A Visual Investigation of the Kronos Incident

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ABSTRACT
This is the abstract.

It consists of two paragraphs.

1. INTRODUCTION
The fictitious Kronos Incident saw the disappearance of several employees from the Tethys-based GASTech in January 2014 after a successful initial public offering (IPO) of the company. Given that GASTech has not been very environmentally friendly in its operations of a natural gas production site in the island country of Kronos, it was suspected that a Kronos-based organisation (POK) is involved in the disappearance of the employees, as a form of retaliation. In order to have a better idea on what exactly transpired to lead to the vanishing of the GASTech employees, we will be applying visual analytical techniques on the datasets provided.

This study will be handling visualisations on newspaper articles, employee records and emails, call center reports and microblog tweets before structuring them into an interactive web application. Users can then investigate the application and understand more about GASTech's reputation. Furthermore, one can navigate around the app to find out how certain events unfolded on the incident day itself.

2. MOTIVATION AND OBJECTIVES
The motivation behind this study is to look into analytical techniques to visualise large chunks of text data effectively using R Studio. By doing so, we are able to better understand the relationships among people and organisations of importance, as well as see how multiple events of high consequences unfolded in Abila on the incident day.

This interactive Shiny app aims to provide information on:

1. Media portrayal of GASTech over the years
2. Relationships among GASTech, POK, the APA and Government
3. Meaningful event reports during the incident day
4. Risks identified during the incident day and their corresponding locations

3. REVIEW AND CRITICS OF PAST WORKS
This study is based on the VAST Challenge 2021, which in turn is adapted from a similar VAST Challenge in 2014. Literature review is conducted on the previous VAST Challenge 2014 submissions to look at the analytical techniques used to solve the challenge back then, even though the exact questions were slightly different. While useful, some of the techniques adopted have certain areas that can be further improved.

3.1 Text Visualisations
A study conducted by Peking University (2014) on Mini Challenge 1 presented their text analysis in a form of a timeline to showcase different events occurring between January 20 – 21. Articles in the form of text boxes were layered over the timeline for comparison. While it showcased all the news reporting of different events occurring over the two-day time period, it might be difficult for a user to interpret the main concepts of those articles. Hence, a better alternative might be to utilise a word cloud function to pull out key words of the articles for view and interpretation. In addition, interactive comparisons of different newsgroups can also be performed, giving the user flexibility to choose the newsgroups they are interested in to view and evaluate.

While word clouds are generally useful in identifying topic content for a broad overview as shown in the study performed by Tianjing University (2014) on Mini Challenge 3, their results might be less consistent and harder to make sense of due to the presence of spam data. Hence, to be able to distinguish important events from typical chatter, TF-IDF would be a better statistical tool to use.

3.2 Network Graphs
Network graphs are a good visualisation tool to establish the relationships between different parties of interest. By and large, network graphs would be densely populated with nodes and edges if there are numerous parties involved. Yet, this brings about an issue of overcrowding and overlaps of texts, making the entire visualisation looks cluttered, as seen in Fig. x.

One way to overcome this issue of cluttering will be to divide the network graph into sub graphs. When the graph is divided, the density of the visualisation will be reduced, with the readability enhanced.

3.3 Geospatial maps

Static geospatial maps tends to show many different points of interests, which might overload the user with content. Hence, to enhance the use of geospatial maps, we intend to include in the interactivity function so as to allow users to click and explore different points as desired.

4. DESIGN FRAMEWORK

This application makes use of the open-source R language to conduct visual analysis. The application design considerations are as follows:

- Utilise standard R packages to create reproducible text and visual analysis
- Utilise the embedded Shiny Web Application in R to translate the codes into a webpage for users' ease of understanding
- Provides interactivity functions for users to navigate through the app to discover trends and insights

The design of the application will consists of five major tabs for navigation at the top panel. First, we will have an Introduction page to describe the main purpose of our application.

4.1 Data Used

4.2 Analytic Techniques used in Shiny App

4.2.1 Text Analysis

4.2.2 Network Graphs

4.2.3 Geospatial mapping

5. APPLICATION INSIGHTS

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6. CONCLUSION AND FUTURE WORK

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References

[1] Fenner, M. 2012. One-click science marketing. *Nature Materials*. 11, 4 (Mar. 2012), 261–263.

[2] Meier, R. 2012. *Professinal Android 4 Application Development*. John Wiley & Sons, Inc.