

Paper Presentation by Ben Janzen

- Millions of transactions a day(e.g. Ebay)
- Many buyers, many sellers, many products
- Analysis used to maximize profits (prevent fraud, improve advertisements)

- Aggregate into trends (e.g. sparklines)
- Automated data mining
- Automated clustering and aggregation

- Not enough focus/zooming
- One specific buyer or seller may collude
- Mostly overview, hard to drill down to detail

Region	Actual Sales (mil)	% to Goal (12 Month)	Gross Profit (mil)	Profit Trend (12 Month)
Alabama	\$4,915	107%	\$1,172	
Alaska	\$3,110	65%	\$791	
Arizona	\$5,199	103%	\$262	
Arkansas	\$5,293	101%	\$410	
Illinois	\$4,955	93%	-\$22	
Indiana	\$5,032	91%	\$516	
Ohio	\$5,555	112%	\$524	
Oklahoma	\$4,245	85%	\$787	
Oregon	\$5,408	102%	\$392	
Wisconsin	\$4,244	73%	\$1,455	
Virginia	\$7,664	161%	\$325	
Washington	\$4,558	88%	\$1,929	

VAET

Typical Tasks

Overview through Saliency Map

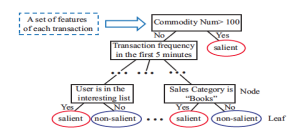
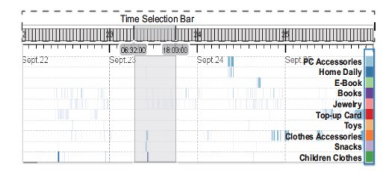
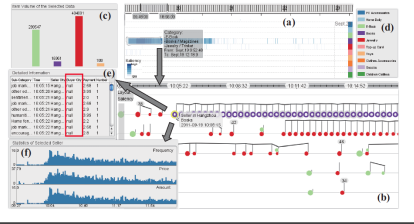
What is a PDT?

- Juxtaposed overview + detail
- Introduces new visual encoding: Knotlines

- Identify time periods and categories of interest
- Identify Interesting transactions and drill down
- Identify interesting sellers
- Examine transaction patterns of specific seller

- Probabilistic decision tree computes interestingness
- Encode in a dense pixel based layout
- Allow zooming and time selection

- User provides training set of interesting and non interesting transactions
- Machine learning algo (see paper) computes something similar to a finite state machine
- Probability of TP is function of exp TP and



Detail View: Knotlines

Knot Glyph Details

Knot Details on Demand

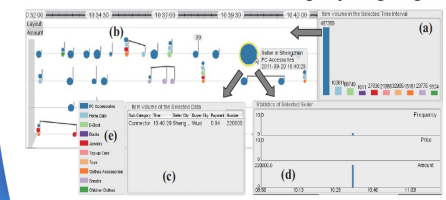
Validation of the Tool

- Novel visual encoding based on sheet music
- Based on three level hierarchy (grouped by seller, by time period then by item category)
- Linked with saliency overview

Visual Encoding	Transaction Data
A knotline	Transactions from the same seller in different time (a group)
A knobunch	Transactions from the same seller in a time interval (a sub-group)
The stem length	The total payment amount of transactions from the same seller in a time interval
A knot	Transactions from the same seller with the same sales category in a time interval (a section)
The knot color	The sales category of the knot
The knot size	The number of commodities in the knot
An unfilled knot	A transaction with abnormal seller or buyer locations

- Interaction and selection of knots provides greater detail
- Related knots shown with grey highlights

- Informal walkthrough case study with expert analysts
- Full user study, two analysts eight novice users
- Variety of exercises simulating analyses that would happen in the real world



Results

Criticisms

Conclusion

- Experts concerned with usability, but novice had 95% accuracy rate on the exercises
- Minor issues with glyph cultural expectation
- Size coding caused minor selection issues
- Analysts excited about using the tool, especially to find missing values

- Saliency map assumes we a priori know what transaction patterns are interesting
- Unfilled knots draw the eye to faulty data
- Seller names and details only visible through interaction, arduous to examine several knots
- Knots on a row implies continuity, but may be from several sellers

- VAET Presents an approach to encoding an overview of transactions through saliency
- Introduces a novel visual encoding of knotlines for detailed time series data
- Provides an effective overview + detail view of E-Transactions
- Could be further improved and customized, but the validation is convincing