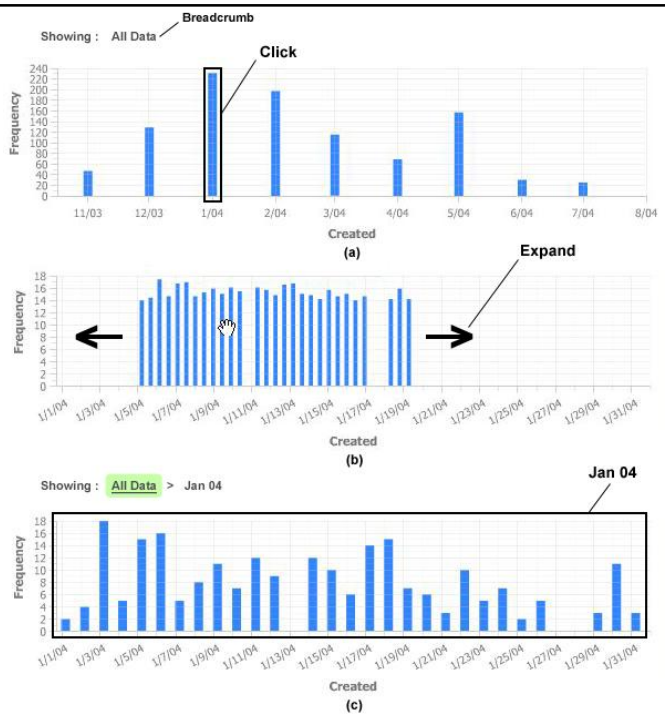
Point-map vs. Heat-map



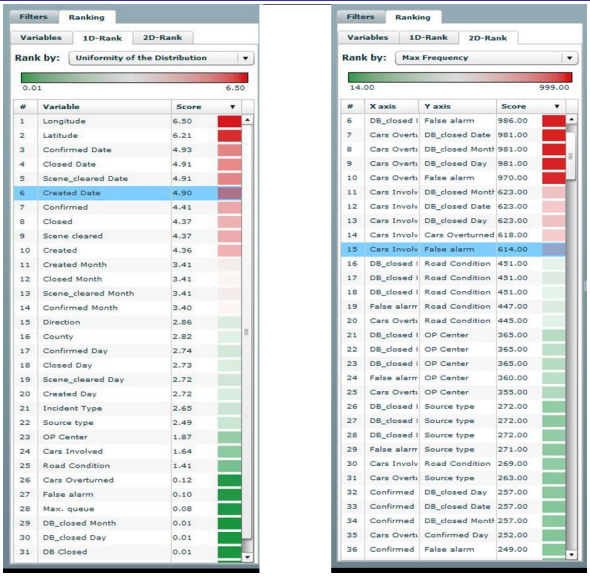
"Linking"



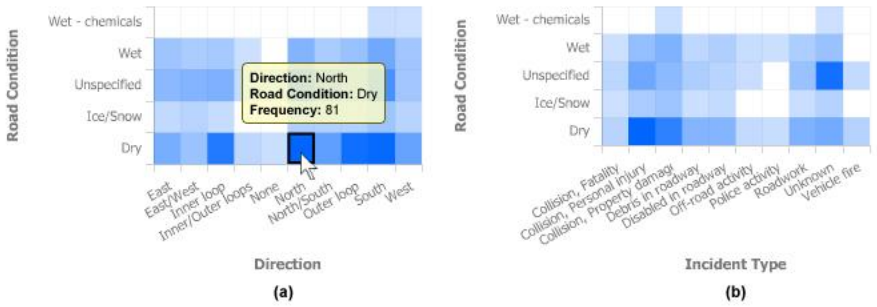
Animated Zooming with Histograms



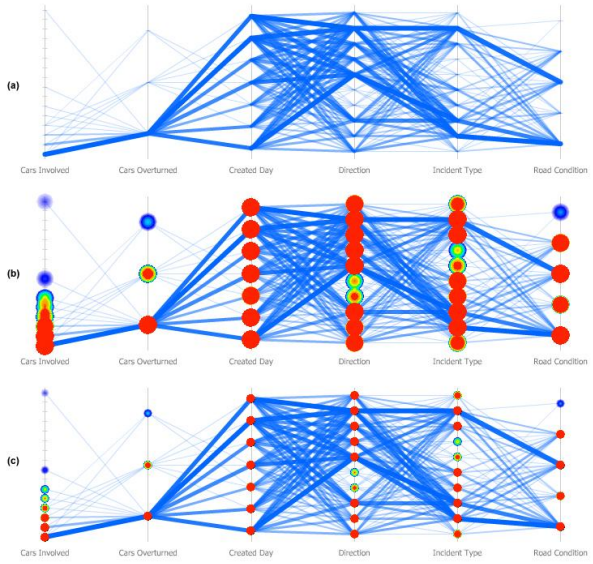
1D and 2D categorical ranking



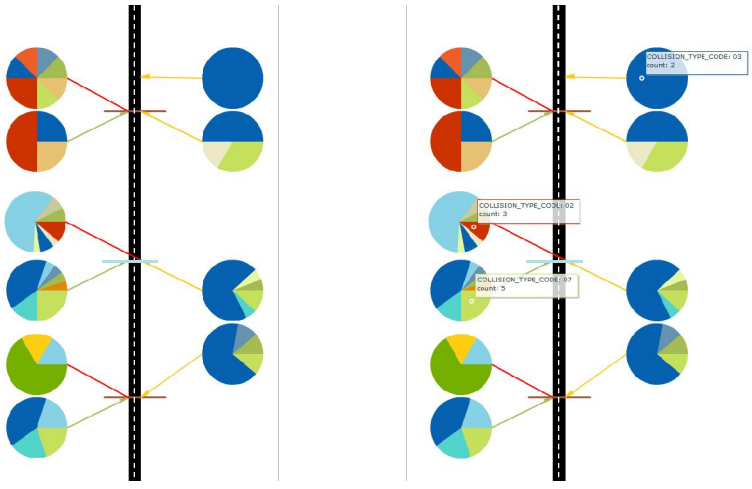
Interactive Grid Plots



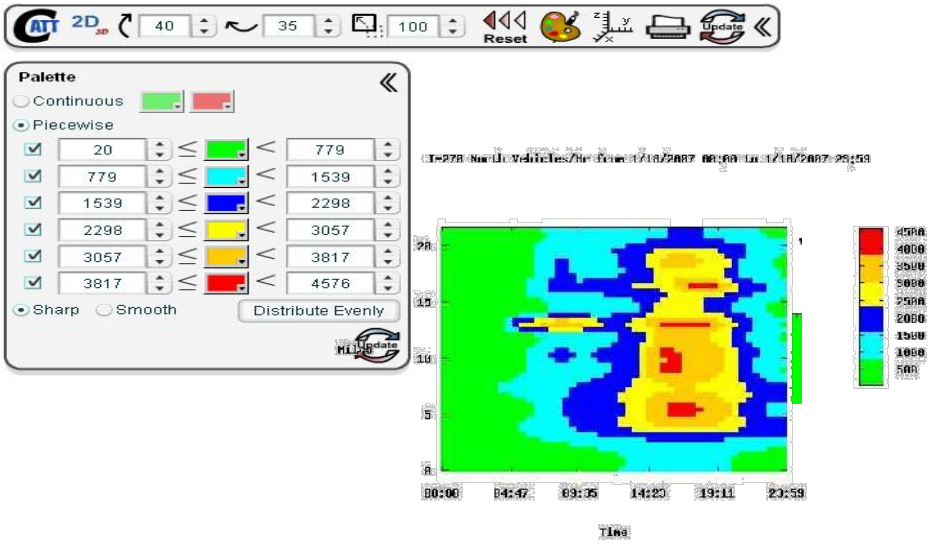
Parallel Coordinate Plots



Corridor Diagrams



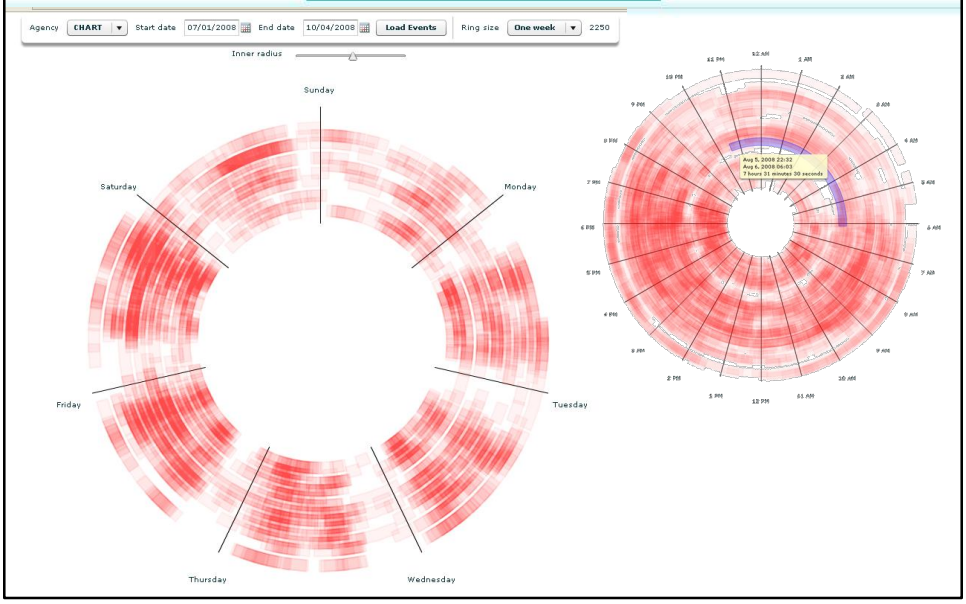
User Interaction with graphs



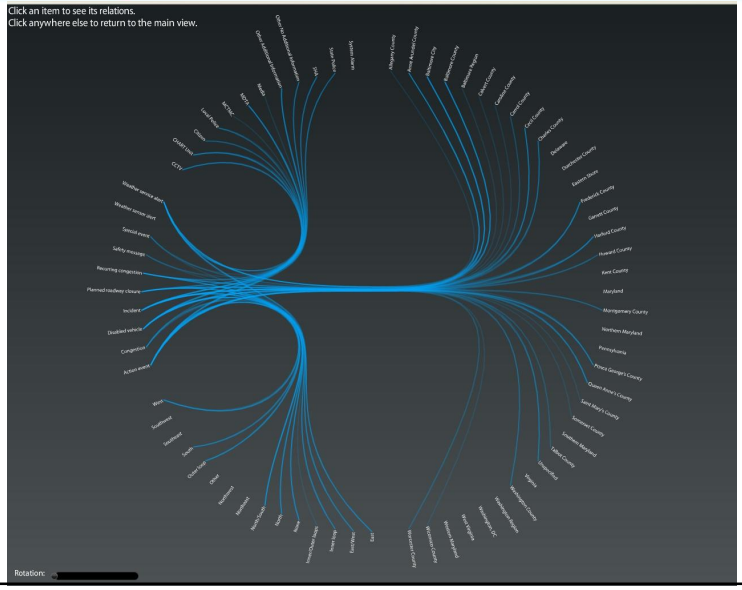
Timeline Incident Visualization

- All incident data on one-screen
  - Communications
  - Response
  - Lane status
  - VMS
  - Traffic

Tunnel Vision



Dependency Circles



3D Virtual Helicopter

Serious Games for Incident Visualization

Conclusions

- Visual Analytics (when done right) help users to work faster, smarter, cheaper…
- Response from users:
  - Extremely Favorable!
  - New trends in data being discovered
  - Web-based functionality especially useful
- Overview first, zoom and filter, details on demand mantra serves us well…

Questions

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