

Visual and Textual Analysis of the Online Anti-Femicide Movement in Mexico: A Narrative Network Approach

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Abstract—This project argues that news consumption from social media (Instagram) is fragmented and distorts how we understand the news narratives that are being shared by various sources. As a case study, the news topic of the ongoing anti-femicide movement in Mexico and its social media content is used to explore how a narrative provides context for its fragmented representation. This research in progress creates new evaluation procedures for the detection of Mexican anti-femicide movement narratives online using mixed-methods. The network science procedures and NLP/computer vision semantic models of the collected fragmented content provide social, legal, and ethical implications of detecting and monitoring online narratives of the Mexican anti-femicide movement. Repository for dissertation on Social movement image narratives: https://github.com/lwdozal/SM_Narrative

Index Terms—Digital Narratives, Natural Language Processing, Network Science, Social Movements, Social Media, feature selection

I. INTRODUCTION

As more people get their news online [1], it becomes jumbled in with other cultural and social topics curated by our personal algorithms [2]. Recent reports show that more and more Americans consume their news and information from social media [1]. Particularly, 26% of adults under 30 years old regularly get their news from visual based content social media platform, Tik Tok [4]. This project argues that this form of news consumption is fragmented and distorts how we understand the news narratives that are being shared by various sources. Specifically, social movements have been using social media to share their goals, values, and grievances with the world for the past decade which spreads throughout platforms usually in visual form, and from various perspectives [3]. As a case study, the news topic of the ongoing anti-femicide movement in Mexico is used to explore how a narrative provides context for the fragmentation of social media image content representing the anti-femicide social movement?

A. Narratives in Social Media

Social media is not going anywhere, and since its inception users have been interpreting and making sense of its fragmentation with great capacity for knowledge building [5], [6]. Sadler [6] argues that narrative plays an important role in how people interpret the fragmented information but in a non-linear fashion with an attempt to find meaning from the

daily absorption of parts that fit into a whole. For the purposes of this project, narratives are defined as a way of producing and communicating knowledge. This is supported by Mateas, Sengeres [7] who argue that narratives are used to organize.

The affordances of social media enable interaction with the news and boost coordination, and transactions aside from screen consumption [8]. As images, videos, and memes about a social cause have become more common for circulating information, these newer types of engagement can be understood as activity within the social movement [9], [10]. By refreshing through social media updates and information circulation, social movements might be able to build better mobilization power online [11]. More specifically, images and visual messaging of social movements have become popular content on social media in the past decade [12], [13] and each event representing a social movement appears to be independent of the one before [14]. But, when users consume information on social media about a social movement event, they get fragments of the whole narrative.

1) *Narrative Frames*: Different narrative frames surrounding the Anti-Femicide movement in Mexico will be considered as guidelines. The frames identified in this research were found from patterns in the literature surrounding femicide frames in Mexico. If a theme emerged in more than one piece of research it was identified and later categorized into an overall frame in an iterative process [15]. This grounded theory approach from the literature is intended to reduce researcher bias in qualitative coding, and identify common frames to inform the methods applied in this research [16].

This research categorizes the frames as societal, cultural, social movement, and humanization. Societal frames refer to the representation of a group or community with beliefs and practices, in this case it refers to Mexico society as a whole [17], [18]. Societal frames include militarization and organized crime; sex trafficking; social class and the effects of the North American Free Trade Agreement (NAFTA). Cultural frames refer to the beliefs/ideas, traditions, and norms practiced by a society [18], [19]. Here, cultural frames regard the behavior of masculinity and femininity, age, and victim blaming. In line with this work's definition of social movements, this frame is understood as Gardner's [20] definition as collective group engagement of non-institutionalized discourse and practice

aimed at changing the existing condition of society. Social movement frames refer to the conversations and protests made by individuals, communities, or NGO to address the stigma of feminicide. Humanization discusses the attempt to introduce a new way to view and humanize victims of feminicide and how they affect the overall society. Particularly, most of this research looks at humanizing through an online lens. The frames defined here are not static and can be compared together or within the lens of one another. For example, feminicide is a growing problem in municipalities with large indigenous populations [21], [22], this could be looked at through the lens of a societal frame that implicates class and economic structure, or it can also be understood as a humanizing element that shows feminicide is affecting different types of women the Mexican community.

B. The Anti-feminicide Movement in Mexico

As a case study for understanding fragmented narratives in social media, the anti-feminicide movement in Mexico will be used in this research. This work does not attempt to theorize reasons why the feminicide phenomenon happens, how it happens, or its impact on those affected. What it does do is use its messaging to identify how we as spectators interpret what is being said about the phenomenon. The anti-feminicide movement in Mexico grew from years of feminicide at the border of Mexico and Texas, with cases beginning to be documented around 1993 [23]. Aggravated homicide due to gender, specifically females, sexual violence, dehumanization through the image of discarded female remains, or other visual representation of ultraviolence against a woman leading to murder or death is how feminicide came to be known in Mexico [24].

C. Citizen Data Production and Data Counting

Since the initial recorded case there have been many small, grassroots movements led independently by mothers, friends and extended family [25]. In 2016, Maria Salguero published a map of all of the recorded feminicides by the government and media or news sources that have happened in Mexico since 2011 [26], [27] Salguero tries to include as many details of each case on the map, details of how the victim was murdered, who they might have been or who they were associated to, the offenders, motivations, homicide patterns and crime scenarios. The intention is to provide an identity for these women who have been murdered and are seen as a statistic, if they are seen at all [28]. The idea of providing an identity for the victim is a narrative many leaders of the anti-feminicide movement want to push forward in the national conversation. Much of this information is found by creating keyword notifications on social media like Facebook, Twitter and Instagram and pulling from the images, videos, and user comments that accompany these events [29]. The hope with this research is to explore these online narrative pushes to see how anti-feminicide is being expressed online.

II. PROPOSED METHODS

The idea is to analyze the visual and textual narrative representations of the anti-feminicide movement in Mexico online using narrative structure, network science and Natural Language Processing models [30], [31].

A. Data Collection

The data is collected by web scraper packages used to target social media images of the anti-gender-violence movement in Mexico using relevant keywords and time frames. A customized content-scraper script was developed using python libraries which enable image and metadata collection of the Instagram social media platform. The data is collected based on searches for particular hashtags and Instagram accounts. Hashtags and accounts include #mexicofeminicida, #niunamenos, #vivasnosqueremos, #noestamostodas; @noestamostodas, @siwapazyjusticia, @womansonfire, @brujamixteca.

Metadata collected from the hashtags and accounts include comments, likes, hashtags, URLs, account information, and automated descriptions. So far, about 2,000 images have been collected within a year's time-frame between November 25, 2021, and March 8, 2024. The day November 25th was chosen because it is the international anti violence against women day, March 8 is international women's day. A second round of data collection will be done to include posts surrounding the topic on international women's day. The goal is to download over 10,000 images and their metadata. Similarly, publicly available government and non-governmental organizational data will be used to support online data collected in this work. The goal of this work is to create a repository with the web-scraping scripts, along with a zip-file of the data that was collected from public social media accounts.

B. Build the Narrative Network

From frames, relational networks can be implemented into specific narrative networks consisting of temporal, event based, and relational structures. Here, the idea is to use computational narratology, which is "the algorithmic processes involved in creating and interpreting narratives, modelling narrative structure in terms of formal computable representations" [58]. As computational narratology can be interpreted and applied based on context [58], this research focuses on representing frames as community clusters within the overall network narrative.

This network narrative will consist of three main aspects. The first network representation are the *nodes* which are the individual Instagram posts which encompass the image with its attributes: *Hashtag*, *content*, *likes*, *datetime*, and *account holder* (if information is available). The *link* between nodes is represented by the topical relations found through classifying the image node based on its attributes. The nodes and their links will be grouped into community clusters which represent the *frames*. The frames are decided using grounded theory from the literature, and the nodes are classified within these frames using semantic classification models.

C. Classify Narrative Frames

Clustering the posts based on narrative frames using semantic classification models for both text and image has the potential to provide contextual information that adds to the meaning of the overall social movement messaging. To identify narrative frames, the project will explore two potential applications to classify the frames.

One potential method will use a sentiment analysis of image-text data using hierarchical linking models as proposed by [32] and [33]. A proposed model for information retrieval of image and texts simultaneously in a hierarchical cross-model format will be followed, along with its historical sources [34]. The article implements global and local approach to matching video and text. It implements three levels of hierarchical graph representation of global to local representations from video, to clips and objects [34]

Another method will use topic modeling via latent semantic analysis (LDA) and term frequency-inverse document frequency (TF-IDF) of the post's original comment to be classified into one of the narrative frames [53], [52]. Although newer approaches to classification using topic modeling have appeared including large language models like TopicGPT and embedding topic models (ETM). [51], [54]. This text approach will be couple with, a computer vision task called semantic segmentation which identifies select pixels within an image to identify an object; This object can be anything of interest [55], [56]. A more detailed approach would take on instance segmentation where a classification can become a deeper representation of multiple objects in the same class [55], [57].

III. ANTICIPATED RESULTS

Implementation of this research will show how the use of fragments in narrative structure can be used to create a network encompassing groups of similar story frames within the overall narrative. Detecting the narrative of the anti-femicide movement on social media networks will provide context for interpreting the (mis)representation of a social movement event online. This procedure can be applied to a large-scale, domain-specific data set to identify stronger narratives in the movement's messaging.

Emerging narrative frames found in the research will hopefully become more clear outside of the suggested narrative frames found in common anti-femicide areas which have historically been Domestic, Workplace, Political (Global and Local), Gender, Artistic, and Academic [24], [36], [37].

A. Challenges

Working with multi-modal data is potentially expensive and time consuming, but project organization and management is of the essence with this research as it is part one of a three part dissertation project. Based on the ablation studies, user study review, and comparison of the model against other models, the proposed should similarly be able to identify a narrative from a collage of images [38], [39]. In the case of extreme failure or unintelligible outcomes, shifts or changes in the types of models would be applied and potential back-up models will

be considered [40]. This provides room for model exploration if similar methods are available.

Risks that will be considered in this research are identifying fake images, or images generated by bots, working with malicious or violent images, Instagram's API access and how to work around its changes, and applying the knowledge graph model to search queries and other platforms outside of a controlled API environment.

IV. SOCIAL SIGNIFICANCE

Some social and ethical implications for the project are of course the sensitive nature of the data and how privacy and safety are taken into account. With this being said, account information will be removed from the public facing materials as well as any identifiable information in the comments. Images and image comments will be included in public facing content and nothing else. An IRB application has been completed to include aspects of working with sensitive data. Similarly, established ethical concepts particularly tailored to gendered data will be included and used as guidelines throughout the project [41]–[44].

A. Citizen Data Collection

With more attempts to keep the memory of loved ones alive, documenting who victims were before they were murdered has become a new humanizing device. Independent data collection happens because authorities fail to report, examine, or investigate the crimes properly, if at all. Evidence is not stored correctly or lost, forensic tests and processes are mishandled and ignored which results in inadequate or missing data. [46], [59]). This is also due to a lack of resources, specializations, and conditions for state investigators to carry out these duties properly [46]; [49]. Because of these shortcomings, families and other citizens take it upon themselves to investigate or put pressure on authorities through their own means, or international support [50] [46].

Some people have become vigilantes or citizen data analysts who collect and record data. For example, maps are a very common way to document Femicides in Latin America. In 2016, Maria Salguero published a map of all of the recorded Femicides by the government and media or news sources that have happened in Mexico since 2011 [25]. Salguero tries to include as many details of each case on the map, details of how the victim was murdered, who they might have been or who they were associated to, the offenders, motivations, homicide patterns and crime scenarios. The intention is to provide an identity for these women who have been murdered and are seen as a statistic, if they are seen at all [28]. The idea of providing an identity for the victim is a narrative many leaders of the anti-Femicide movement want to push forward in the national conversation. For example, *Ellas Tienen Nombre* "They have a name", is an online site that maintains a digital map of Femicides in Ciudad Juarez, Chihuahua tracked by an independent researcher who shows pictures of the victims, details of who they are and any other information found online and in police reports [45], [46]. Much of this information

is found by creating keyword notifications on social media like Facebook, Twitter and Instagram and pulling from the images, videos, and user comments that accompany these events [47], [48]. This idea of providing an identity for the victims including image, music and bio is one way individuals in the movement are pushing for change [45].

These citizen data scientists approach femicide reporting with a focus on data and data counting. The term data counting was coined by Catherine D'Ignazio after working with research labs that observe citizen data production [27]. Data counting refers to the production of data in relation to femicide and gender-killing by data activists in Latin America [27]. It stems from D'Ignazio's book *Data Feminism* and has been further described as missing or counter data to mainstream counting institutions [48] [44]. For example, common outlets get their data from government organizations that lack contextual information, and add or remove variables with each new version of data [59] [60]. In an ontological comparison of citizen data scientist data and institutional based data from Uruguay, the citizen dataset identifies a date, location and a substantial relation to the perpetrator when known whereas the institutional dataset sets up the information on the age and how the victim died, and shows the age and what (if any) weapon the perpetrator used, with less emphasis on the location [59]. Although these datasets describe the situation in Uruguay, it provides insight on small differences between citizen and institutional data that lend for different institutional pretenses, motivations, resources, and importance of those involved.

Efforts of this dissertation research support independent data collection groups by working along side them. This research also intends to provide an interactive output of the narrative analyses to provide insights to social movement groups in need of online contextual information.

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