VISUAL 2008
10th International Conference on
Visual Information Systems
Salerno, Italy

Operational Risk Visualization

Concetto Bonafede, Roberto Marmo
University of Pavia, 27100 Pavia, Italy

Dep. of Statistics "L. Lenti"
Faculty of Engineering, Laboratory of Computer Vision

http://www.unipv.it/dipstea, http://vision.unipv.it
Email: roberto.marmo@unipv.it

Abstract

- Operational risk management is a new paradigm for decision making, that involves the two-way exchange of information between interested parties in order to manage risks according to strategic background. The database used to develop our graph comes from a telecommunication service company which provides custom communication equipments to client. We provide three graphical representations useful to decide pro-actively if a new client is a potential source of some kind of problems that lead to growth of some risks. One representation is based on classical horizontal bars, and the other is based on new visual arrangement. We compare the usability of graphical formats using eye tracker and related statistical measures.

Risk analysis

- Part of the process of planning a technological system and addressed the risk inherent in its day-to-day operations.
- The risk is measured as combination of two variables concerning two different aspects of an harmful event: Frequency and Impact.
- Risk visualization involves the two-way exchange of information between interested parties in order to make decisions about how best to manage risks.

Data Description

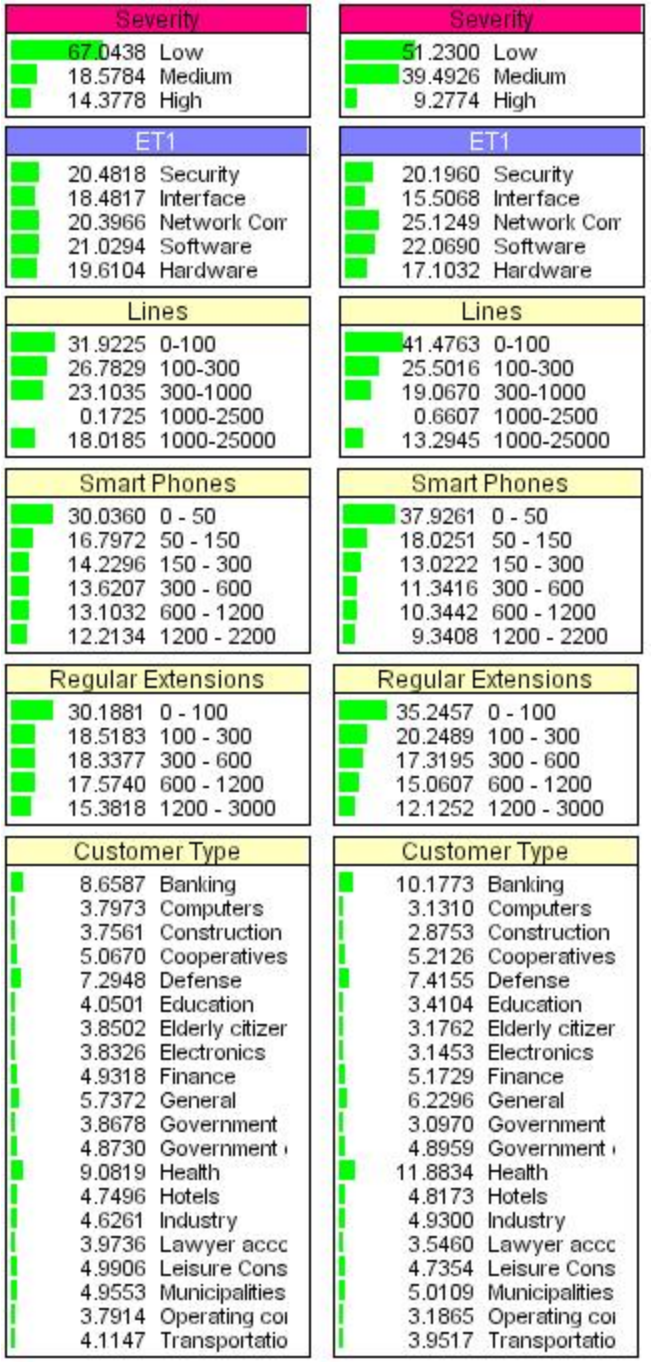
- Related to PBX (Private Branch Exchange) which is a private telephone network used to enable communication within and out an enterprise.
- Source of service interruption risk are problems due to Hardware, Software, Network, Interface and Security happen to PBX.
- Such data are gathered after the call-centre, operator is not able to solve the problem.

Data Description

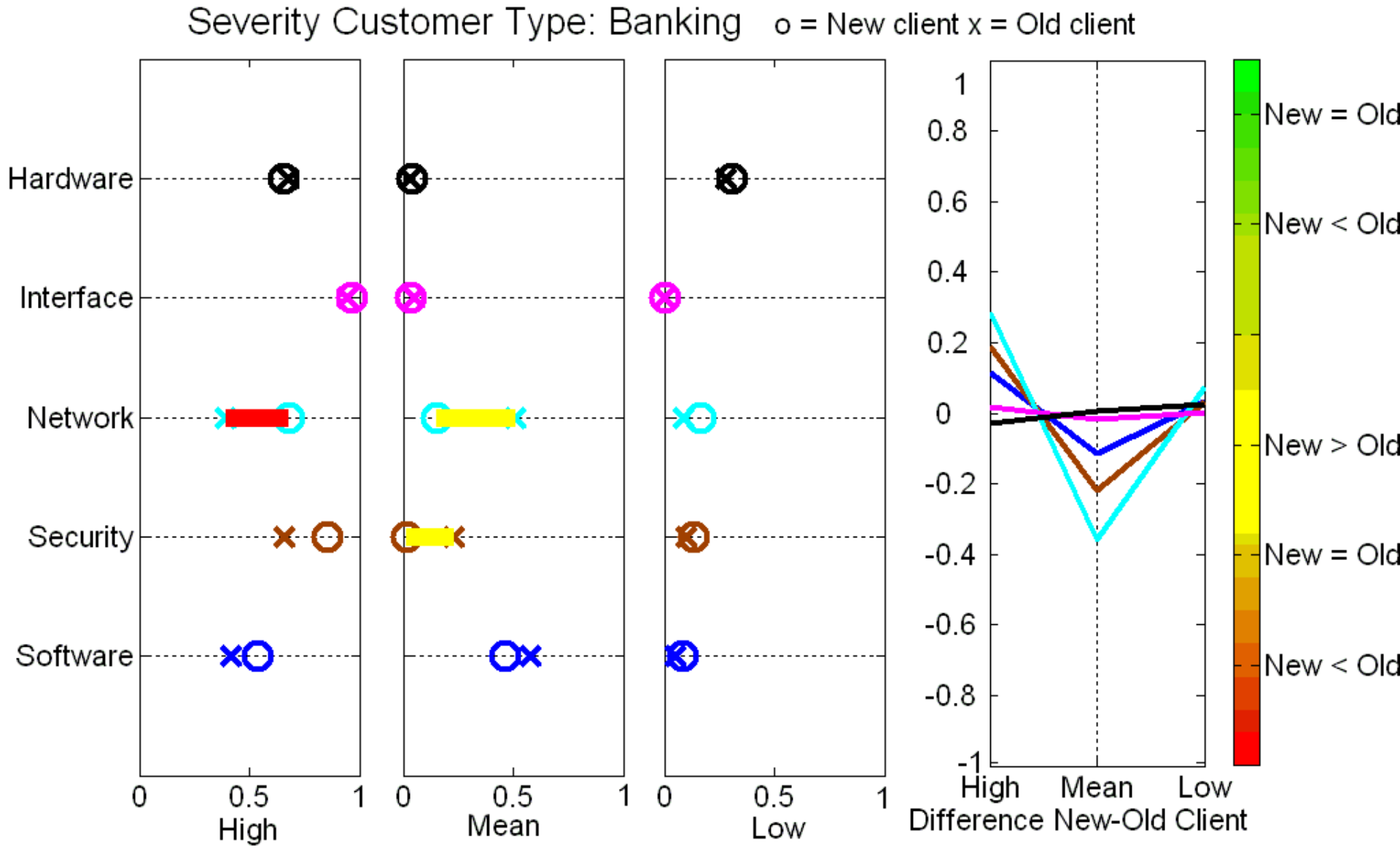
- class of customer: Health for hospital and similar, Banking for bank, Finance for credit institute etc.
- class of new client within the categories of customer;
- PBX interruption date;
- class of problems that lead to an interruption: Hardware, Software, Interface, Security, Network;
- severity (categorized in three levels) that describe magnitude of interruption related to problem and customer;
- other information related to the clients as number of smart phone, number of lines, etc.

Classical approach

- Problem: to compare clients and to decide to accept new client.
- Left: old client, right: new client.
- Matrix of histograms and numbers that it is difficult to read and analyze.
- We propose an information visualization approach.



New approach



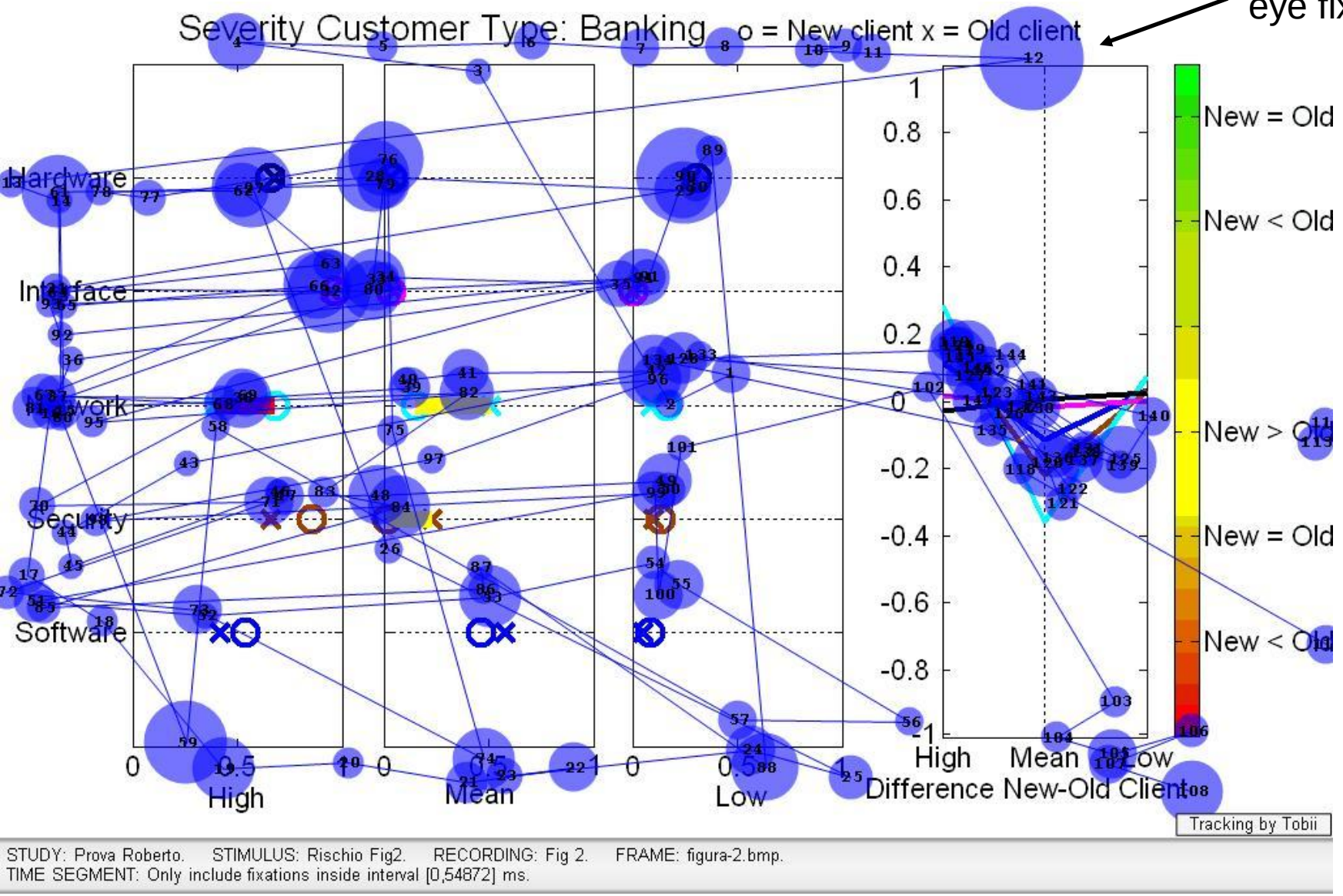
Advantages of new approach

- This kind of visualization deals with high dimensional number of feature.
- Each observation is represented by sequence of its coordinate values plotted against their coordinate indices.
- The color of each line is related to color corresponding to one information on the row of other sub-plots.
- In this way it is possible to describe the trend of values corresponding to difference between New_client and Old_client.

Usability design

- When a risk manager reviews a graph, he or she will perform a sequence of perceptual and cognitive operations.
- A graph designer should select the graph and arrangement of information to reduce the number of operations performed and reducing the errors in judgment and in the time needed to perform the task.
- As eye tracker we use the Tobii 1750 which integrates camera and infrared lighting into a monitor.

Eye movements



Usability discussion

- Question regards: yes or no about acquisition of the new client. There are no wrong answers.
- Test on:
  - time taken to answer the question;
  - error rate for the question;
  - number of fixations;
  - average total fixation duration;
  - scan path length for the duration;
  - participants' rating of graph usability.
- Rating of graph usability on [1,4] where 1 denotes low rating and 4 denotes high rating, average: 3.

Conclusions

- We have proposed and illustrated a new visual paradigm for decision making about operational risk management.
- Other details on paper.
- Open questions: how to measure the usability of information visualization?

Thank you.