

Team Brown

Assignment 3 – Video Presentation Checkpoint

Team Members :

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Introduction

- This project intends to create a novel visualization that uses the temporal dimension to study the **traceability** of the released software features and app reviews.
- We leverage data from App reviews and Released features datasets to analyze user reactions to feature changes and detect software evolution patterns.
- Team went through different published papers and took few inspirations from them.

Type of Data

- Our Datasets include feature releases and app reviews for the following during the period of 2022 – 2024 :

1. Zoom

- The type of Data here we are going to work is **traceability between features and app reviews** to understand how updates impacts user feedback.

Temporal Aspects in Data

- Temporal aspect in data refers to the time-related characteristics of the data.
- Here, Feature releases and app reviews which consists of timestamps allowing us to track feature adoption trends over the time, surge in user feedback after updates and long-term sentimental analysis.

Literature Survey and Insights

Paper 1 :Analyzing and Visualizing Emotional Reactions Expressed by Emojis in Location-Based Social Media

- **Authors:** Eva Hauthal, Dirk Burghardt, and Alexander Dunkel
- **Venue:** ISPRS International Journal of Geo-Information, 2019
- **Paper Link:** <https://www.researchgate.net/publication/331434359>
- **Visualization Technique:** Emoji sentiment classification using geospatial and temporal mapping; bar charts and timelines of emoji usage.
- **Why We Chose It:** Focuses on emotion detection through emojis over time and location, directly aligned with our use of emoji sentiment in app reviews.
- **What Inspired Us Most:** Their strategy to map emotion types and intensity using emoji frequency and co-occurrence. Their framework will guide our design choices in representing complex sentiment data.
- **Our Takeaway:** We are ready to adapt this idea into our emoji-sentiment correlation heatmap and time-series emoji tracking.

Paper 2: Feature Transition Charts for Visualization of Cross-Project Scope Evolution in Large-Scale Requirements Engineering for Product.

- **Authors:** Krzysztof Wnuk, Björn Regnell, Lena Karlsson
- **Venue:** International Workshop on Requirements Engineering Visualization (REV), 2009
- **Paper Link:** <https://doi.ieeecomputersociety.org/10.1109/REV.2009.2>
- **Visualization Technique:** Feature transition charts to track changes and dependencies across time
- **Why We Chose It:** Closely matches our goal of showing how features evolve over time and impact feedback
- **What Inspired Us Most:** Their method of tracking scope evolution using timeline-based transitions
- **Our Takeaway:** We'll use similar timeline-based trend charts to show feature introduction and its review patterns.

Paper 3: The Perceptual Proxies of Visual Comparison

- **Authors:** Nicole Jardine, Brian D. Ondov, Niklas Elmqvist, Steven Franconeri
- **Venue:** IEEE Transactions on Visualization and Computer Graphics (TVCG), 2019
- **Paper Link:** <https://doi.ieeecomputersociety.org/10.1109/TVCG.2019.2934786>
- **Visualization Technique:** Comparative visualization guided by human perceptual biases (perceptual proxies)
- **Why We Chose It:** Helps guide our design toward user-friendly comparisons between features and reviews
- **What Inspired Us Most:** The insight that users rely on perceptual shortcuts when comparing visuals
- **Our Takeaway:** We'll design our correlation charts to align with perceptual proxies, making comparisons intuitive.

Paper 4: Orientation-Aware Pedestrian Attribute Recognition Based on Graph Convolution Network

- **Authors:** Wei-Qing Lu, Hai-Miao Hu, Jinzuo Yu, Yibo Zhou, Hanzi Wang, Bo Li
- **Venue:** IEEE Transactions on Multimedia (TMM)
- **Paper Link :** <https://doi.ieeecomputersociety.org/10.1109/ICMEW63481>
- **Visualization Technique:** Graph Convolutional Network (GCN) with temporal awareness for traceability
- **Why We Chose It:** Introduces graph-based modeling that relates entities over time
- **What Inspired Us Most:** Their use of GCN to model time-sensitive relationships between attributes
- **Our Takeaway:** We use their concept to design a feature-review network graph weighted by sentiment and time.

Paper 5: Visualization for Diagnostic Review of Copy Number Variants in Complex DNA Sequencing Data

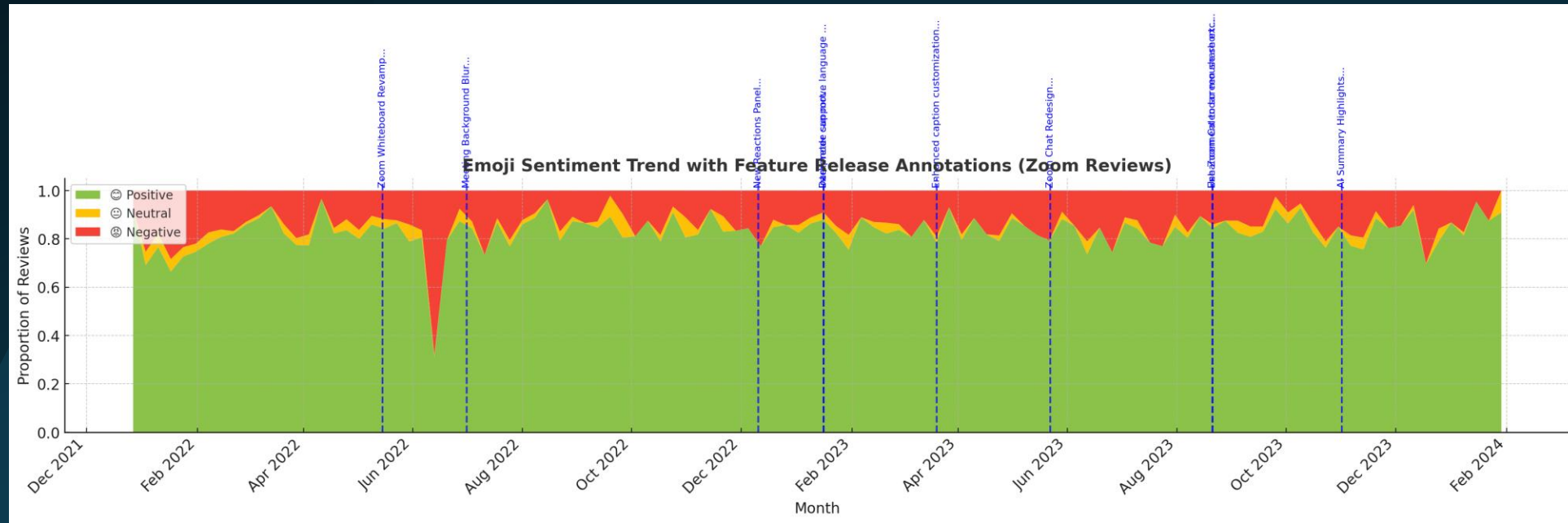
- **Authors:** Emilia Stahlbom, Claes Lundstrom, Jesper Molin, Anders Ynnerman
- **Venue:** IEEE Transactions on Visualization and Computer Graphics (TVCG), 2024
- **Paper Link:** <https://doi.ieeecomputersociety.org/10.1109/TVCG.2024.3385118>
- **Visualization Technique:** Clustered correlation matrices to reveal patterns in complex data relationships
- **Why We Chose It:** Demonstrates how visual clustering uncovers feature interactions and behavior patterns
- **What Inspired Us Most:** Their use of correlation matrices to discover latent relationships in data
- **Our Takeaway:** Aim is to use correlation matrix to explore how app features and reviews relate over time.

Visualization : Feature-Review Area Graph

- After reviewing key research papers on visualization and traceability, our team designed a novel, integrated visualization that captures both user emotion and feature impact over time.

This fusion of data allows for more than surface-level trends; it empowers product teams to:

- Detect which feature rollouts sparked delight or disappointment
- Spot recurring patterns in user sentiment tied to specific feature types (e.g., UI updates vs. performance fixes)
- Take action early when releases cause negative spikes, or double down on features that drive consistently positive feedback
- By aligning human-centered emotional data with system-driven updates, our solution offers a visual feedback loop — turning unstructured review data into insightful, traceable signals for developers, UX designers, and decision-makers.



Unlike conventional charts that treat sentiment or features separately, our approach overlays both in a unified time-series view — offering a traceability bridge between feature releases and real-world user reactions.

This design not only shows when features were launched, but also how they affected user sentiment in the form of emojis, giving stakeholders an intuitive and evidence-backed method to evaluate release outcomes.

In short, this visualization bridges the "what" (features released) and the "how" (users felt about them) — in real time, over months of product evolution.

Why is this Visualization Novel ?



1. "Bridging Features and Feedback: Why Our Visualization Novel"

- Insight-Driven Understanding:

Our visualization enables teams to identify which features impact user sentiment most significantly — whether positively (😊) or negatively (😡).

It helps detect emotional spikes in real time, signaling features or updates that require immediate review or investigation.

- Temporal Traceability in Action:

By aligning emoji-based sentiment with feature release timelines, we deliver a unique view that ties user experience directly to product changes.

This allows developers and product managers to trace emotional reactions back to specific system behaviors.

Why is this Visualization Novel ?

2. "A Unified and Scalable Approach to Product Insight"

- One Display, Multiple Dimensions:

Our chart combines weekly sentiment proportions, emoji-based emotional markers, and annotated feature events — all within a single, readable display.

This multidimensional integration supports faster decision-making across product, UX, and QA teams.

- Scalable Across Product Lines:

The approach is applicable to any platform with timestamped reviews and feature logs — Zoom, Firefox, Webex, etc.

It is domain-independent, flexible, and efficient for handling large-scale temporal datasets.

Who Benefits from This Visualization? (Usefulness)

- **Primary Stakeholder:** Product Managers at Zoom.
- Product managers are responsible for **understanding user feedback, monitoring satisfaction**, and making **decisions about new or existing features**.
- They need to know **how users emotionally respond to new feature launches**—but going through thousands of reviews manually is slow and difficult.
- Our visualization gives them a **clear, time-aligned view of user sentiment**, using emojis as emotional signals.
- With this dashboard, they can:
 - **Track emotional reactions** (positive, neutral, negative) over time.
 - **Link spikes or drops in sentiment** to the release of specific features.
 - **Make faster, evidence-based product decisions**.

Why This Visualization is Important for Product Managers?

- **Quick Issue Detection:**
 - Identify **when and why** user satisfaction suddenly drops (e.g., bugs, poor UX).
- **Feature Validation:**
 - See which feature rollouts led to **positive emotional feedback**, so they can replicate success.
- **Prioritization Made Easier:**
 - Use emotional patterns to **decide what to fix, improve, or promote** in future releases.
- **No Guesswork:**
 - Managers don't need to interpret complex charts — this area chart is **visually intuitive** and shows **real-time user mood** at a glance.
- **Saves Time & Adds Insight:**
 - Instead of reading endless reviews, teams get a **compressed, emotional timeline** that tells a complete story.

Teamwork Management

Data Cleaning

- **Team Members** – Shraya Bejgum & Jagan Mohan
- Collected and pre-processed Zoom, Webex, and Firefox datasets
- Handled missing data, extracted emojis, and standardized date formats

Exploratory Data Analysis (EDA)

- **Team Members** - Lekha Reddy, Pranathi Induri & Tharun Medam
- Visualized trends in reviews, emoji usage, and ratings
- Used Matplotlib and Seaborn to generate exploratory insights

Teamwork Management

Sentiment Analysis

- **Team Members** – Ramakrishna & Naga Prem Sai
- Implemented sentimental scoring using ROBERTA for better accuracy.
- Build custom emoji polarity logic for nuanced emotion detection.

Dashboard Development

- **Team Members** – Shashidhar Reddy & Akash Nallagonda
- Build the interactive visualization Dashboard
- Integrated Plotly and Matplotlib to show sentiment overtime

Teamwork Management

Timeline and Area Graph

- **Team Members** – Saketh Reddy & Deepak Reddy
- Designed and implemented the **feature–review traceability timeline** by overlaying **Zoom feature releases** with **weekly emoji sentiment trends**.
- Helped translate research insights into **visual encoding strategies** that support both **trend analysis** and **developer actionability**.

Presentation & Video Compilation

- **Team Members** – Sahastra Vadde & Sindhura Patel
- Coordinated script development and voice-overs
- Compiled the 10-minute video presentation for submission

Conclusion and Future Work

Conclusion:

- In this project, we developed a comprehensive Feature–Review Correlation Visualization that overlays Zoom’s feature releases with user-generated emoji sentiment across time.
- This chart integrates temporal traceability, emotional feedback, and release-level annotation — creating a consolidated and scalable view of how product changes affect user response.

The visualization is:

- Compact: Encodes hundreds of data points in a single frame
- Actionable: Enables detection of sentiment shifts tied to specific updates
- Intuitive: Uses emoji-based emotional data that's easy to interpret for all stakeholders — from engineers to UX designers

Conclusion and Future Work

Future Work:

1. Expand Dataset Scope Include more platforms like Webex and Firefox to evaluate cross-product sentiment trends.
2. Enhance Sentiment Classification Integrate Natural Language Processing (NLP) to automatically classify reviews into positive, neutral, or negative categories beyond emojis.
3. Add Interactive Filters Enable dynamic filtering by: Feature category, Sentiment type, Time range, Review star ratings.
4. Implement Trend Alerts Trigger notifications or flags when the system detects sudden sentiment spikes — helping teams respond to user concerns in real time.

Thank You!

Thank you for your time. We're excited to complete and present our full prototype. Our final submission will include the complete link, peer evaluations, and implementation documentation.