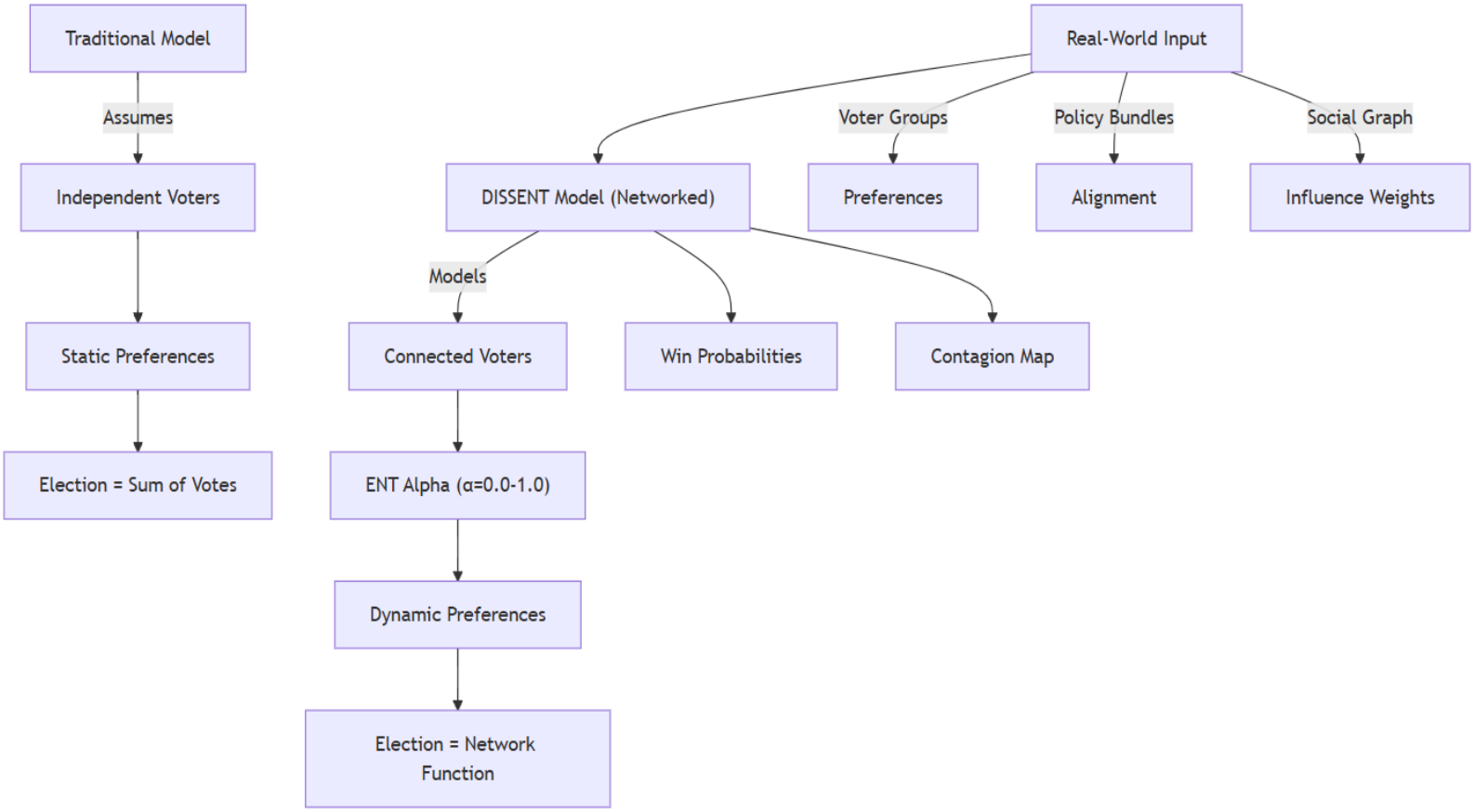
DISSENT : Decision-making In Social Systems via Emergent Network Theory



For decades, the dominant models have operated on a flawed but convenient assumption: voter independence . But this assumption no longer holds.
With rising use of social media across the world the assumption of voters not being influenced by social networks is inaccurate . According to Abdelsalam M. Alodat et. al, around 60% of Americans use social media to obtain political news and information, and roughly 40% use it to engage in political discussions or distribute

political content.[2023] In such a hyperconnected information ecosystem, voters don't just form opinions : they absorb them, share them, remix them, and often conform to the dominant beliefs of their networks.

The question therefore is : If people don't vote in silos why do our simulations treat them that way? The existing models treat ballots as independent events i.e. it inherently assumes that a voter is not influenced by his social network or peer group in his choice in an election. We model diseases as networks, yet elections, arguably one of the most socially contagious processes in society, are still modeled as a collection of independent coin tosses.

That's where DISSENT comes in.

DISSENT (Decision-making In Social Systems via Emergent Network Theory) asks something more human: "Who are they listening to?" . At the heart of DISSENT is a mechanism called ENT or Emergent Network Theory, a tunable system that lets you inject social influence directly into the simulation.

ENT Alpha:

- Modeling Real-World Influence ENT introduces a simple but powerful idea: Not every vote is formed in isolation. Some are blended from peer pressure, groupthink, and dominant narratives.
- The ENT Alpha (α) is your dial:
    - α = 0.0 → Pure independence (status quo modeling)
    - α = 0.5 → Heavy social blending
    - α = 1.0 → Conformity-driven dynamics

Evolving Preferences:

Most models fix voter groups with static identities. DISSENT lets blocs evolve. Each bloc has: A unique policy preference vector,a turnout probability with

realistic noise, influence edges to other blocs via a social graph These groups shift not through ideology, but through networked exposure to others' beliefs. That's how persuasion actually works.

How did I model DISSENT :

- Grounding in real data : I used Young People and the 2024 Election: Struggling, Disconnected, and Dissatisfied by Tufts Research[Link] to come up with pressing problems of the youth .
    - I zeroed in 5 voter groups in the youth category -
        1. Young men without college degree
        2. Young men with college degree
        3. Young women
        4. Asian youth
        5. Black youth

        Each group was assigned:

        - A population weight
        - An expected turnout rate
        - A vector of preference scores for the top 3 key issues in the survey: Economy, Climate, and Health. Values ranged from 0 to 1 with higher values indicating stronger support.

- Then I defined a bunch of policy bundles . These simulate real-world political platforms.Each policy bundle is a 3-element vector, matching the dimensions of voter preferences, allowing us to calculate alignment via a dot product.

- To model how an election might unfold under uncertainty, we ran 100,000 Monte Carlo simulations, where each iteration introduces:

    - Turnout noise
    - Preference noise
    - This allows us to capture how small random changes in voter behavior affect which policy wins the election.

- This is where DISSENT becomes novel.
    - In the real world, voters don't just hold opinions , they share them, discuss them, and converge under social influence.
    - To simulate this, we introduced an Emergent Network Theory (ENT) layer, where each voter group is influenced by others via an influence matrix .
    - Preferences are partially updated based on the average stance of peer groups
    - The alpha parameter controls how susceptible a group is to social influence (alpha = 0 means no influence, alpha = 1 means full convergence)

- We tracked each policy outcome . The policy with the highest total support is selected as the winner

Result Table

ENT Alpha	National Gun Ban	Pro-Choice Right	Green New Deal	Ban Gender-Affirming Care	Reproductive Health	Religious Freedom Act
0.0	0	1146	43,834	0	9,168	45,852
0.1	0	1219	44,140	0	9,052	45,589
0.2	0	1207	44,034	0	8,989	45,770

0.3	0	1274	44,071	0	8,920	45,735
0.4	0	1234	43,983	0	8,919	45,864
0.5	0	1203	44,079	0	8,607	46,111

At ENT Alpha = 0.3, we observed noticeable migration of support from moderate policies like Universal Reproductive Health toward more culturally dominant narratives , even without changing anyone's base preference.This is social gravity in action where smaller, undecided clusters are "pulled" into dominant preferences simply due to the weight of networked opinion.

Thus Dissent :

- Embeds social influence directly into voter behavior
- Tracks how peer groups shift preferences, not just cast them
- Measures the emergent effects of idea spread, not just ideology

DISSENT isn't just a model. It's a challenge to how we think about democracy in the age of influence