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CSC369: Intro to Distributed Computing

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**Week 4 Analysis – Why are the most painted pixels the most painted?**

The pixels at coordinates (0,0), (359,564), and (349,564) are hotspots with 98,807, 69,198, and 55,230 placements respectively.

My analysis began by compressing the dataset using Polars. I cleaned the timestamp strings (removing UTC and ensuring millisecond precision) and converted them into datetime objects. The dataset provided pixel placements along with user IDs and pixel colors. I then filtered data for the top three coordinates.

**Why 1: Why were these pixels placed so often?**

The three coordinates had significantly more placements than others. I found that this is because the pixels were targeted by a large community (162,547 unique users overall) including both casual and highly active users. A bar chart (Figure 1) displays the number of unique users per top coordinate.

A graph with blue bars

AI-generated content may be incorrect.

*Figure 1*: Bar chart that shows the number of unique users per top coordinate.

**Why 2: Why do both casual users and superusers contribute to the pixel placements at these coordinates?**

Although many users painted these pixels, there are a few superusers (e.g., user 10272996276027584121 with 102 placements on one pixel). The distribution of paint counts per user (detailed in the user\_counts table) indicates both spontaneous and more coordinated actions.

**Why 3: Why were these pixels specifically targeted by these users, and what motivations influenced this choice?**

(0,0) was painted most intensively during the night of April 4th and early morning of April 5th. A heatmap of placements over hourly intervals (Figure 2) clearly shows the peak during this time.

A purple and yellow gradient

AI-generated content may be incorrect.

*Figure 2*: Heatmap of placements over hourly intervals.

**Why 4: Why is the evening of April 4th such a popular time to be placing pixels at (0,0)?**

The event timeline confirms that the placements surged as the event was closing (from 12:44 pm on April 1 to 12:14 am on April 5). As the event neared its end, users raced to paint pixels to secure their design.

**Why 5: Why does (0,0) get painted so much at the end of the event? Was there a color battle?**

Color analysis reveals that white was repeatedly placed at (0,0) 27,830 times between 11 pm on 2022-04-04 and 1 am on 2022-04-05. There was not a color battle, but instead, multiple users were placing white at (0,0). We can assume multiple users were placing these pixels because users were limited on how often they can place pixels, and it would be impossible for one user to place white 27,830 times in that timeframe.