



Figure 3: Temporal Heatmap of the GPS activities

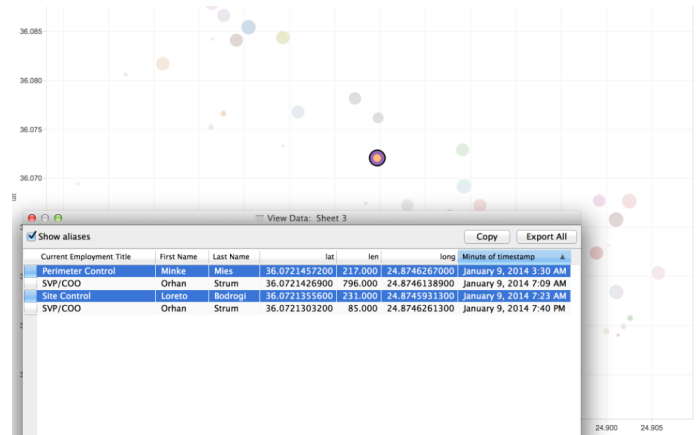


Figure 6: The scatter plot visualization about “Who” and “Where”

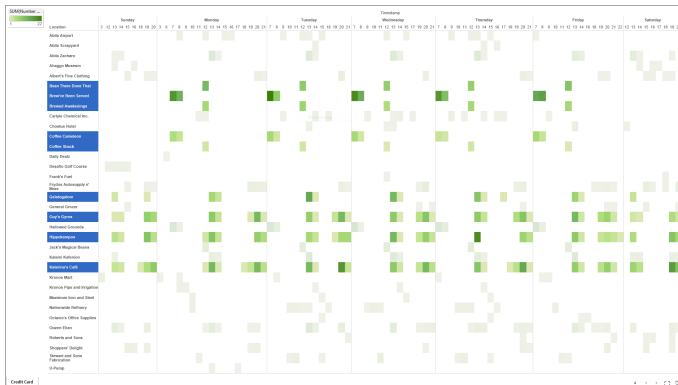


Figure 4: Temporal Heatmap of credit card transactions

2.2 Anomalies Detection

To further detect the hidden anomalies, we filter the GPS data by focusing on the employees’ activities off their work. By synthesizing the GPS data with car assignment records, as well as the map materials of Abila and Kronos, we want to relate the 3Ws: “Who”, “When” and “Where”.

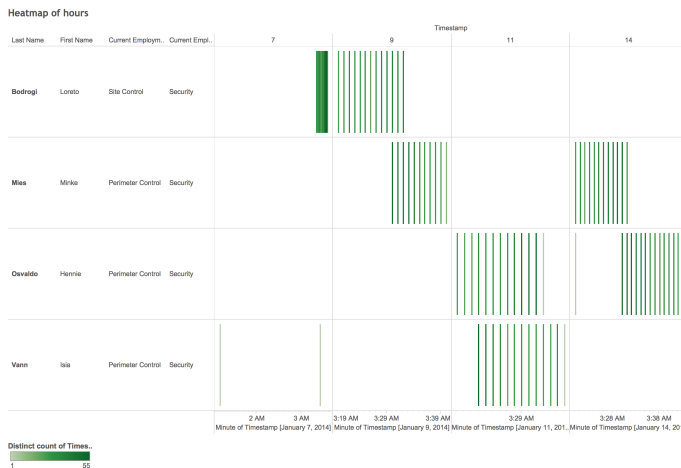


Figure 5: The time-line visualization about “Who” and “When”

Figure 5 describes the relationship of “Who” and “When”. Only four GASTech security staff have activities during 2am - 4am. Besides, this figure shows that every two staff have activities at the exact same time of each day’s midnight. Figure 6 demonstrates the connections between “Who” and “Where” on Jan 14, 2014 around 12pm. We find that two security staff and GASTech SVP/CFO appear at the same places. By foraging more details of their activities, we understand that these two security staff stayed near the GASTech SVP/CFO house in shifts. In all, we forage the related data based on 3Ws, and speculate that four GASTech security staff (Minke Mies, Loreto Bodrogi, Isia Vann and Hennie Osvaldo) carried out the surveillance on executives’ houses in pairs. These unusual events happened about Ada Campo-Corrente (SVP/CIO) on January 7th, Orhan Strum (SVP/COO) on January 9th, Willem Vasco-Pais (Environmental Safety Adviser) on January 11th, and Ingrid Barranco (SVP/CFO) on January 14th.

Our 3Ws’ foraging loop effectively synthesizes the relevant data for discovering the unexpected events, linking the evidences and assumptions based on the Tableau visualization and interaction.

3 CONCLUSION

This paper shows our analytical reasoning processes about GASTech employees’ daily routine based on the commercial visualization software Tableau. Our results show that we can effectively find the important patterns and anomalies by leveraging the existing tools. While our solution can not discover all possibilities, we demonstrate that combining sense making loop with existing softwares is an efficiently way for problem solving, especially the time-critical tasks.

ACKNOWLEDGEMENTS

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