

A Loopy Belief Propagation Factor Graph Simulation of my Grandma Nonna's Insane Facebook Feed

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Abstract

The content emerging from my Grandma Nonna's facebook feed has been becoming alarmingly more and more insane. Though she has historically been a loving grandmother, too apolitical, and polite to say anything controversial, her feed has been fast filling up with emotionally charged political dank memes completely uncharacteristic of historic Grandma Nonna data [1]. Worryingly, her extreme political rhetoric has oddly emerged from extreme right and left view points, socially isolating her from her weekly card and zoomba groups. My fridge is fast filling up with her pot roasts and potato salads left unconsumed, a clear indicator of drama at the church potluck [2]. By abusing a [Loopy Belief Propagation](#) (LBP) bidirectional [factor graph](#), this paper successfully simulates and explains the Grandparent Radicalization Process (GRP). By miss applying The Sum-Product Algorithm, Nonna re-filters dank political memes passed recursively and acyclically using Meme Reverse Political Polarization (MRPP) [3] through a disguised Russian troll farm, Uncle Johnny's far right political facebook groups, and Grand Aunt Elizah's far left facebook groups.

Keywords: Factor Graphs, Loopy Belief Propagation, Fake News, Trust Networks, Echo Chambers, Machine Learning

1. Introduction

Historically speaking, Grandma Nonna is a sweet old woman who has never said anything mean spirited or underhanded in her senility [1]. As she has grown older, she has only become more polite and less confrontational until 2019. According to a recent uptick in her online [Thought Virus](#) Magnitude Metric (TVMM) [4], this trend in her online behavior has been found to be completely reversed. This has called for careful analysis of her online behavior, contacts, and influence. Cursory analysis has shown that she has recently become highly exposed to extremist content due to two family members sharing >10 posts a day from meme groups.

While Exposure to two tree nodes of ideological content will allow Nonna to balance out her beliefs reasonably, Uncle Johnny and Grand Aunt Elizah's tree nodes have acyclically recycled meme content from each other causing a dangerous LBP architecture which has left Nonna confused, angry, and bad at memeing. Using the LBP architecture previously used

by artificial intelligence experts to determine smart parity bits in communications and other robotics message passing architectures, her online behavior can be accurately modeled and simulated as shown in figure 1.

2. Background

In machine learning, robotics, and communications, Factor Graphs have fast become an easy way to model trust networks and how information is passed through multiple nodes and functions. This structure allows for a computationally efficient method to create marginal distributions for better communication networks. Now that the information message passing architecture has matured, it has begun to be applied in more elaborate applications such as an explanation for why the silent gen and boomers are becoming absolute monsters on facebook.

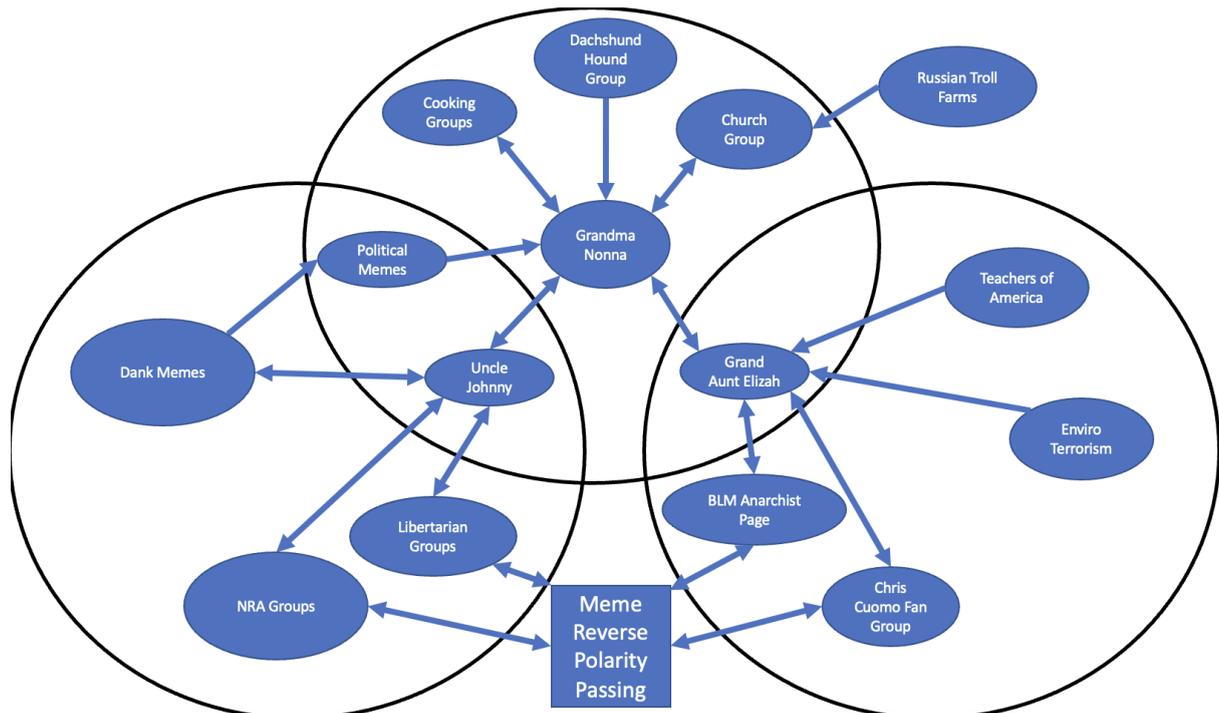


Figure 1: Grandma Nonna LBP Factor Graph Cliques

In a landmark paper, a man was able to explain how his grandfather Peepaw simultaneously believed in the need for a libertarian government while also demanding an end to globalization [5] two years ago. Since this paper, concerned grandchildren have begun to apply graph theory to map their family’s previously unexplainable behavior and opinions. In this paper, the methods outlined in [5] will be used to map out and resimulate my Grandma Nonna’s transition into outrage.

3. Clique Modeling

While Grandma Nonna has many friends on facebook, only a couple post and share content regularly. Among this shared content, clustering analysis has been applied to classify which echo chambers she is intersecting with [6]. By applying the loopy factor graph structure, Grandma Nonna, and her active facebook friends each form their own intersecting clique which is grouped together and interacts directly and indirectly through other cliques in the larger interwebz.

While the facebook groups Nonna directly interfaces with are primarily harmless, she is exposed to a large amount of outrage porn content indirectly through the Uncle Johnny and the Grand Aunt Elizah clique. While Johnny and Elizah do not create their own content, they are active commenters and reposters from their outer facebook groups within their own cliques. These two

intersecting cliques do not directly communicate anymore due to an argument about mask effectiveness against Covid, but they do via the later described Meme Reverse Polarity Passing (MRPP) process.

3.1 Grandma Nonna Clique

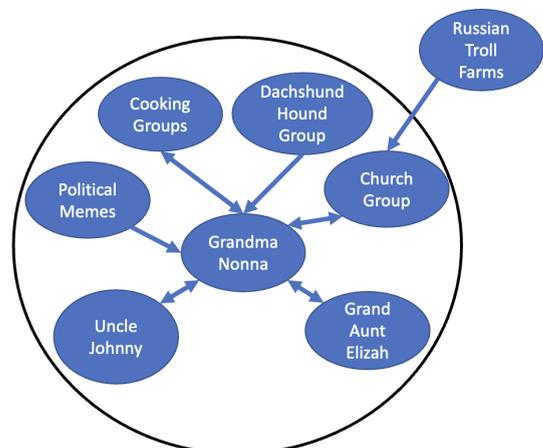


Figure 2: Grandma Nonna Clique

As shown in figure 2, the Grandma Nonna Clique (GNC) consists of primarily harmless content. While she will only directly interact with a *Grandma’s Cooking Recipes’s* group, her church group at her Methodist congregation St. John’s, and family, she acts as a sink node from *The Dachshund Hound Appreciation* group, and some political meme groups pushed to her by the

facebook algorithm. She also interacts with content reposted by Aunt Elizah and Uncle Johnny in a bidirectional manner.

Other than some spicy Dachshund Hound memes commenting on inflation by putting the lazy caption ‘Nobody: Me at the pump these days:’ on a picture of a surprised hound, her direct groups are generally apolitical and low on the TVMM scale. Some content did get filtered through her church group which regularly received external extremist content from other Christian facebook groups run by Russian troll farms.

Applying automated clustering algorithms to Nonna’s feed did become tricky as it frequently got hacked every other month after Nonna would click on some dangerous link and scammers would create fake grandma Nonna accounts in an attempt to steal her friend’s personal information.

3.2 Uncle Johnny Clique

Uncle Johnny, Nonna’s second son, was additionally modeled using the clustering method in [6] into the Uncle Johnny Clique (UJC). The analysis revealed that he had also gone down a youtube rabbit hole starting with some relatively harmless conspiracy theories, which led to closely following the Louder with Crowder channel, before devolving into a far right echo chamber. Uncle Johnny views and frequently reposts political dank meme channels consisting of Bring us your Banned, your Tired and Poor Memes, Dank Conservative Memes, and Conservative Memes for Reagonomic Teens. He is also a member of a few NRA facebook groups and some libertarian tea party groups [who still think Sarah Palin is a real person](#). As shown in figure 3, he is an active commenter and reposter which is represented in our model by a bidirectional message passing scheme.

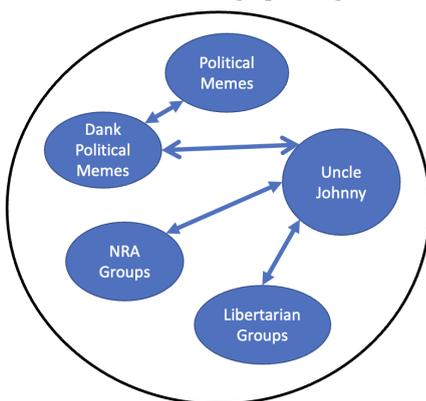


Figure 3: Uncle Johnny Clique

Johnny, while he used to be a hippy and a deadhead, recently fell victim to online [logic bully’s](#) who reinforce their own ideologies with an infinite amount of [strawman](#)

[arguments](#) and [whataboutisms](#). These seemingly rational arguments filter and circulate through the UJC to be endlessly recycled with new captions and twitter screenshots.

3.3 Grand Aunt Elizah Clique

Contrary to the UJC, the Grand Aunt Eliza Clique (AEC) consists of extreme left wing propaganda comprising of a Teachers of America group, an enviro terrorist facebook group, a Chris Cuomo Fan Group, and a BLM group. While interacting less with the teachers and enviro terrorist groups, the AEC commonly passes messages bidirectionally between the BLM and the Christ Cuomo group.

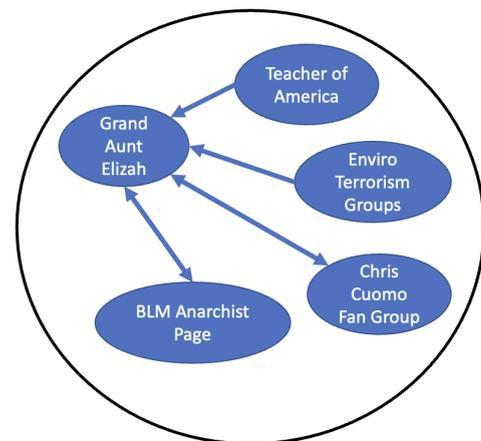


Figure 4: Grand Aunt Elizah Clique

Aunt Elizah was a true child of the 60’s and she has stayed that way her entire life. She has been a middle school English teacher since the 1980’s and believes America has been on the decline since Jimmy Carter left office. Due to the propensity for left wing ideology, the AEC regularly reposts and engages with anarchist content from the BLM facebook page and extreme anti-American propaganda posted to the Chis Cuomo group. The Chris Cuomo Fan Girls group used to be a harmless group which gained popularity in the early days of the COVID-19 pandemic. Unfortunately, the group’s moderator has been MIA for the last year and a half, leaving it as a cesspool of spammers and unfiltered posting from the disenfranchised left.

4. Loopy Belief Propagation Message Passing Architecture

Many academics believed it was a dumb idea to apply the Sum-Product Algorithm to model belief propagation structures in our relatives social media feeds [7], but smarter academics like myself believe it’s closer to real world online interactions than anything else. Just as

information marginal distributions can be calculated using the equation below (1) for communications networks, it can similarly be used to estimate Meme-Message-Passing (MMP) in our most vulnerable online population.

$$u_{a \rightarrow v}(x_v) = \sum_{x'_a: x'_v = x_v} f_a(x'_a) \prod_{v^* \in N(\bar{a})\{v\}} \mu_{v^* \rightarrow a}(x'_{v^*})$$

Equation 1: Sum-Product Algorithm Equation where the letters mean things and the functions mean other things

By iterating through message passing on a week by week time step process, MMP can be simulated on the scale of years and the Grandparent Radicalization Process (GRP) takes shape through the resulting TVMM tracked within the simulation. Additionally, Inter UJC-AEC indirect clique characterization is simulated using the Meme Reverse Polarity Passing (MRPP) MMP which was studied and modeled in [8].

4.1 Thought Virus Magnitude Metric

The TVMM has been a reliable metric for the exploding field of social media factor graph analysis. It is as genius as it is simple and can be used to evaluate real world and synthetic meme message data. Each message is posted onto [r/Cringetopia](#), and [r/InsanePeopleFacebook](#) for [karma whoring](#). Once classified by a worldview polarity filter, it is then scored by the number of controversial comments before being normalized by upvotes and how long before the moderator removes the post as shown in equation 2.

$$TVMM = \frac{sign(meme\ Agenda) * Number\ of\ Contraversial\ Comments}{argmax(Uppvote\ Normalization, 1/Time\ until\ Removed\ by\ Moderators)}$$

Equation 2: TVMM Metric Equation

For reference, TVMM can be understood in standard outrage units as shown in Figure 5.

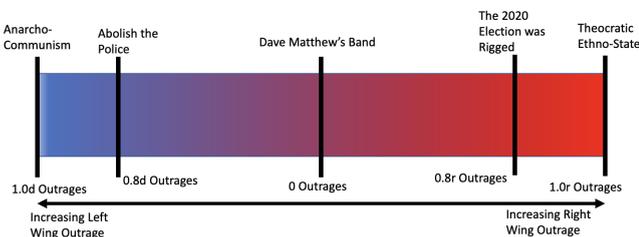


Figure 5: TVMM Scale in Outrages left-right

4.2 Meme Reverse Polarity Passing

Extra Clique communication can then be simulated by using the MRPP process developed in [9]. This process

consists of taking intra clique meme messages, reversing the outrage polarity of the meme world view, and then recaptioning the content to draw outrage from an external clique. Generally speaking, this process results in a seemingly endless amount of memes where each clique criticizes each other. In order to cap off the recursive process, the recycled meme material can be thresholded once they begin generating recycled messages below a chosen outrage threshold.

In the GNC-UJC-AEC architecture, the MRPP module tended to recycle AEC content in the UJC clique highlighting how dumb people are in the AEC clique. Within the AEC clique, UJC content was recycled in order to paint UJC clique nodes as monstrously immoral and racist within the AEC clique. TVMM thresholding became necessary in order for this process to not run forever. The need for the circular message passing is why a Loopy structure was required instead of a tree based belief propagation network.

4.3 Time Step Process Simulation Engine

Once all relationships were defined between the GNC-UJC-AEC as shown in Figure 1, a simple message passing and processing time-step infrastructure was coded up in [Plus Plus Plus](#) using the built in ML and stats library. During each time step, the flow diagram in figure 6 was implemented.

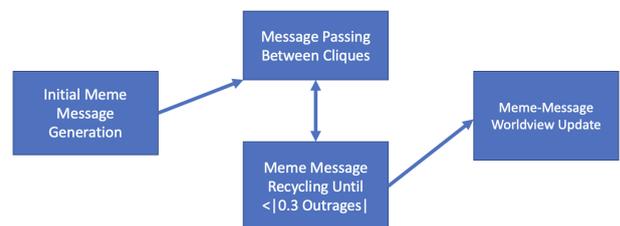


Figure 6: Time Step Process for Grandma Nonna LPB

First initial memes are generated by randomly sampling from each simulated node marginal TVMM distribution in each clique. Next the meme's are passed between the clique command nodes; Nonna, Johnny, and Elizah. Next, the recursive MRPP process then extends the time step MMP until all recycled Meme Messages between each clique achieve a TVMM below a threshold of 0.3 outrages. At the end of the time step, all of the meme messages are used to update the clique command node's worldview using equation 1 at the end of the time step.

5. Results and Discussion

After one hundred simulations of 2018-2022 online history, the results of the LPB Grandma Nonna GRP were

dismally accurate. Further simulations into 2023 and 2024 suggest that thanksgiving is going to be extremely awkward. As shown in figure 7 and 8, the LPB simulation closely matched historic Nonna data through the last four years of internet history compiled in [1].

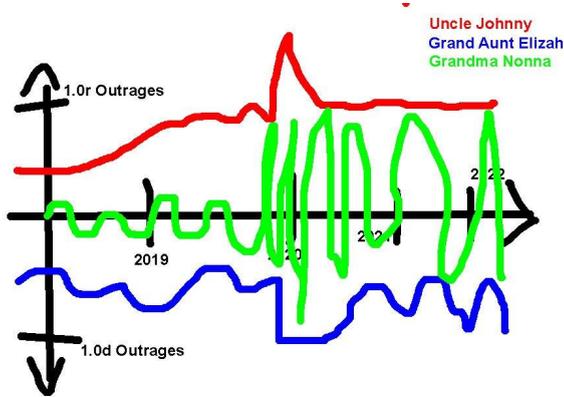


Figure 7: TVMM results from Grandma Nonna LPB Simulation

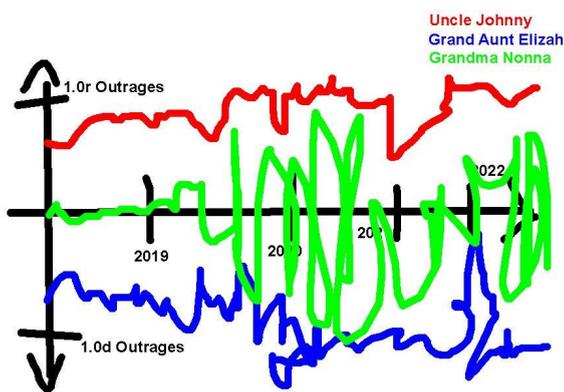


Figure 8: TVMM Historical Truth data

A closer examination of the meme message logging revealed that the more meme messages that were reversed in a MRPP process and recycled by Uncle Johnny and Aunt Elizah, the faster the Nonna GRP accelerated. The only process which seemed to slow down the radicalization were occasional spikes in additional Dachshund Hound memes which distracted Nonna from dangerous radicalization content.

The working theory which was first proposed in [9] also shown by this data, is that the more bored your grandparent is, the more likely they will be on facebook looking for more content. Additionally to this theory detailed in [9], the only method of replacing extremist

content is cute animal memes which are harmless and the antidote to online extremism. Tragically, these animal memes are rarely recursively spread within and between cliques on as massive a scale as high TVMM content.

There is one solution; more animal pictures. It is important to make these images prescriptive for each grandparent. As shown in [9] and again seen in this study, some grandparents may be responsive to cute cat pics while completely scrolling through dog pictures. Likewise, my Grandma Nonna only appeared to be responsive to the calming effects of Dachshund Hounds, Corgi's, Pugs, and other small dogs. When the simulations were experimentally re-run without the Dachshund Hound group posts, Nonna radicalized four times as fast. Above animal memes, the most calming internet content to curb a GRP are pictures of great grandchildren. While a dog meme can distract grandparents from extreme content for a few moments, grandkid babies have been shown to distract grandparents for minutes if not hours.

6. Conclusion

Finally, there is a logical, quantifiable, and repeatable way to model and express how insane Nonna's facebook feed has become. The answer is obvious, have babies and post pictures of them online to save your grandparents from the allure of outrage politics. If you don't have kids, at least adopt a dog or cat and post pictures of them. Your country and political stability depends on it!

7. References

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