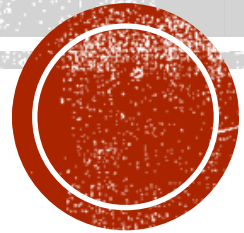
THE INFORMATION VISUALIZATION BASED ON THE SENSOR NETWORK: THE SURVEY



CPSC-547 final project, survey project

Presented by Kaiyuan Li,

THE MOTIVATION

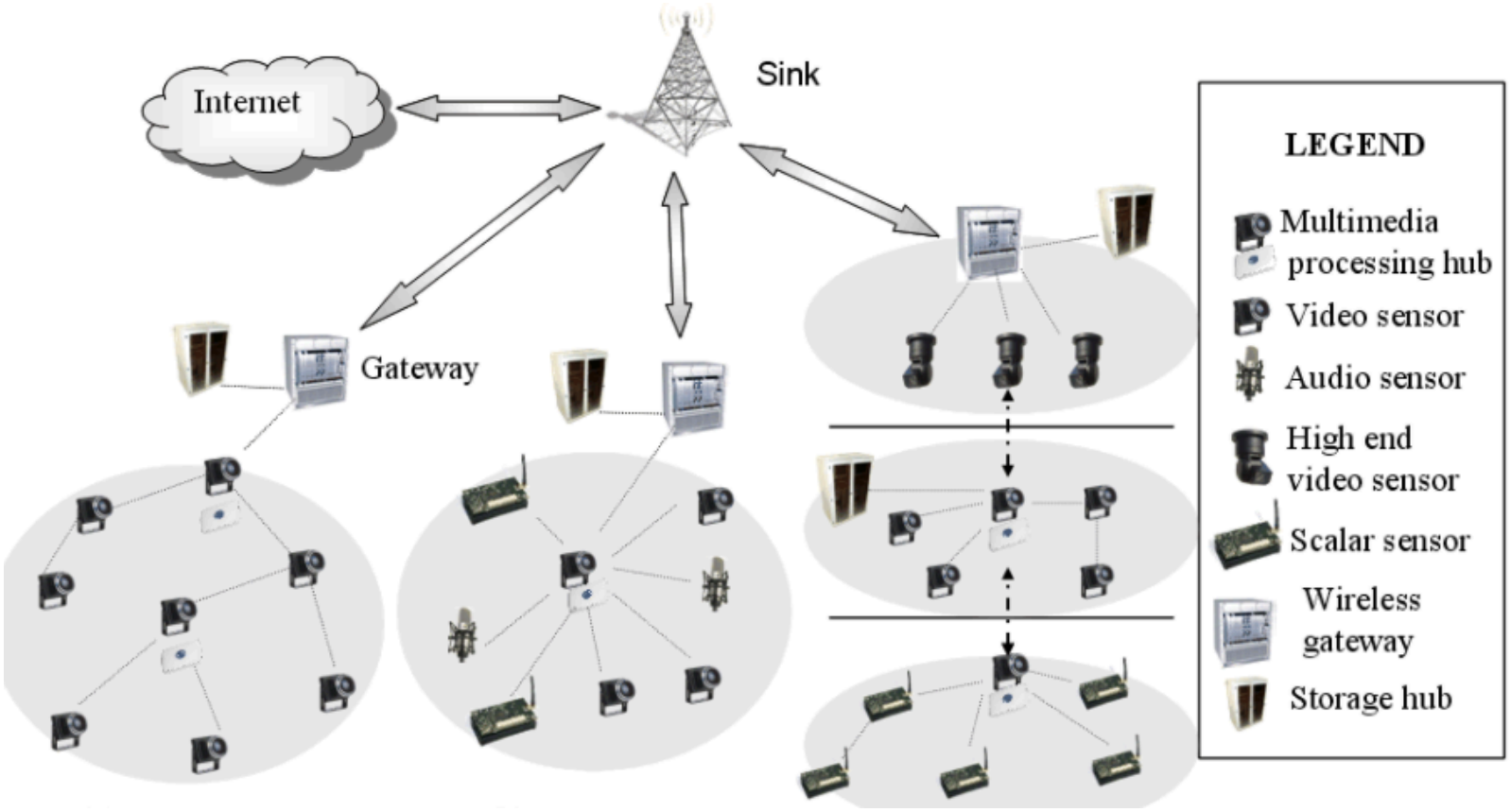
- The rapid increase of amount of data

- The increase of amount of sensor networks

DEFINITIONS IN THE PAPER

- Information visualization
- Sensor
- Sensor network

LAYERS OF THE SENSOR NETWORK



MAIN CONTRIBUTIONS OF THIS SURVEY PROJECT

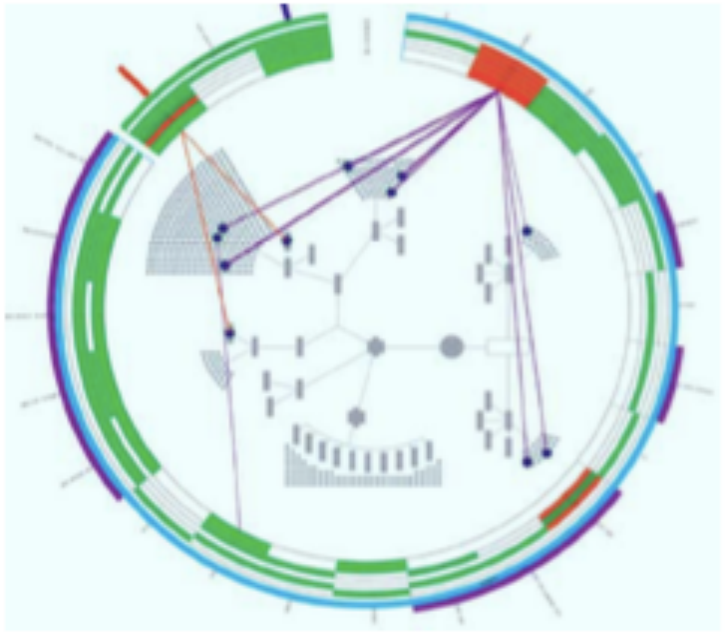
- Provide the overall review of state of art in information visualization in various sensor network
- Analysis the encoding method/ idioms and task/data which have been applied in the fields
- Discuss the current methods which have been applied and evaluate the results for current applications

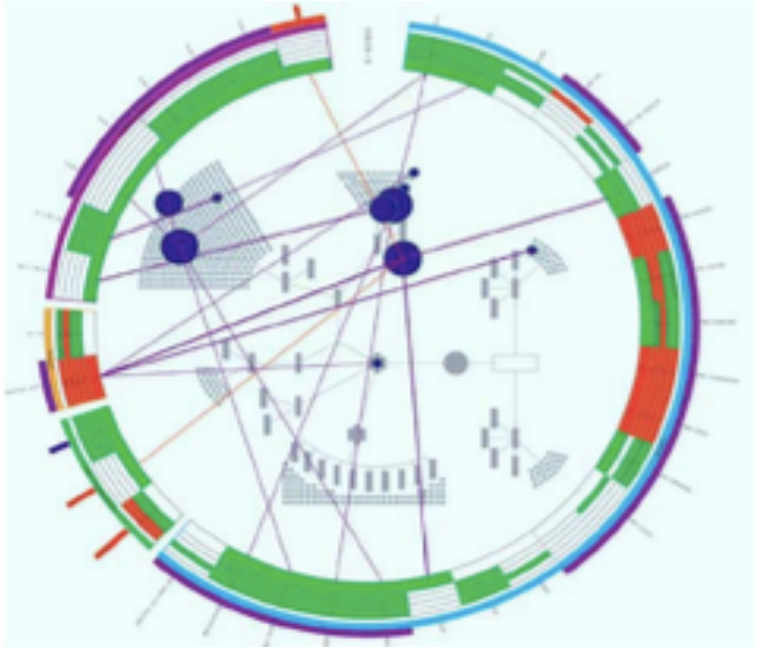
THE PAPER ALLOCATION FOR EACH SECTION

- Definition and relationship with big data: [1]
- Related works: [6],[8] [17]
- Security problems and properties for sensor network :[4],[8],[12],[15]
- Small scale applications (Health care and tracking):[3],[11],[13],[14],[17],[19]
- City-scale/ regional scale applications : [2],[5],[6],[7],[9],[10],[18],[20]

The detailed reference list will be listed on the end of slides.

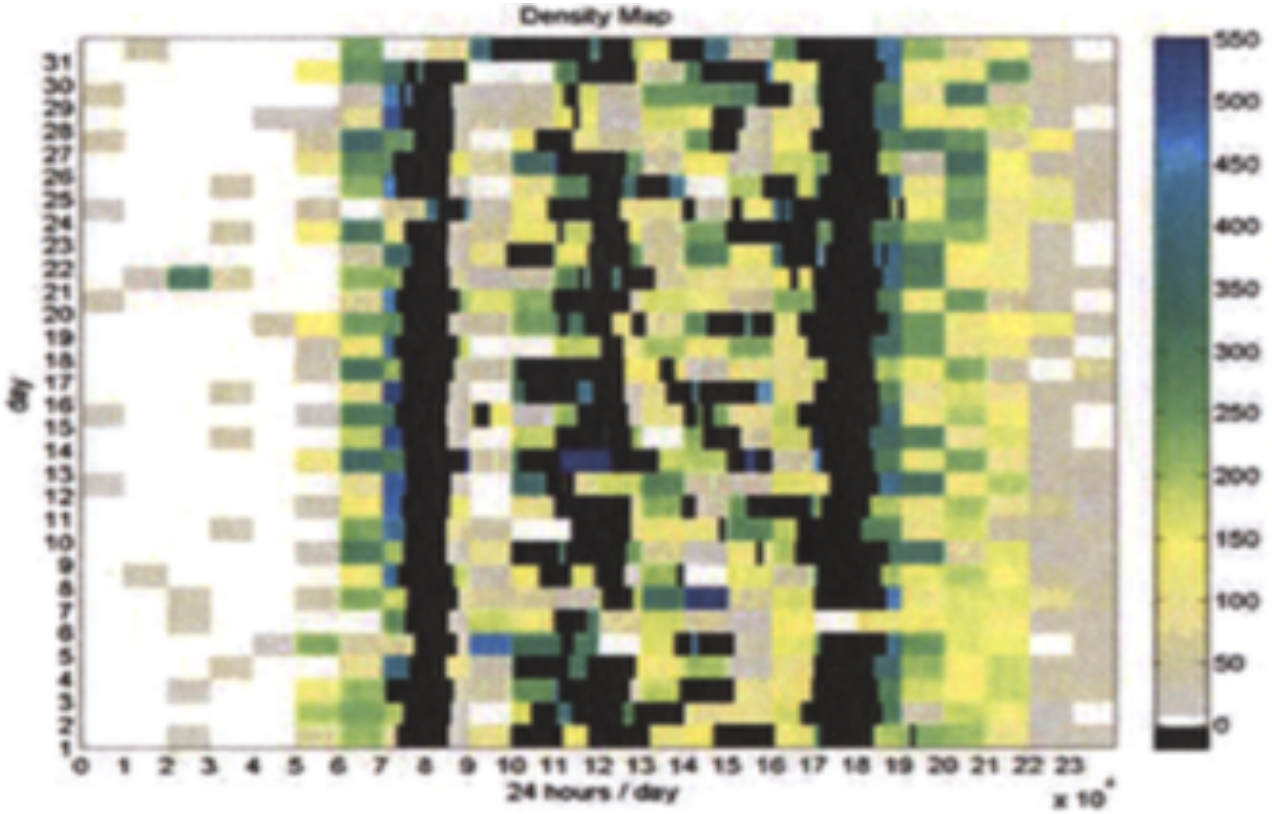
SENSOR NETWORK PROPERTIES AND SECURITY PROBLEMS---EXAMPLE





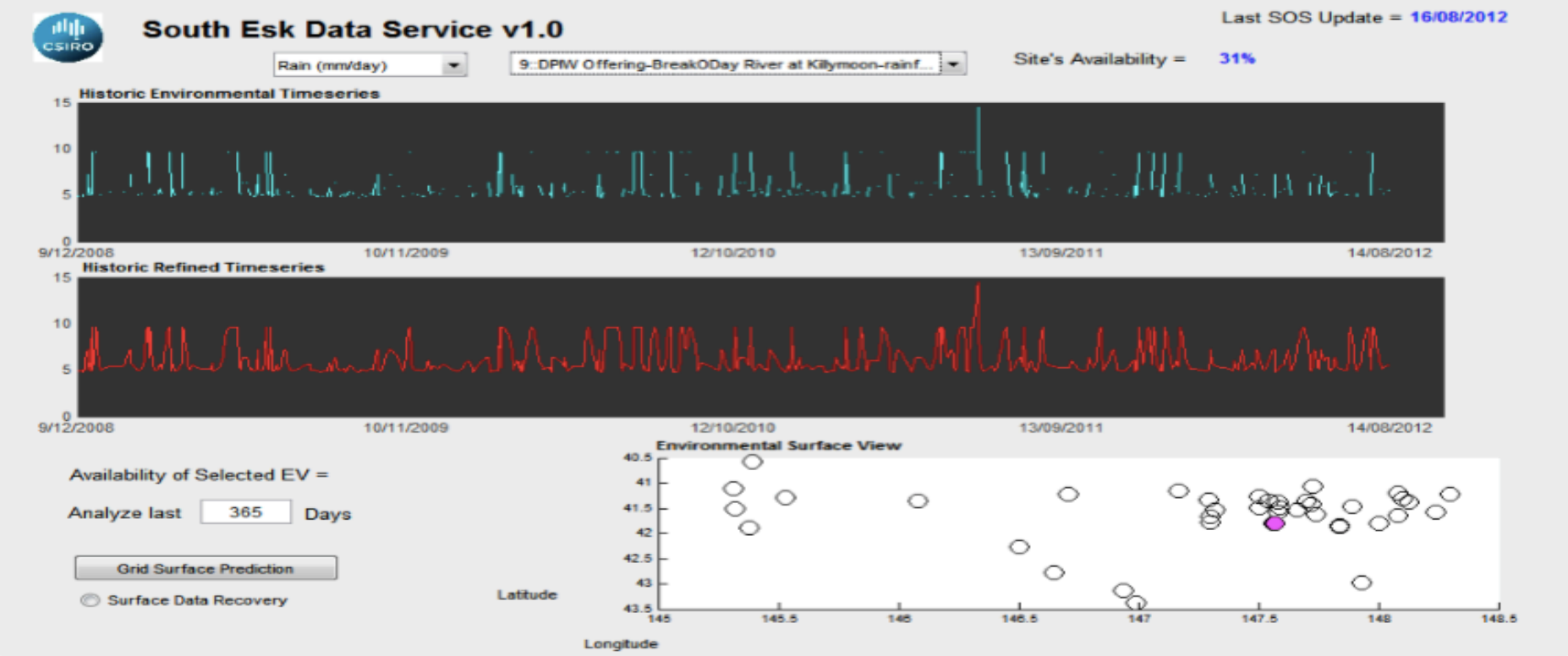
System	VisAlerts
What: data	states of events, topology of the network, the time and duration of event
What: derived	the topology of network, the occurrence of events in time and logical location (not the spatial location, is the level or cluster location of sensor node)
Why: tasks	Display the relationship between time/logical location of event and events, show the topology
How: encode	Size of the marks: size of the line mark indicates the number of event, the size of dot mark indicates the uniqueness of events, color hues: red indicate nodes are in danger and green means safe state, node-link diagram represents the topology of the network, also encode the relationship for events and sensor nodes in time and in location

SMALL SCALE APPLICATIONS--EXAMPLE



System	Density map
What: data	Motions in the room
What: derived	The state of activities for a person
Why: tasks	Visualize the motions in a room for certain day and time, find the activity patterns
How: encode	sequential color hues: the different color hue indicate the different motion states
Scale	In several rooms of an apartment

CITY/REGION-SCALE VISUALIZATION--EXAMPLE



System	South Esk data service v1.0
What: data	Availability of data, rain-drop data
What: derived	Availability of sensed data, precipitation in different location
Why: tasks	Determine the data availability, display and complete the precipitation data
How: encode	Line graph: it has been applied to encode the precipitation of sensor cell. Dot plot: dot plot has been apply to encode the location of sensor node. Different color hues: blue as original data from the sensor, red line as the compensated data. Color saturations: in dot plot, the low saturation (white) indicates the low data availabilities, dark one (black) indicates the high availabilities
How: manipulate	Selection: the precipitation in different time can be selected and viewed. The different types of data can also be selected and viewed
How: facet	The result data can be seen on the top with dot plot in the bottom right
Scale	Sensor network in a sensor cell 5*5km

DISCUSSION--CHALLENGES

- First, the isolation challenge.
- The second challenge is evaluation capabilities.
- The last one is integrity challenges.

DISCUSSION——SUGGESTIONS

- First, the visualization framework should focus on data.
- Then, the innovative visualization framework should be tested.
- Last but not least, the visualization idioms should be easily comprehensible.

DISCUSSION——FOR THREE SECTIONS

- Sensor network properties and security problem
- visualization on small scale such as health care and motion sensing.
- the large-scale applications

SUMMARY

- Introduction
- Result
- Discussion

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THANK YOU, QUESTION?