

Visual Analytics and Storytelling through Video

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ABSTRACT

This paper supplements a video clip submitted to the Video Track of IEEE Symposium on Information Visualization 2005. The original video submission applies a two-way storytelling approach to demonstrate the visual analytics capabilities of a new visualization technique. The paper presents our video production philosophy, describes the plot of the video, explains the rationale behind the plot, and finally, shares our production experiences with our readers.

CR Categories: I.6.9 [Visualization] – Information Visualization, Visualization Systems and Software, Visualization Techniques and Methodologies

Keywords: Visual Analytics, Storytelling, Graph Label Placement, Dynamic Animation, Graph Visualization, Information Visualization

1 INTRODUCTION

We describe our latest effort in applying two contemporary data analysis approaches—*visual analytics* [4][6] and *storytelling* [1][2][3]—to introduce a novel information visualization technique through video. This paper supplements a short video clip (with the same title) that was submitted to the Video Track of IEEE Symposium on Information Visualization 2005. The underlying visualization technique described in the video is created based on our previous work on “Dynamic Visualization of Graphs with Extended Labels” [7], which will be presented at the same symposium.

We argue that we can use a storytelling approach to better demonstrate the visual analytics capabilities and bring out the best of an otherwise static visualization technique. The video presents a carefully plotted story that attempts to integrate our messages on the underlying visualization design through a dramatic case of crime investigation. We would like to remind our readers that our video and its production philosophy are the primary topics of discussion here. While we briefly go through the new visualization technique in section 3, readers are referred to [7] for details.

2 RELATED WORK

Storytelling has been studied together with visualization [1][2] and computer graphics [3] for the last few years. The community so far has produced mostly theoretical results. The real impact of the field, i.e., to better communicate information between humans and computers, remains to be seen.

The term “visual analytics” has just begun to appear in literature [6]. The study of visual analytics has gained momentum after the establishment of the National Visualization and Analytics Center™ (NVAC™) [5] and the publication of its first panel report [4]. Visual analytics focuses primarily on the discourse between humans and their computers and less on visual

techniques and tool development.

Finally, [7] gives a fairly complete reference on the development of the underlying visualization technique shown in the video. The paper also provides a user-evaluation study that shows the strengths and weaknesses of the visualization approach.

3 VISUALIZATION OF GRAPHS WITH EXTENDED LABELS

The visualization technique introduced by the video is known as GreenArrow [7]. It is designed to visually analyze graphs with extended labels in both graph nodes and links. After a series of user evaluation studies, we have strong evidence that our design can at least reduce the visualization problem of graphs with extended labels.

GreenArrow is a prototype system that comprises a suite of interactive and animated tools designed to visualize a graph with extended node and/or link labels. Figure 1 is a snapshot of the visualization technique shown in the video. Basically, the system draws link labels as the links. The label font is larger at the source node and shrinks gradually until it reaches the destination node. The tapered label also indicates the direction of the graph label. If a label is too short to fill the distance between the nodes, we repeat the label to fill the space. If a label is too long, we either truncate the label in static mode or animate the label in dynamic mode. In other words, the label itself becomes the representation of the edge.

4 VIDEO PRODUCTION

Presenting a new technology to the general public and asking them to “trust you because it works” has always been a daunting task. We have successfully presented the GreenArrow technology in an academic forum [7]. Now we attempt to use a video to deliver our new visualization approach to a broader public.

4.1 Philosophy and Approach

One obvious choice is to include audio to walk through the results already described in [7]. This one-way storytelling approach feeds our messages to our video audience. The audience, of course, has the choice of accepting or ignoring our words.

A more elegant approach is to give our audience a two-way storytelling experience that allows them to participate in the story and make a decision on whether the visualization technique is working as the story develops. The audience may not believe us at the beginning; however, the video’s plot lures them into participating in the human-computer discourse between the two crime investigators and their data. As the plot unfolds, the audience begins to identify with the characters and starts reasoning concurrently with them.

4.2 The Plot

The video’s plot follows the classic three-act form [3] that contains the acts of *complication*, *development*, and *resolution*. In our case, the complication starts when the mayor in the movie loses his iPod and the only evidence available is a key. As the story develops, the two investigators are disappointed because there are no effective visualization technologies to address their problem—that is, until they find the GreenArrow tool. The contrasting information that separates the good tool from the bad quietly enters the minds of the audience through continuous visual

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comparisons. Finally, in the resolution act, the good guys prevail. The audience carries away not only our messages but also the tacit knowledge that enriches the video’s story.

5 DISCUSSION

It has been a fruitful experience to study the role of video (or animation, in general) in the realm of visual analytics. While we have overcome many obstacles in producing the video, we have also encountered many unanswered questions. Here we share some of the issues and questions with our readers.

5.1 Shortcomings and Limitations

The fact that we are also the inventors of the underlying visualization technique makes it difficult for us to target the video to both technical and general audiences. The time requirement of the Video Track also plays a major factor in our production. After all, it has never been easy to tell an exciting story in five minutes.

5.2 Questions

We have implemented one storytelling approach using one visualization technique in our video. More work needs to be done to evaluate our basic approach with other approaches. The main thing we want to discover is whether it is acceptable to use the types of characters in our video to tell a story and promote its credibility. Are we taking a risk, or are we breaking new ground for storytelling at this venue?

6 CONCLUSIONS

Both the fields of visual analytics and storytelling used in our context are young and the growth opportunities are abundant. We have produced an experimental video to test the ground before taking the next step. We understand that there are too many unknowns and uncertainties on our pathway. By showing our

video to the community, we hope to receive guidance and inspiration to further our quest on the topic.

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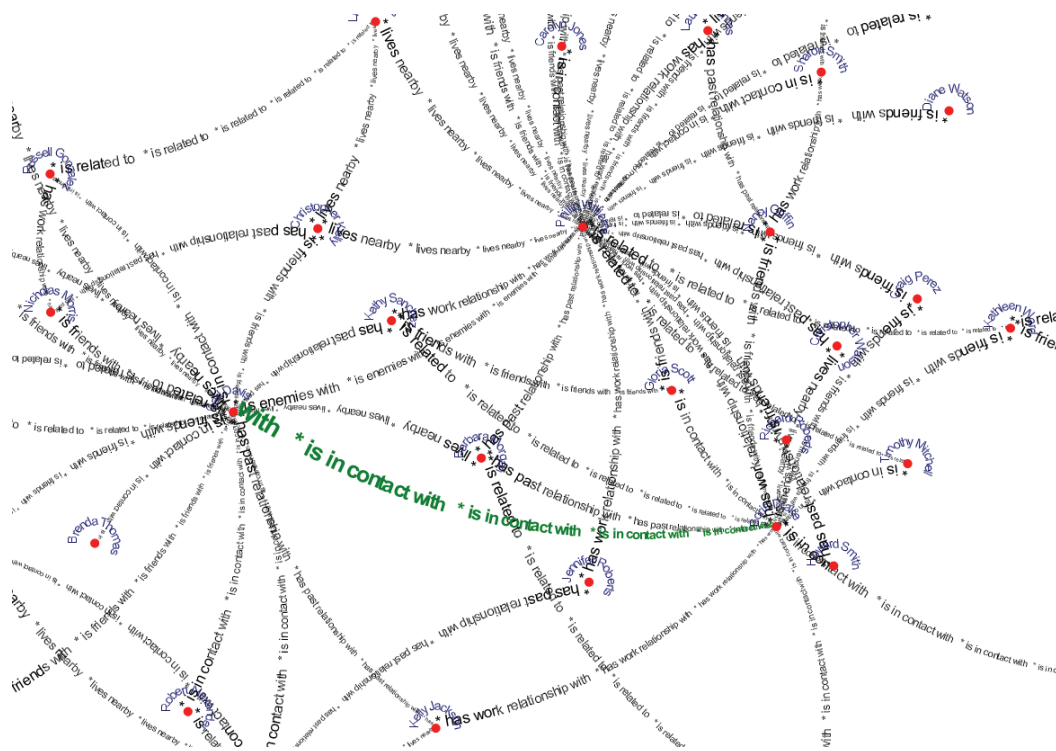


Figure 1: A screen snapshot of the GreenArrow visualization used in the video.