NAME: DIVYA KONANKI

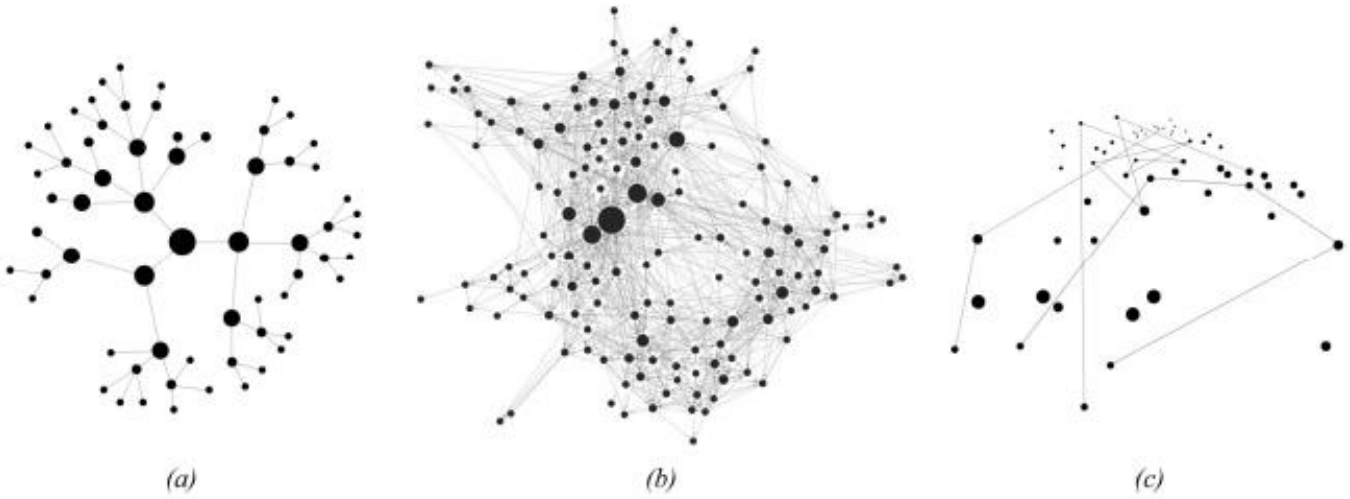
MODELS FOR VISUALISATION OF COMPLEX INFORMATION SYSTEMS

INTRODUCTION:

The paper, "Models for Visualisation of Complex Information Systems," by David Bihanic and Thomas Polacsek, addresses the challenges posed by the increasing complexity of Information Systems (IS). The authors advocate for a new data representation-visualization approach based on generative visualization. By integrating advances in graphical user interfaces and interaction techniques, the paper aims to demonstrate the benefits of creating views for existing models in modeling languages like UML (Unified Modeling Language).

COMPLEX SYSTEMS:

Complex systems as those composed of numerous heterogeneous entities with local interactions, leading to multiple levels of collective structure and organization. These systems exhibit properties such as heterogeneity, flow processing, size, hierarchical organization, and evolution. The paper emphasizes that understanding data relationships and visualizing system logic has become increasingly complex, necessitating specific views adapted to different contexts.



Three major families of representation (a) trees (b) maps (c) landscapes

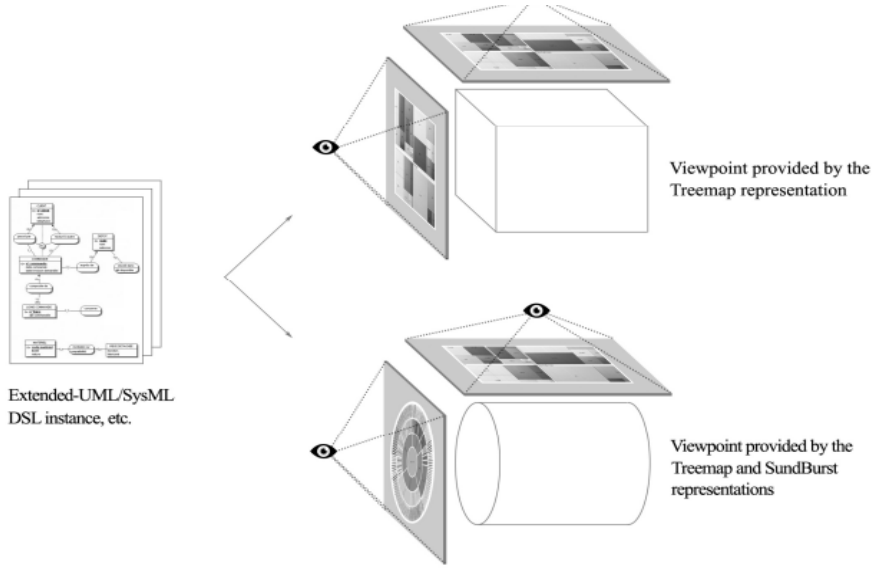
COMPLEX DATA VISUALIZATION:

A. Visual representation of complexity

The paper traces the evolution of information visualization over the last thirty years, from a tool for scientific use to a means of handling raw data sets and perceiving phenomena. The authors introduce the concept of InfoVis, emphasizing its role in amplifying cognition. Three major families of representation—trees, maps, and landscapes—are explored, each offering unique perspectives on the structural and semantic complexity of data.

B. Information visualization: trees, maps, and landscapes

There are three major families of representation, detailing how trees provide hierarchical views, maps offer reticular representations, and landscapes provide multiscale representations of planar shapes. Examples include Treemaps, Cone-Trees, Cam-Trees, and Hyperbolic Trees. The paper highlights the importance of user perception and the relationship between representation techniques and the fluent use of visualizations.



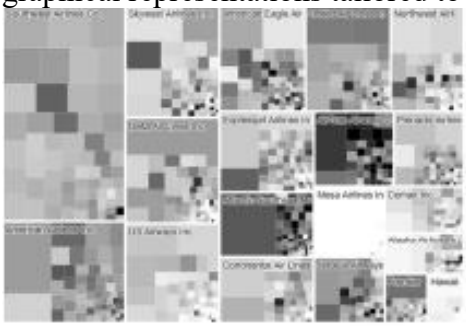
IS: transformation from model to visualization

COMPLEX IS: CUSTOMIZED VISUALIZATION

The paper proposes a customized visualization approach for IS, focusing on providing users quick access to relevant data. It introduces the concept of predefined representation based on user needs and dynamic contextual views. The authors emphasize the importance of defining generic operators to restructure IS visualization according to user requirements and context.

A. From model to predefined representation

The paper discusses the creation of predefined representations from IS models, necessitating the addition of semantic information to existing model notations. They stress the importance of evolving from IS models to graphical representations tailored to user needs.

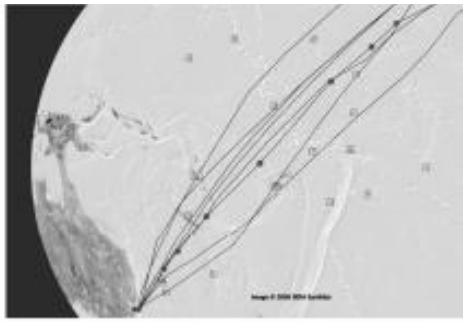


(d) Airline Treemap

Airline and airport traffic and delays
Creds: JuiceKit™

(e) Air traffic network

The paths of air traffic (US) visualized in color and form
Creds: A. Koblin



(f) Flight tracker data landscape

Tracking maps/status and airport delays for airline
Creds: S. D. Jackman

B. From predefined representation to visualization

The paper explores the transition from predefined representations to dynamic visualizations. It suggests moving from fixed representations to dynamically generated views based on contextual information, user profiles, and hardware settings.

A VISUAL UNIFIED MODELING LANGUAGE (VSML)

A Visual Semantic Unified Modeling Language (VSML) as a framework for transforming IS models into representation-visualization models. VSML relies on semantically coherent visual/graphical codifications and event-driven graphics. The paper discusses how VSML incorporates user profiles and semantic data structures to dynamically generate graphical representations.

CONCLUSION

In conclusion, the paper initiates a dialogue between computer design and model-driven engineering, emphasizing the need for dynamic representations in the face of complex data. It highlights the importance of adding semantic information to existing models for creating contextual views. The authors advocate for adopting VSML as a tool for transforming IS models into representation-visualization models.

Learnings

After reading the paper "Models for Visualization of Complex Information Systems" by Bihanic and Polacsek, I've learned some important things. It's about the growing complexity of information systems and suggests using dynamic representations to tackle this challenge. There are three ways to represent data—trees, maps, and landscapes help us understand the complicated structures and meanings in data. The idea of customized visualization, where views can change based on user needs, is highlighted as practical. The introduction of the Visual Semantic Unified Modeling Language (VSML) is a key point, offering a way to transform information system models into visual representations that adapt to changes. This paper made me realize the importance of balancing static and changing views in understanding complex information systems, and it emphasizes how semantics plays a crucial role in improving data representation. The suggestion to adopt VSML as a tool for today's needs and future developments stands out as a forward-thinking approach in the field of information system visualization.

Research paper:
"Models for Visualisation of Complex Information Systems," by David Bihanic and Thomas Polacsek
Models for Visualisation of Complex Information Systems | IEEE Conference Publication | IEEE Xplore