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POSTS with NO RESPONSE: THE ISLAND of LONELINESS

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Abstract

Loneliness and isolation are eternal emotions in human beings. Technological advancements create ample avenues, like social medias, for individuals to articulate themselves and record emotions. However, the sense of loneliness has never vanished, as their expressions are easily buried in the digital stream. We analyze tweets that express loneliness during holiday seasons but receive few responses. By superimposing digital charts on physical models, we visualize these lonely posts and generate the island of loneliness. We aim to reveal the complexities of human emotions in the digital age and reflect on the interconnections between technology, solitude, and social communication.

Authors Keywords

Social Media; Loneliness; Physical Visualization; Data Visualization; Data Art.

VISAP'23, Pictorials and annotated portfolios.

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Loneliness is not on the mountain
but on the street, not within one
person but among many people.

——Kiyoshi Miki

Introduction

Social media platforms generate a constant flow of digital expressions, opinions, and emotions, forming a mass of data that constantly exists and continuously evolves. While much attention is often given to opinion leaders and posts that receive extensive responses [8], few works explore the unacknowledged expressions in this vast digital landscape.

These unresponsive posts, seemingly insignificant in their weight or impact, hold an intrinsic value as reflections of individuals' thoughts and emotions at specific moments. Like grains of sand sinking and settling at the bottom of the data sea, these posts form an unseen layer that merits our attention.

We explore these overlooked expressions, focusing on posts that convey feelings of loneliness. The absence of responses amplifies the sense of isolation, compelling us to shed light on these silent voices and highlighting their existence and significance. They record human loneliness and indicate its perpetual presence: even in a world where the Internet connects people and everything, individuals can still experience deep feelings of loneliness.

The loneliness experienced on social media is a complex phenomenon that has been studied [3,7]. This project aims to amplify the expression of loneliness in social media through visualization. We first collect social media posts that received no response, particularly during poignant periods like the Christmas and New Year holiday seasons. Through data-driven approaches, we extract underlying topics and unravel the emotional undercurrents embedded within each post. We try to comprehend the multifaceted nature of loneliness within social media, the digital and perpetual landscape.

Finally, we undertake the task of visually representing these unattended expressions. By creating a metaphorical island, we symbolically manifest the accumulation of these lonely "sands" in both the digital realm and the physical world. This visual representation serves as a testament to the enduring presence of these expressions and embodies the continuous nature of the data-driven landscape we inhabit.

In the vast mass of the data-centric world, this work strives to unveil the hidden narratives and untold stories within the expansive sea of data. By bringing attention to these neglected expressions and illuminating them through visualization, we aim to deepen the collective understanding of the intricate interplay among data, human emotions, and the ever-evolving fabric of our world.

Data Collection and Analysis

We choose Twitter, one of the most popular online social media platforms, as our data source. Twitter enables users to post tweets and receive responses such as reposts, comments, and likes.

We collect a vast dataset comprising 162,376,361 tweets during the Christmas and New Year holiday seasons between 2016 and 2019. The collection was achieved using a roughly 1% sample rate of the entire tweet stream.

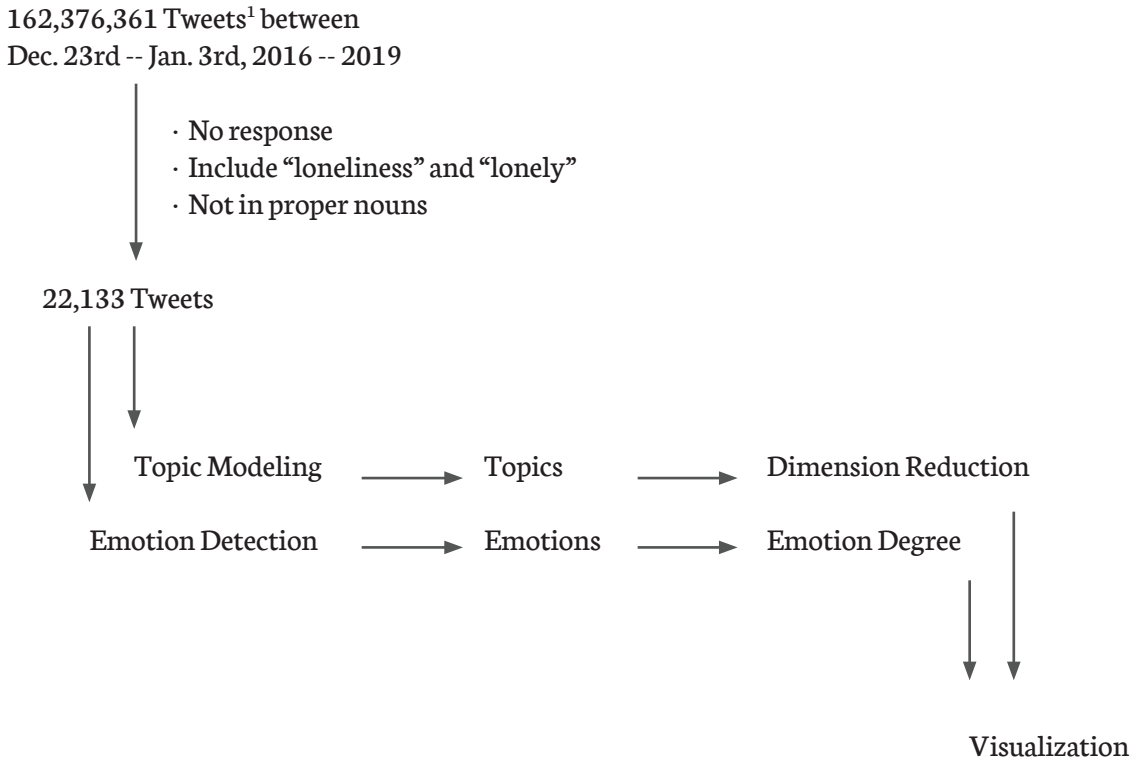
Upon analysis, we find that the majority of tweets receive no responses from others. This leads us to narrow the filter criteria to identify those lonely tweets that were left unnoticed.

Following the data processing methodologies utilized in previous studies [1, 4], we specifically select tweets containing keywords related to "lonely" or "loneliness". To avoid confounding factors, we exclude tweets where these words appear as proper nouns. As a result, our dataset consists of 22,133 tweets that capture the existence of loneliness.

To extract meaningful insights from the collected tweets, we employ a Latent Dirichlet Allocation (LDA) model [2,6] to extract meaningful insights from the different contents. In order to strike a balance between accuracy and efficiency, we adjust and finally set the number of topics as 20, ensuring a representation of the underlying themes within the dataset.

Additionally, we utilize an Emotion English DistilRoBERTa-base model [5] to detect the emotions conveyed in each tweet. This model provides us with a comprehensive understanding of the emotional nuances encapsulated within the tweet content.

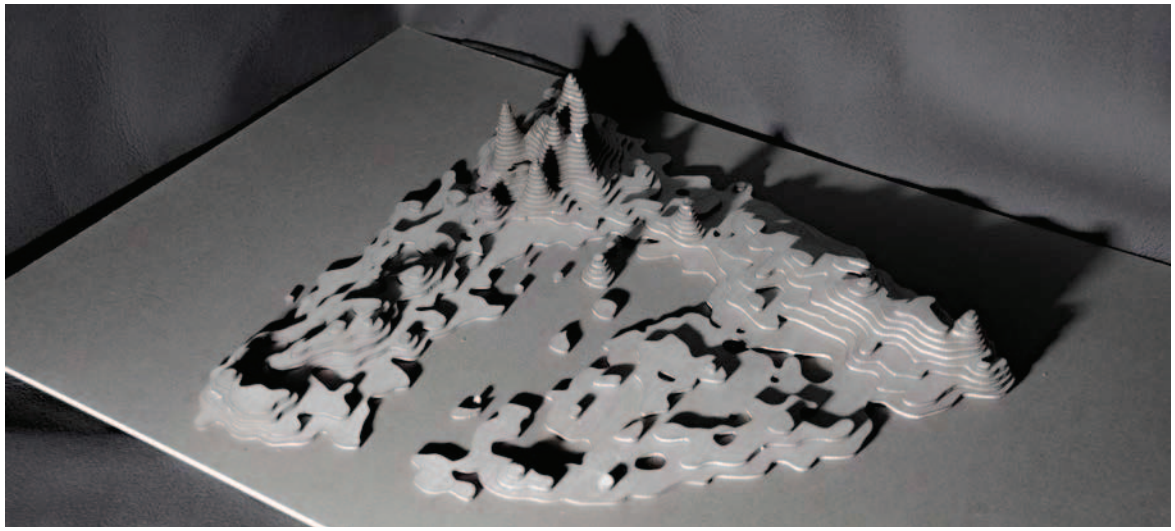
For each tweet, we utilize the LDA model [2, 6] and the emotion detection model [5] to generate a list of topics and a list of associated emotions, respectively. These lists include weights that indicate the relevance or significance of each topic and emotion to the tweet. Based on these multiple weights, we represent each tweet with a multi-dimensional vector. The vector plays a crucial role in our visualization process.

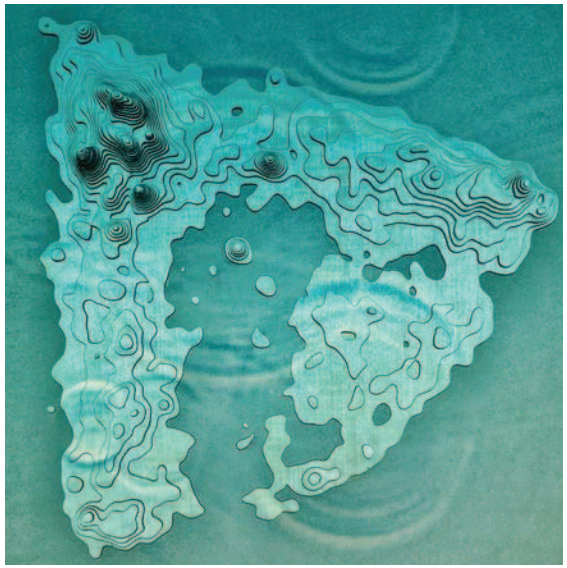


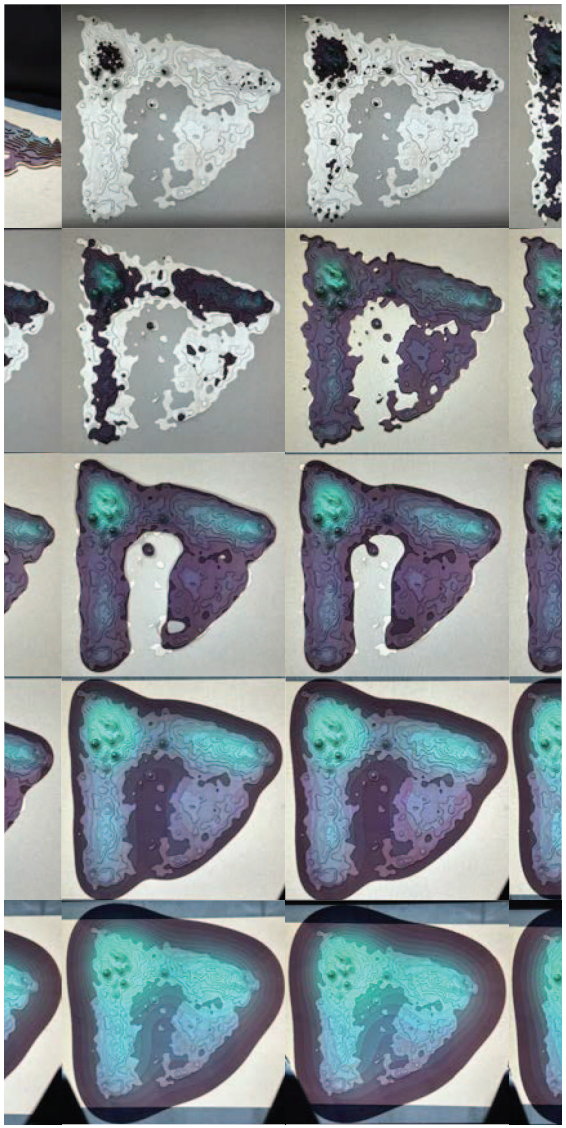
The workflow of data collection and analysis in this work.

[1] By Twitter Standard APIs v1.1: https://developer.twitter.com/en/docs/twitter-api/v1

Overview







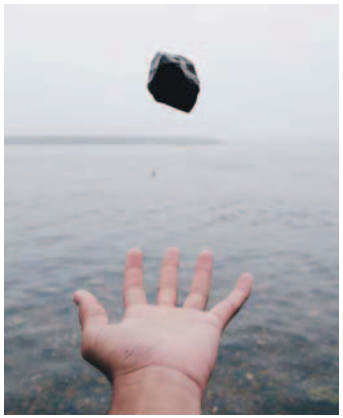
The physical model, projections of ripples and contours. The supplementary materials can be found in https://osf.io/3kt8d/.

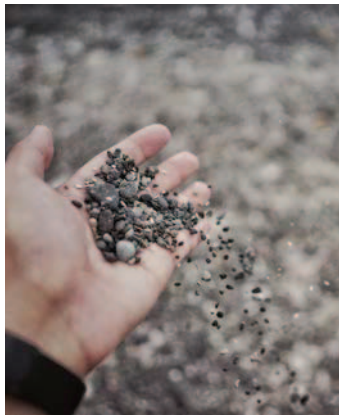
Metaphor

In the digital world, social media platforms can be likened to an expansive, boundless sea brimming with many semantic data. Individuals continuously contribute their emotions, feelings, and opinions to the torrential stream of information.

Each post acts as a metaphorical stone cast into the sea, with some carrying significant weight, size, or other captivating features that generate continuous ripples and water flowers, sparking mass responses within the crowd.

However, the majority of posts bear lightweight and unremarkable appearances, failing to generate any notable ripples or water flowers. These posts akin to grains of sand, simply sinking to the seabed. While they may temporarily resurface through topic resonance when certain keywords are searched, they primarily exist as unnoticed and unattended sedimentations of information.





People threw their thoughts and emotions to the data sea. <1> Some of them are big and weighty, <2> while some of them are small and unimpressive.

<3> Only a small number of stones make noises and generate continuous ripples.

<4> The majority of stones straightly sink into the bottom of the sea.

<1> Photo by Jerome Ru.
<2> Photo by PAN XIAOZHEN .
<3> Photo by Linus Nylund.
<4> Photo by Yannis Papanastasopoulos.
All above photos are on Unsplash (https://unsplash.com/).

Design Process

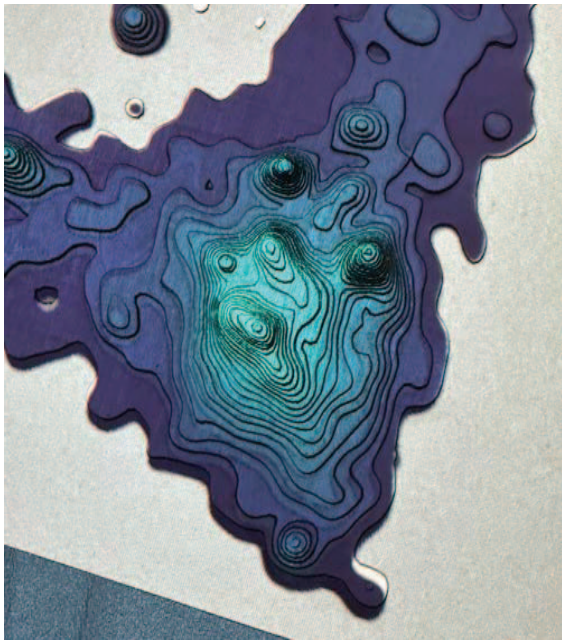
We first introduce the major elements of this project, namely **loneliness contour**, **emotion side view**, and **noisy ripples**, and then report the implication in both digital and physical versions.

Loneliness Contour

We gather the solitary sands to uncover the hidden island of loneliness based on the collected data. To intuitively convey the results of topic modeling analysis and visually align with the geographical island metaphor, we employ Isomap dimension reduction after testing commonly used non-linear dimensionality reduction methods.

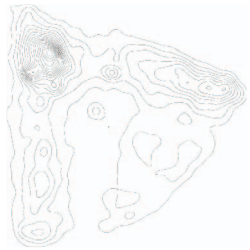
By reducing the vector dimensionality to two, we are able to render a scatter plot of all the tweets within an x-y space. The resulting 2D scatter plot is the basis of the island layout. In the scatter plot, each point represents a tweet, and the proximity of points indicates thematic similarity. More adjacent points (tweets) share closer thematic connections. Subsequently, we calculate the density of these tweets and utilize the density contour to delineate the shape of the island. This mapping provides valuable insights into the popular topics frequently mentioned within the realm of lonely tweets.

We simulate the accumulation process of the island through adjusting the bandwidth. In the projection, we utilize a sequential color scale (from dark blue to bright blue) to encode the height of the island.



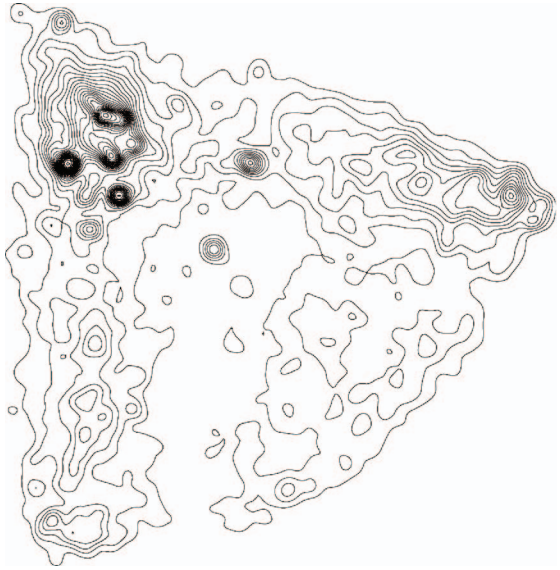
bandwidth = 1

bandwidth = 6

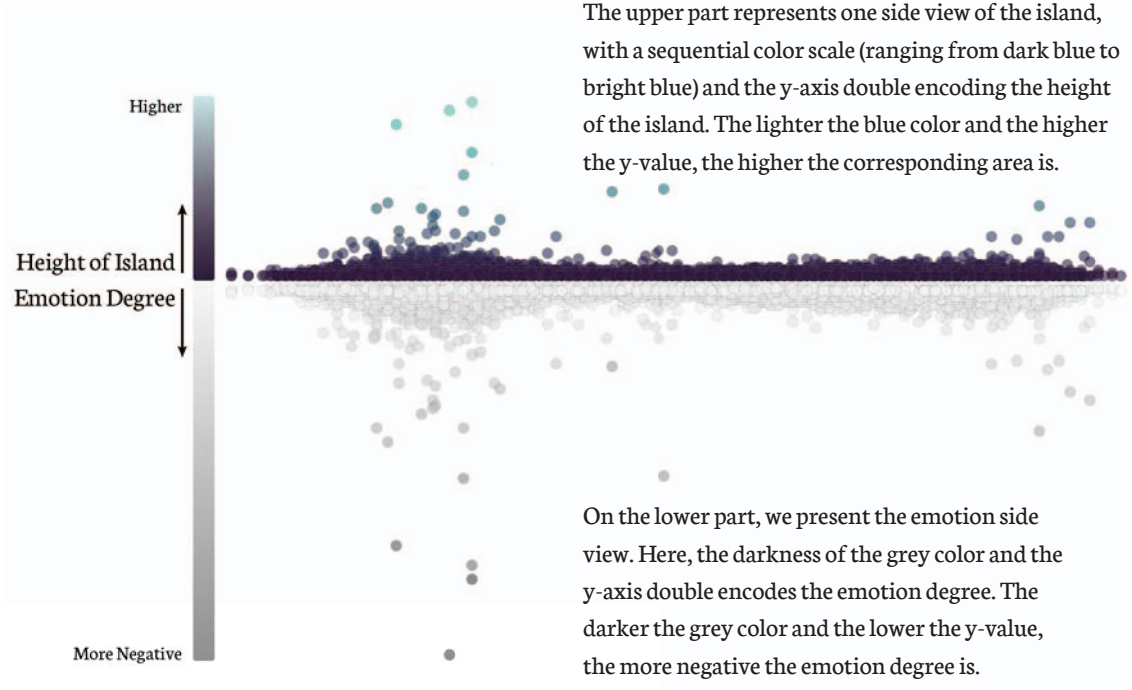


bandwidth = 15

bandwidth = 40



bandwidth = 8



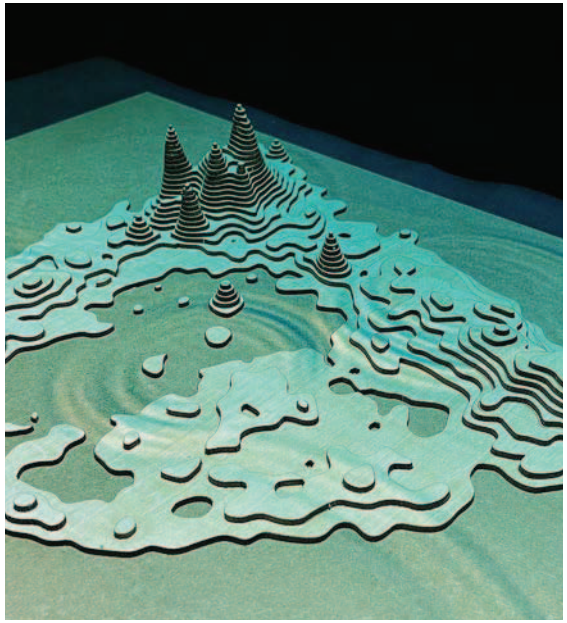
The upper part represents one side view of the island, with a sequential color scale (ranging from dark blue to bright blue) and the y-axis double encoding the height of the island. The lighter the blue color and the higher the y-value, the higher the corresponding area is.

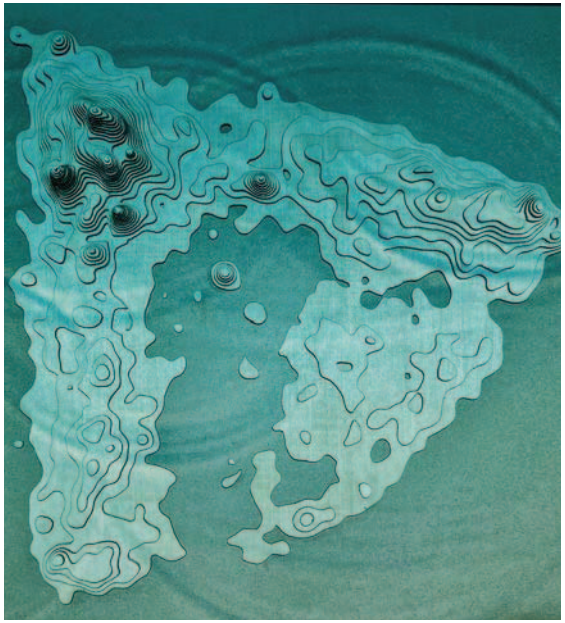
On the lower part, we present the emotion side view. Here, the darkness of the grey color and the y-axis double encodes the emotion degree. The darker the grey color and the lower the y-value, the more negative the emotion degree is.

Emotion Side View

In order to assess the emotional overview embedded within the tweets, we calculate the emotion degree by assigning positive weights to active emotion values and negative weights to negative emotion values. In this context, the "emotion values" are the absolute values of both kinds of emotions, derived from the results of emotion detection [5].

While the tweets themselves are visible, the underlying negative emotions that often accompany lonely tweets remain easily overlooked, much like the submerged portion of an iceberg.

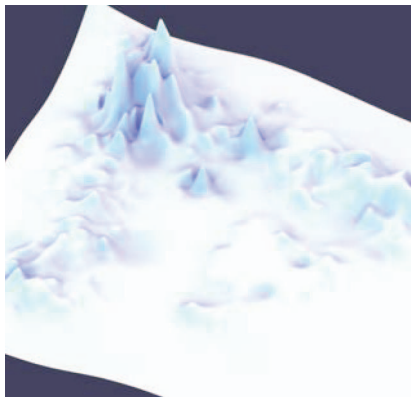




Noisy Ripple

In addition to visualizing the sunken land beneath the sea, we aim to capture the bustling surface of the water through the metaphor of ripples. We encode the intensity of response with the radius of each ripple. The response degree is defined as the cumulative number of reposts, likes, and comments, indicating engagement and communication.

In this context, ripples serve as an indicator of the presence of responded posts when the unresponded posts sediment into the seabed. The noisy ripples are deliberately juxtaposed with the quiet sedimentation to emphasize this contrast.



The model rendered in Rhino.

Laser cutting.

Manual assembly.

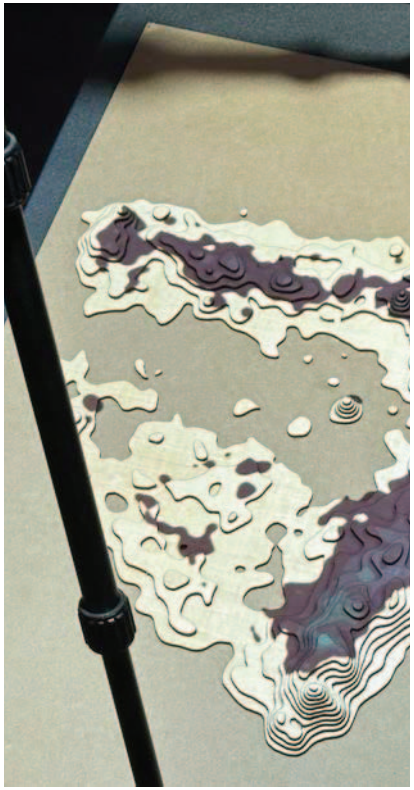
Projection seetting.

Implementation

The visualization work encompasses a harmonious fusion of digital charts and physical models. The loneliness contour and emotion side view are rendered using D3.js.

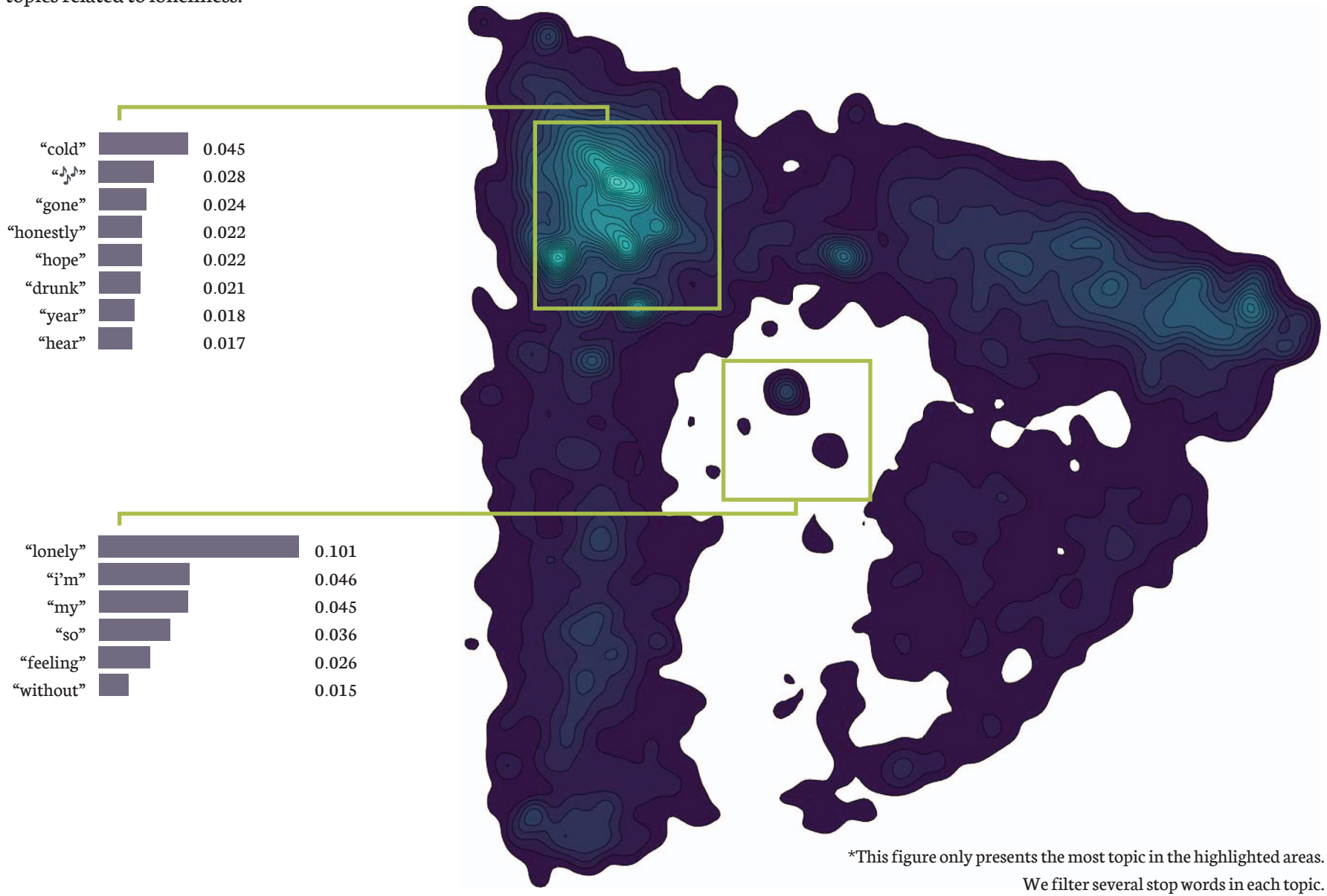
To deepen the solid presence of loneliness, we physicalize the data-driven contours. We choose the contour (bandwidth=8) with ample details for physicalization. The initial step involves transforming the contour chart into a threedimensional model using the Rhino software. Subsequently, we finetune the contour lines in AutoCAD, ensuring precision and practicability, and fabricate the individual components of the island using laser cutting techniques with wooden materials. Through the meticulous assembly of these components, a tangible and tactile physical model of the island is brought to life.

We project the ripples and contours over the island model temporally. By incorporating a physical model, we offer an additional sensory dimension to the experience. Through touch interaction with the physical model, viewers can further engage with the data, extending their understanding beyond the visual channel and enriching their perceptual encounter with the visualization.



Case: Lonely Tweets

We present what people tweet when they express loneliness. The higher places on the island indicate popular topics related to loneliness.



*This figure only presents the most topic in the highlighted areas. We filter several stop words in each topic.

Here are some lonely Tweets:

It's 3 am I must be **lonely**.

You are too lovely to be so **lonely**.

He is the **lonely** one ... he is the sad one ... the greedy one ...

still **lonely** at 🏁😪

I'm beyond **lonely**.

I just realized I'm gonna be **lonely** for Christmas. My family is 2000+ miles away. I have no bae. My friends are with me

It...strikes me as a very long and **lonely** path through the year as opposed to looking forward to anything.

Idk if any of y'all felt so **lonely** for ya parents but I am. Like so fxxking bad! I'm honestly not used to this.

lonely I get and am. I'm not perfect and lord knows I...talk about it alot anymore but I don't know what else to do...

lonely it is

lol I'm so broke and so **lonely** and so sad haha :'+)

Mood: **lonely**.

#joinin when am I going to spend Christmas with those I love. Why is it so **lonely** and sad

What a **lonely** day it's been 😔

This Christmas has been **lonely** af for me. Again, not bixxhing.

Man had this morning sucked. One of my friends wants to deactivate and I'm **lonely**. FML.

Well, one of my best Twitter friends wants to deactivate and I'm feeling **lonely** without my bf.

I'm scared of **lonely**

I'm really trying but this **lonely** feeling is getting the best of me.

Shhhh. I know that. I'm just fxxking **lonely**. I hate it.

Idk. This is one of them nights, I feel so **lonely** for everyone.

Fxxk this. I'm too **lonely**. 😭💔

A boyfriend would be nice. Even just a friend. Being **lonely** sucks. I just want someone I can share my life with

i just want to not be **lonely** this new year's :(

pull up to your function being **lonely** as fxxk!

Being **lonely** during the holidays is NOT a good feeling.

I wish I had someone other than my mom to rely on. I be **lonely**.

It just makes you... kind of really **lonely**

Tomorrow has the potential for greatness but also ennui and self loathing and crippling **loneliness** and depression so lessmakeitagood pls

SINGLE is not a relationship status. Its a word describing your **loneliness** If you ask me, yes I'm SINGLE.

If a star fell each time I thought about you then the moon would truly realise what **loneliness** is really like.

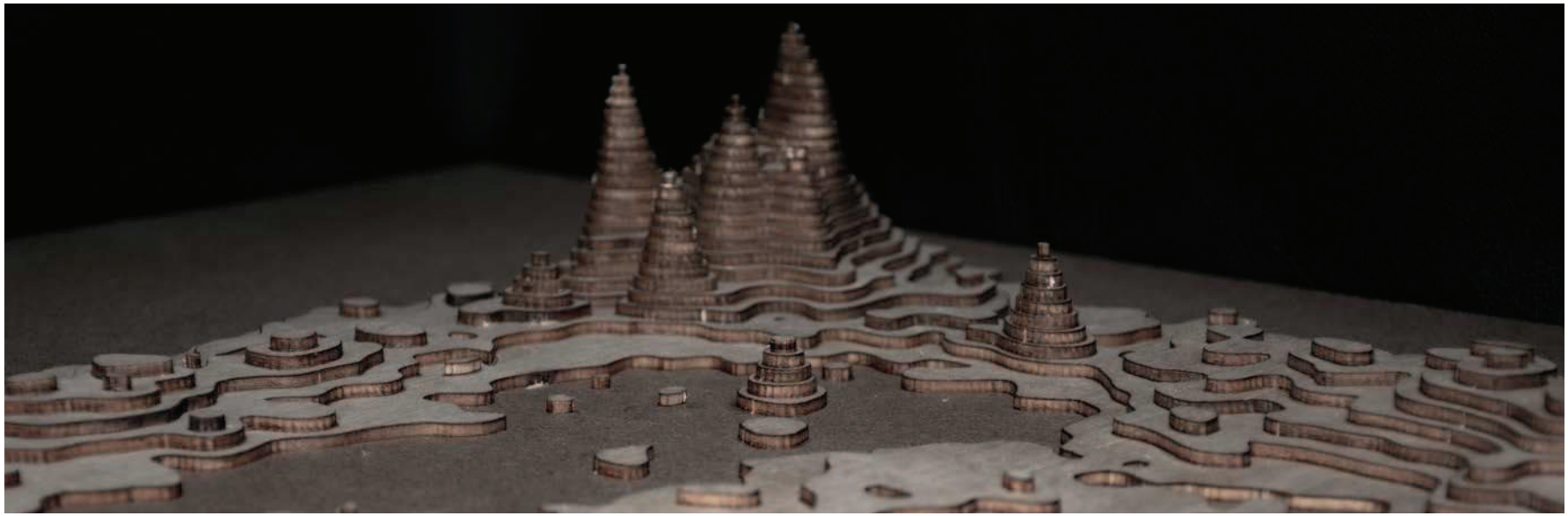
Discussion

By shedding light on the unattended expressions of loneliness, we strive to provide a deeper understanding of the emotional landscape within social media platforms. Through the data-driven approach and visual representation, we hope to illuminate the hidden narratives embedded within the vast sea of social media.

Social media serves as a unique intersection between public information and private life. It provides individuals with a platform to express their opinions on hot topics while also offering a space for personal reflection and documentation. However, not every post is shared with the expectation of receiving a response. Sometimes, individuals simply use social media as an outlet to express their emotions without a specific purpose in mind.

It is crucial to acknowledge that not all posts without responses should be considered isolated cases. The absence of engagement does not necessarily indicate the insignificance of these expressions. Instead, it highlights the complex nature of social media dynamics and the diverse motivations behind sharing personal experiences. Whether individuals who feel lonely seek any form of responses when expressing their loneliness requires further investigation.

In this art project, we collect social media posts using a heuristic approach under a limited temporal period, understanding that it may not capture all the relevant data related to loneliness or other negative emotions. There are likely many hidden posts within the vast expanse of social media that remain unexplored. By acknowledging these limitations, we recognize the ongoing exploration and the potential for future research to uncover additional insights into the intricate interplay between social media and loneliness.



Acknowledgements

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