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.

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 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 eternal
existence: 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—a content
repository—, we symbolically manifest the
accumulation of these solitary "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 chose 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 collected 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 found that the majority of tweets received no responses from others. This led 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 selected tweets containing keywords related to "lonely" or "loneliness". To avoid confounding factors, we excluded tweets where these words appeared as proper nouns. As a result, our dataset consisted of 22,133 tweets that captured the essence of loneliness.

To extract meaningful insights from the collected tweets, we employed 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 adjusted and finally set the number of topics as 20, ensuring a comprehensive representation of the underlying themes within the dataset.

Additionally, we utilized an Emotion English DistilRoBERTabase model [5] to detect the emotions conveyed in each tweet. This model provided us with a comprehensive understanding of the emotional nuances encapsulated within the tweet content. We generated a weighted list of topics and emotions associated with each tweet by combining the information obtained from the LDA model and the emotion detection model. These factors played a crucial role in informing our visualization process.

162,376,361 Tweets[1] between
Dec. 23rd -- Jan. 3rd, 2016 -- 2019

· No response
· Include "loneliness" and "lonely"
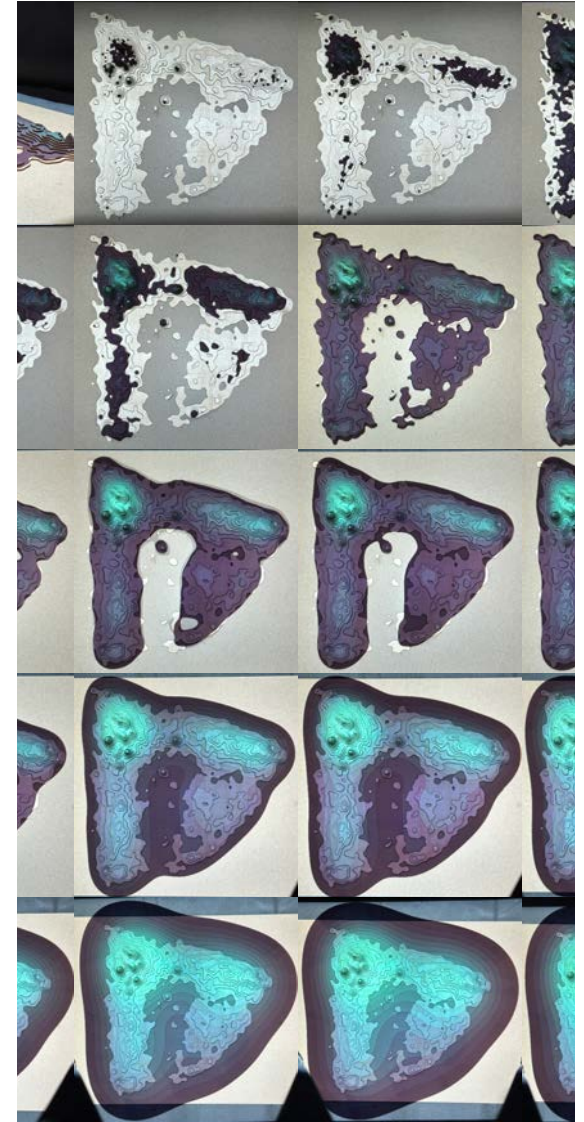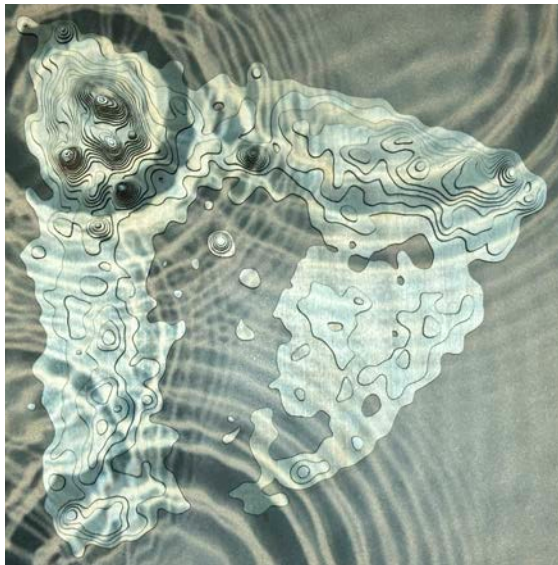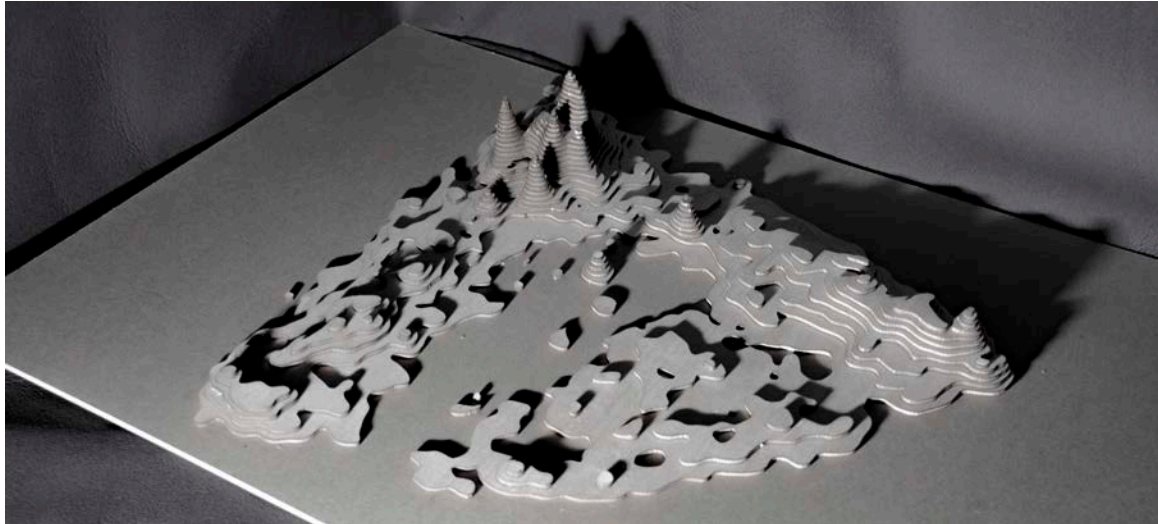· Not in proper nouns

22,133 Tweets

Topic Modeling → Topics → Dimension Reduction

Emotion Detection → Emotions → Emotion Degree

Visualization
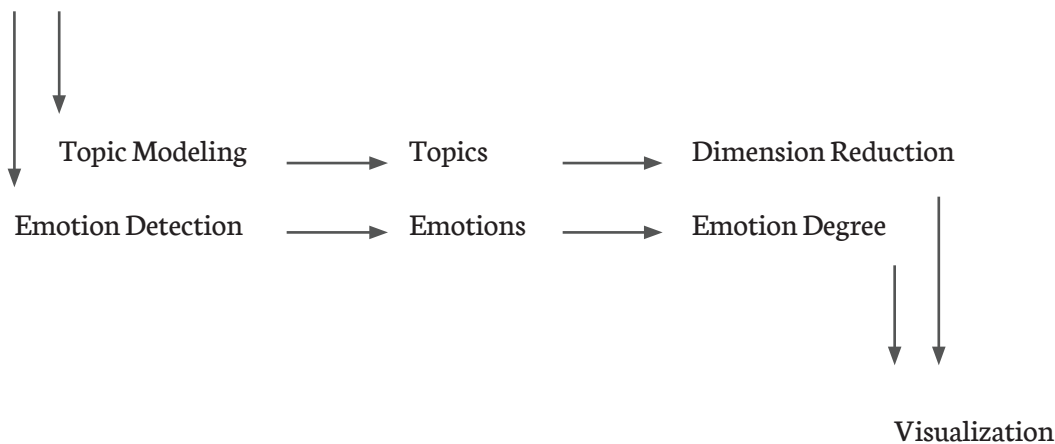
The workflow of data collection and analysis in this work.

[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.

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 simply sink to the seabed, akin to grains of sand. While they may temporarily resurface through topic resonance when certain keywords are searched, they primarily exist as unnoticed and unattended sedimentations of information.
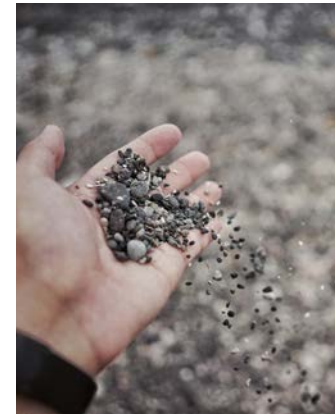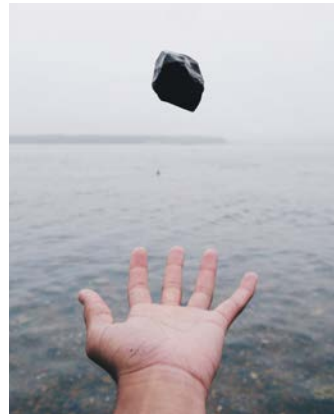
People threw their thoughts and emotions to the data sea. <1> Some of them are big and weighty, <2> while some of them are small and unimpressive.

<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.
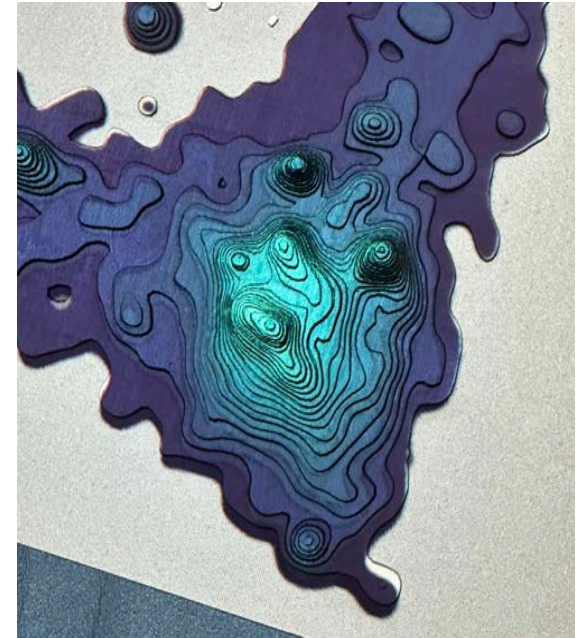<4> Photo by Yannis Papanastasopoulos.
All above photos are on Unsplash (https://unsplash.com/).

Design Process

We first introduce the major elements of this project, namely **loneliness contour**, **emotion profile map**, and **noisy ripples** a, 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 align with the geographical island metaphor, we employ Isomap dimension reduction after testing commonly used non-linear dimensionality reduction methods.

By reducing the dimensionality to two, we are able to render a scatter plot of all the tweets within an x-y space. 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.
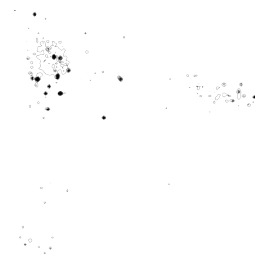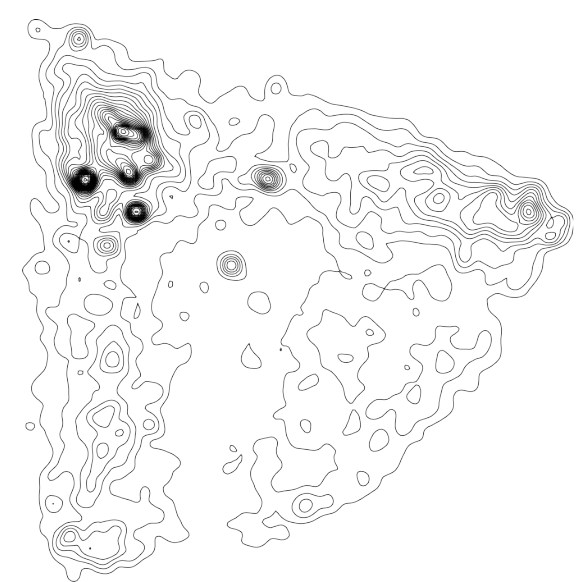

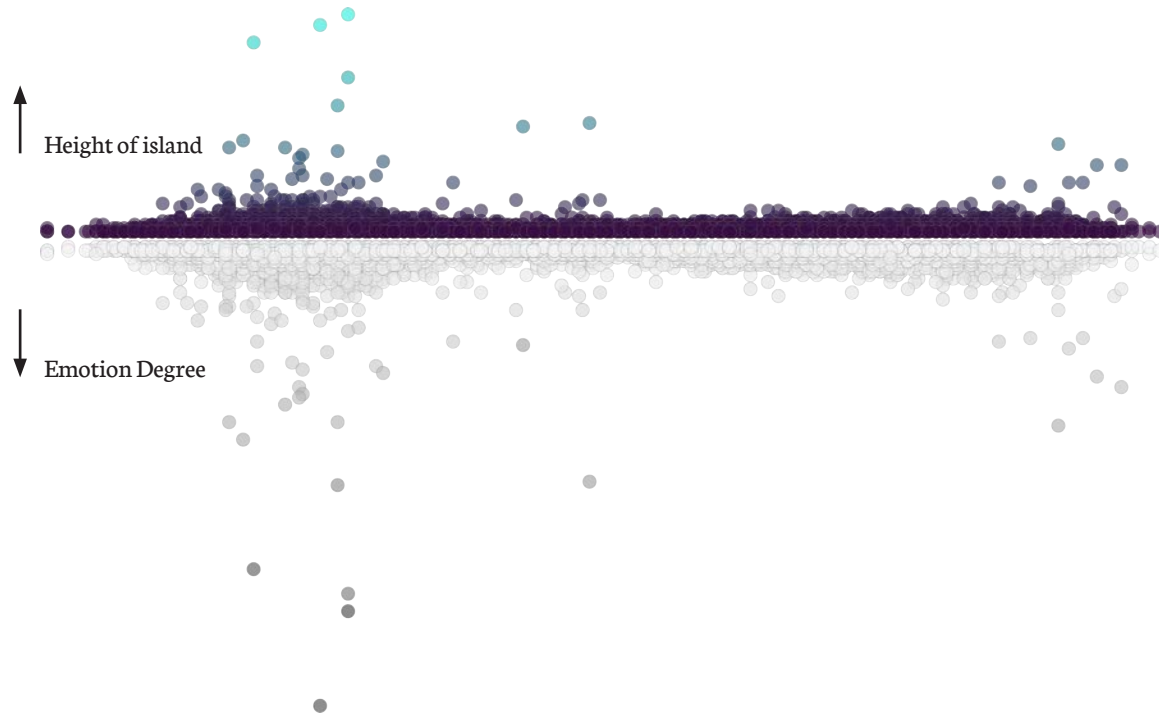bandwidth = 1   bandwidth = 6

bandwidth = 15   bandwidth = 40   bandwidth = 8

Emotion Profile Map

In order to assess the emotional overview embedded within the tweets, we calculate the emotion degree by assigning positive weights to active emotions and negative weights to negative emotions. The absolute values are determined using the emotion model.

The darkness of color encodes the emotion degree. The darker, the more negative the emotion is. The y-value indicates the sum of emotion degree. 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.
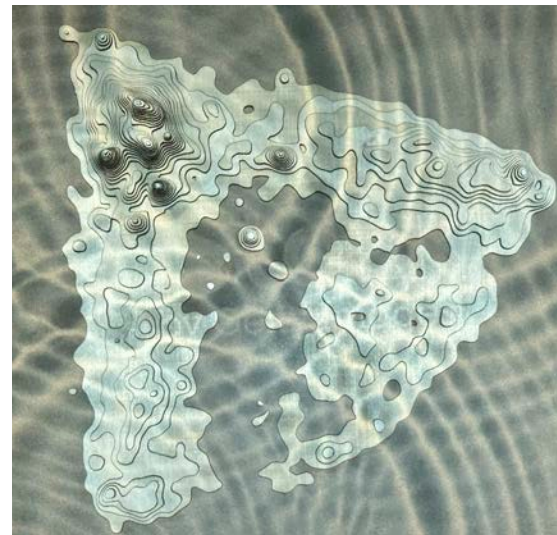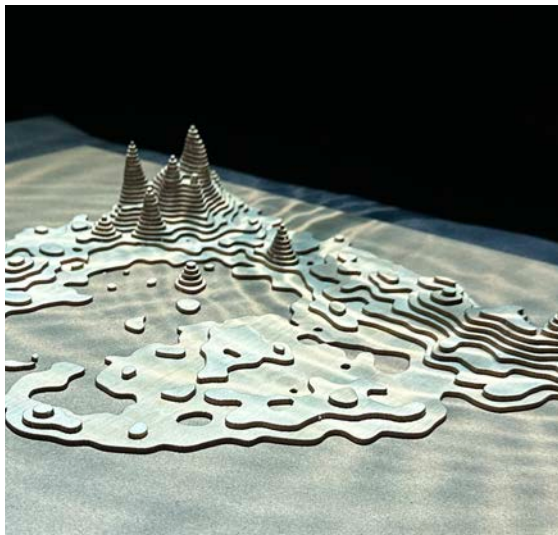
Noisy Ripple

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.
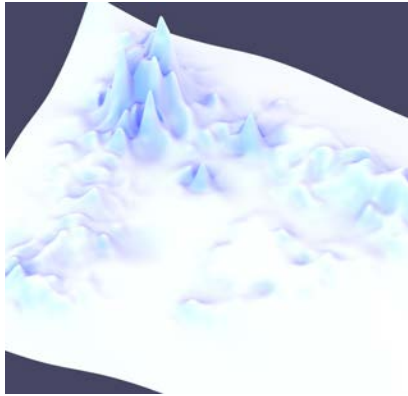
The model rendered in Rhino.

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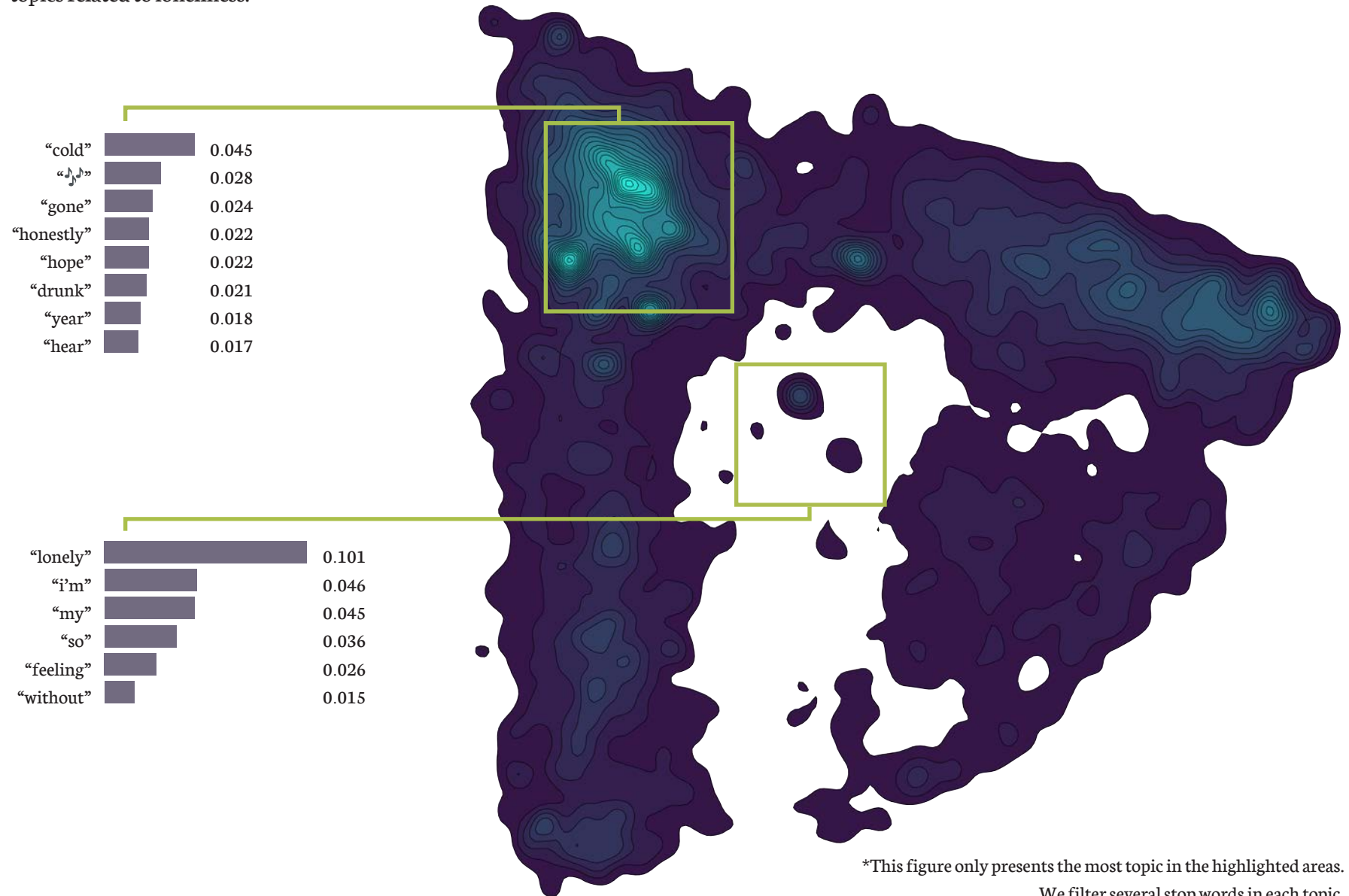
We project the ripples and contours over the island model temporally. By incorporating a physical model, we offer an additional sensory dimension to the experience. Through touch and interaction with the physical model, viewers can further engage with the data, extending their understanding beyond the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

Case: Lonely Tweets

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

Topic	Value
"cold"	0.045
"♪♪"	0.028
"gone"	0.024
"honestly"	0.022
"hope"	0.022
"drunk"	0.021
"year"	0.018
"hear"	0.017

Topic	Value
"lonely"	0.101
"i'm"	0.046
"my"	0.045
"so"	0.036
"feeling"	0.026
"without"	0.015

VISAP'23, Pictorials and annotated portfolios.

*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 fucking 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 bitching.

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 fucking lonely. I hate it.

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

Fuck 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 fuck!

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.
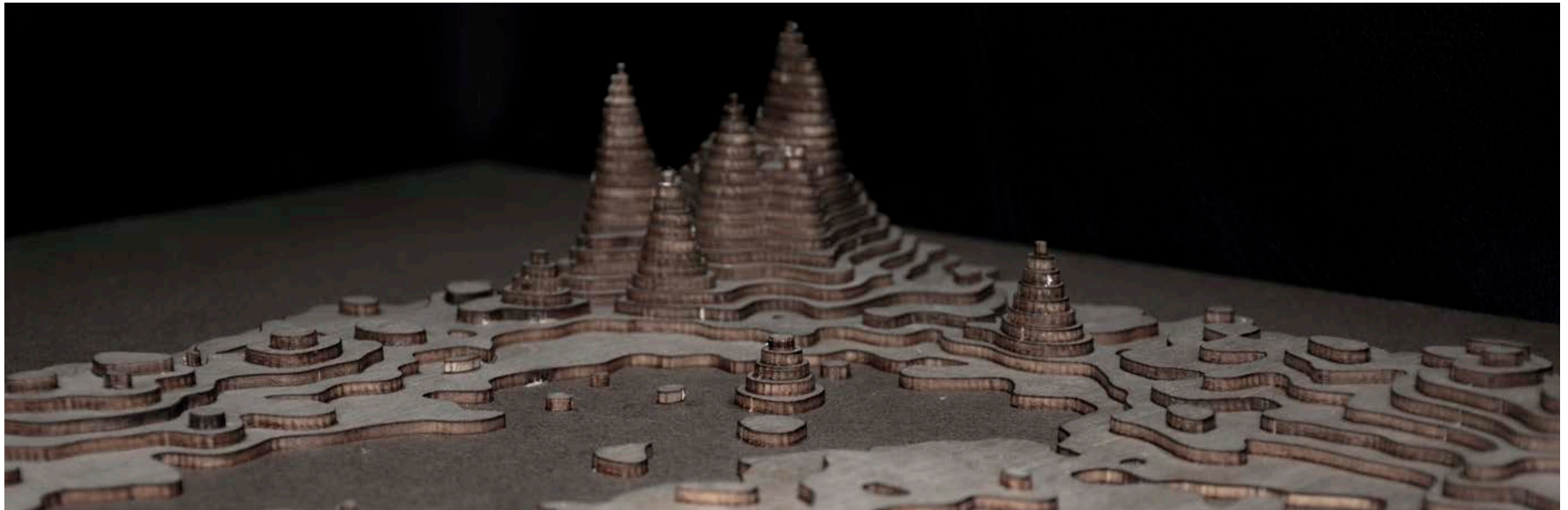
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