DSOC: Decision Support for Organizational Change

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Fig. 1. In the Clouds: Vancouver from Cypress Mountain. Note that the teaser may not be wider than the abstract block.

Abstract— Our abstract goes here.

Index Terms—Organizational change, decision-making, information visualization

1 Introduction

The idea of organizational change has started to shift over the past decade with the introduction of the gig economy and other non-traditional employment models. Historically a person would obtain a job after high school and university and stay with the same company until retirement. This has fundamentally changed where employees are commonly switching jobs every 2-3 years and some might be more contract workers then employees. This can stress an organization especially if the change is not well understood. Understanding the intricate interlocking contingencies between people in an organization can be difficult and changes to its social structure hard to understand. This paper looks to create a visualization tool to help an organization understand these changes and help decision makers minimize negative side-effects from the change. The visualization will support the other concept we want to introduce which is organizational change from the information flow perspective vice the traditional organization hierarchy. To understand how change will disrupt the flow of information through an organization you first have to model the flow. We have chosen to model the flow based on the email communications within an organization combined with social networking theory.

2 Background

3 Design

Our visualization came organically through a couple iterations and discussions with real world users. The original design was developed by the authors, this design was then presented to real world users interested in the topic. Based on their feedback adjustments were made to refine the design. After a second round a feedback from the users we showed it to academics who provided further feedback. This resulted in the final design presented in this paper.

3.1 Data

To achieve the goal of a visualization to communicate knowledge or discover new knowledge we first had to develop a problem set to create a visualization for. Our colleague Brad Mazurek came up with the original idea to understand the impact of information flow through an organization when the organization changes. This resulted in a number of discussions to determine how to model information flow and visualize the impact to any changes within the flow. The result of this discussion was using email and associated SMTP information as a representation of information flow within an organization. Traditional organization structure is captured within an organizational chart, however these charts tend to be outdated quickly and do not represent the true flow of information or value of an individual employee.

The initial value model is based on a primitive concept of each email representing a value of 1. This results in the generation of a node, representing a person, and an edge representing a single email between 2 people with a weight of 1. Using SMTP header information this was easy to model in a database. Alternative value models are discussed in section 5 under future work.

To demonstrate our value model we chose the popular Enron email data set. This data set was originally made public during the Federal Energy Regulatory Commission investigation. It contains the emails of approximately 150 users in the Eron organization. Most of these users are senior managers. This particular data set has been studied a number of times primarily with a focus in social networking and natural language processing. This paper will use this data set to illustrate our visualization to support the flow of information through an organization.

In addition to the email boxes of users we also required an organizational chart to represent what the organization thinks is the structure of the employees. Unfortunately, during our research we were unable to obtain an organizational chart. This is a well documented

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problem with the data set which has limited research against it for lack of undisputable verification. Since our research is primarily focused on the visualization and not the under laying data we decided to use the organizational chart developed by A, B, C in the paper XYZ (https://event.cwi.nl/lsde/2015-2016/group5.pdf). Based on our research this is one of the more accurate examples to model the organization from a standard organizational structure vice a social networking structure.

3.2 Data Preparation

The Enron data set was obtained from Carniege Mellon University. It was processed using a Python script to parse all the SMTP header information from a given email. This was then stored in a MySQL database for further processing by the application. SMTP information was chosen since it contained all the information required to construct the nodes and edges within the graph.

4 Implementation

5 Evaluation and Discussion

5.1 Future Work

During the design and development of the visualization we discovered many areas to take the research. While presenting to the users and academics we found they were more focused on discussions of the value model vice the visualization.

The weight of each edge in the value model needs to be adjusted. For example this could include a new value based on whether the user is in the from, to, bcc, or cc field. It could also explore the content within the email through natural language processing to reduce the weight of trivial emails that do not contribute value to the business.

The current data is housed in a relational database which is not optimized for graph sets. To increase the performance of the application it might be better aligned with a noSQL type of database or other non-traditional RDBMS.

6 Conclusions