DinoFun World Investigation

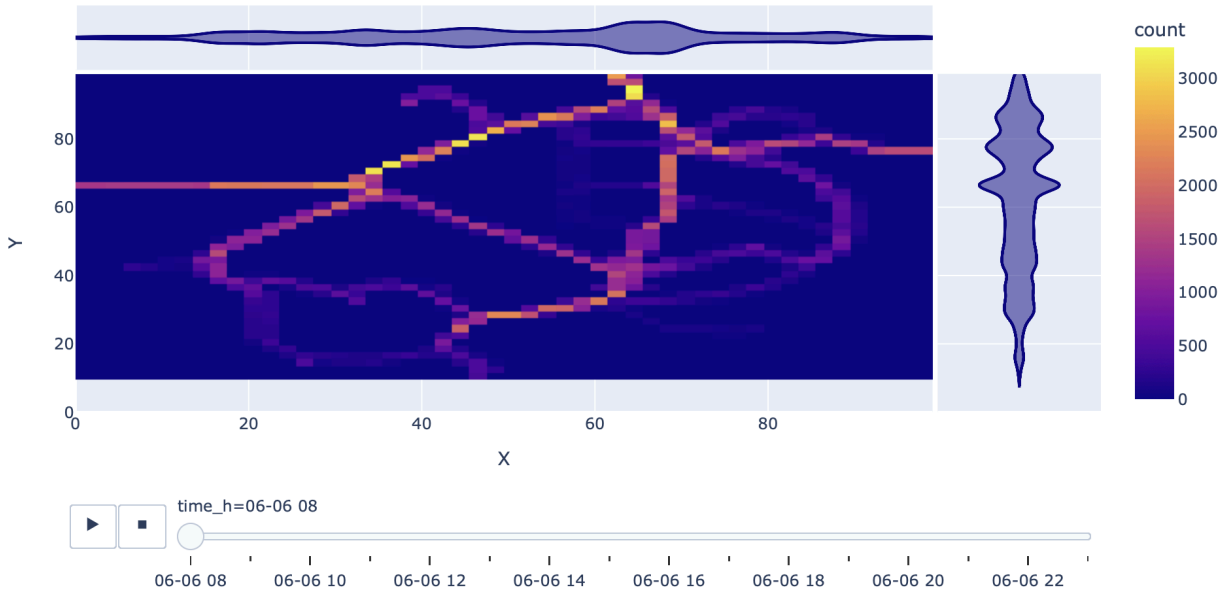
Linh - Robbie - Yijing - Yuzhang

Objectives

The objective of this analysis is to use multiple view visualizations to explore the movement and communication data of park visitors, uncover patterns in the crowd behavior, and identify potential suspects linked to the crime. We aim to offer a comprehensive view of visitor dynamics and key events over the course of the Scott Jones Weekend to highlight potential suspects and incidents of interest related to reported crime events by analyzing movement and communication of the visitors in the park during the weekend.

Findings

a. Movement Density over Time



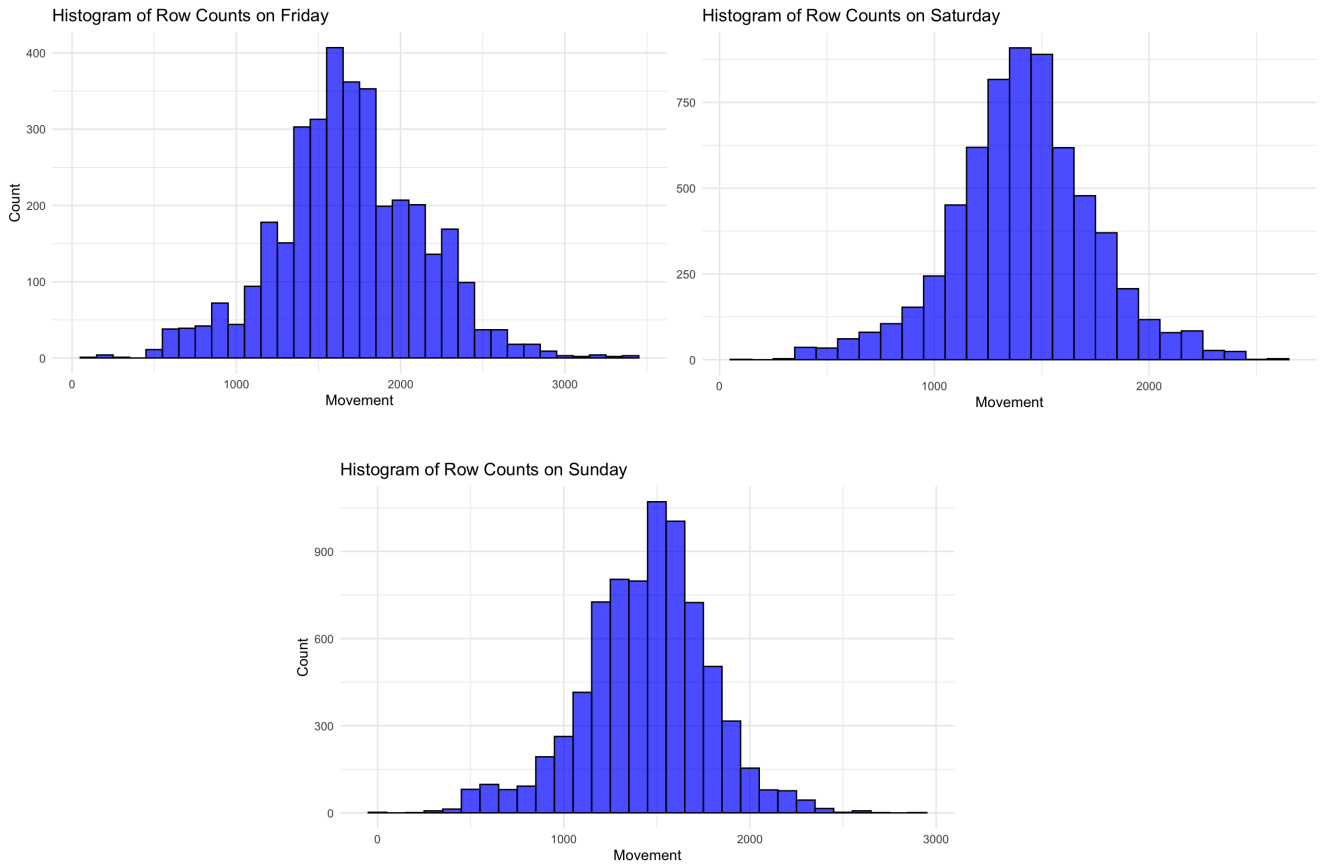
To understand overall visitor flow, we visualized movement density throughout the weekend. The heatmap below represents the park's coordinates on a 100 × 100 scale, distinguishing between check-ins and continuous movement data. The grid is color-coded by the frequency of occurrences at each coordinate at a given time—darker shades represent lower counts, while lighter shades indicate higher counts. A time slider lets us observe movement trends hour-by-hour. We also added violin plots on both x and y axes to provide coordinated multiple views for the visualization.

We observed that Sunday, June 8th recorded the highest visitor count, peaking at over 10,000 movements around 2 pm. Despite this, the daily movement patterns remained relatively consistent. In the mornings, visitors tended to visit Tundra Land and Wet Land in the top left corner of the park. By early afternoon, they gathered around the trails on the bottom right, likely heading toward the Grinosaurus Stage. In the evenings, there was a significant increase in movement data at the top of the park, indicating that visitors were leaving the park.

To refine these insights, we moved on to daily movement data, aiming to identify specific paths and visitor behaviors.

b. Movement Frequency & Tracking

Three histograms of total movement data across the three days indicated a normal distribution, with no significant outliers, suggesting typical park movement trends.

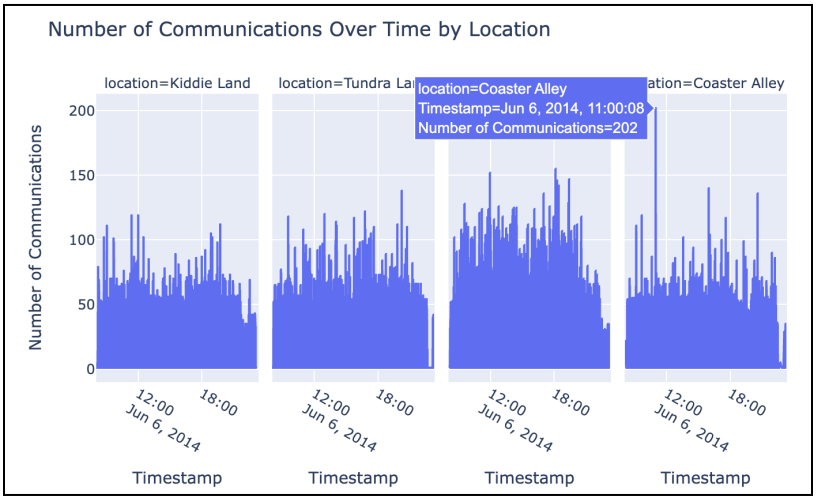


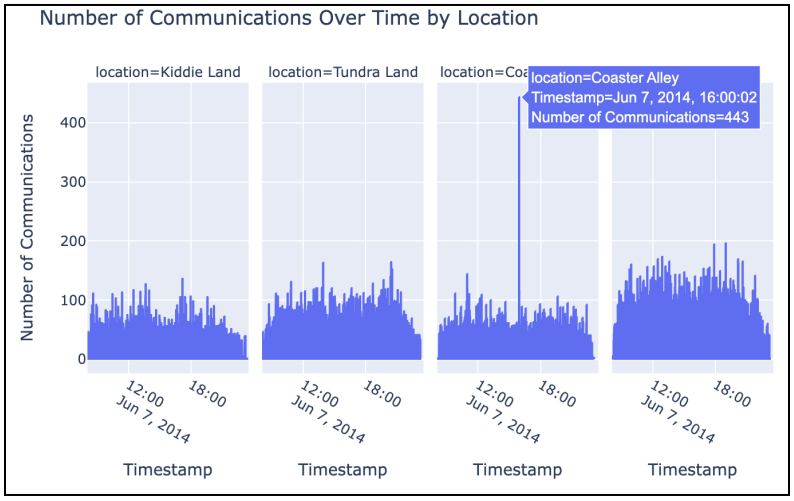
On Saturday, we tracked visitor paths from the entrance to visualize common routes and uncover any anomalies related to suspicious activity. Applying a 100x100 grid overlay, we mapped each visitor's movement path. People occupied all paths possible from the park. However, the number

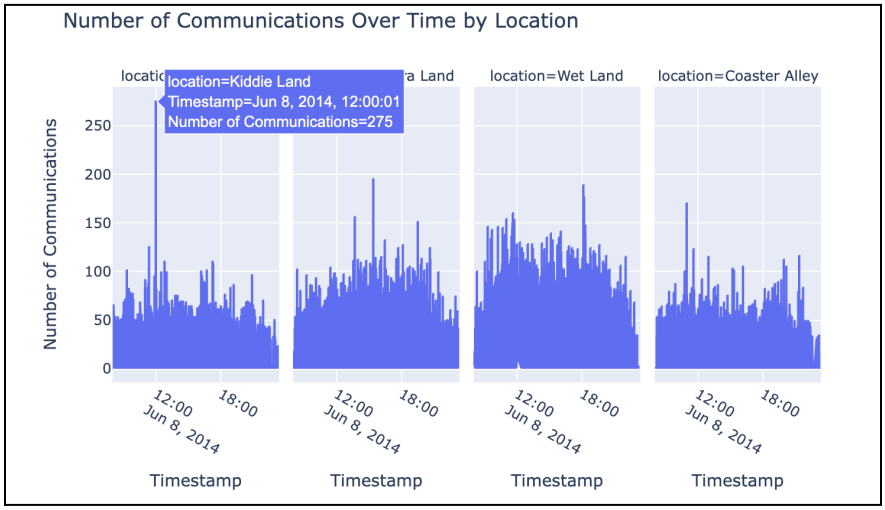
of people made the movement hardly readable. We revised this approach by making an animation for the movements in the park on Saturday. Looking at the movement, we did not see any place with abnormally heavy traffic for Saturday, and the flow of people out and into the park seems to be well-managed.

c. Communication Frequency

These three graphs show the number of communications by locations on Friday, Saturday and Sunday. We did not include Entry Corridor in our location selection because the communication data from Entry Corridor is too large and there is no huge difference of this location in the three days' data.







We detected three anomalies in the visualizations. Two of them happened in Coaster Alley at 11:00:08 on Friday and at 16:00:02 on Saturday. One of the anomalies happened in Kiddie Land at 12:00:01 on Sunday. The one on Saturday is the most notable one because the communication numbers reached 443 at that time which is the highest among three days.

Based on these observations, we initially hypothesized that these could be the timestamps at which the Scott Jones's shows took place. The sudden rise in communication could be the indicator that park visitors were notifying each other about a show that was about to happen in the park.

However, further investigation revealed a certain park visitor ID that exhibited communications abnormal in frequency on all 3 days of the show: **ID 1278894**. Surprisingly, we were unable to find any movement data corresponding to this person.

d. Communication Tracking

Once we are able to identify the movements of the suspect, this is what we have in mind to visualize their patterns in terms of both communicating and movements. This can reveal the exact actions and locations of the crime suspect over time and whether they work individually or in a team.

Conclusions

- We have so far assumed that the timestamps at which the 3 Scott Jones' shows most likely happened were Friday June 6th at 11:00, Saturday June 7th at 16:00, and Sunday June 8th at 12:00.
- We have also identified several suspicious park visitors who can be prime suspects of the incident: ID 1278894, ID 657863.

Next steps

While we were able to find some anomalies in the communication data, especially the strange communication pattern of ID 1278894, we could not find any movement tracking data that reveals substantial findings on the crime suspect. We request further movement data collection of this certain park visitor to establish a clearer understanding of their motives. We also found suspicious behaviors in the movement data of ID 657863, but could not find any communication tracking data that reveals substantial findings on the crime suspect. These may be just noise in the data, and we should look into other places to find more clues.