

Bounded Confidence Model

Week 1 Report

The Model

1. Deffuant AKA **Bounded Confidence** model we consider a population of N agents.
2. Let us consider only the simplest case when the agents are on the complete graph.
3. Each of these agents is initially assigned opinion x_i which is randomly chosen from the interval $[0,1]$.
4. Afterwards at each time tick two random agents are selected. If their opinions are not too different, $|x_i - x_j| < \epsilon$, they interact in the following manner:
 - a. $x_i(t+1) = x_i(t) - \mu(x_i(t) - x_j(t))$
 - b. $x_j(t+1) = x_j(t) + \mu(x_i(t) - x_j(t))$

$$|x_i - x_j| < \epsilon$$

$$x_i(t+1) = x_i(t) - \mu(x_i(t) - x_j(t))$$

$$x_j(t+1) = x_j(t) + \mu(x_i(t) - x_j(t))$$

- ϵ could be interpreted as tolerance to differing opinion.
- μ is the adjustment rate.
- ϵ is in the interval $[0,1]$.
- μ is in the interval $[0,0.5]$.

Features of Bounded Confidence Model

- Opinions are Continuous
- Opinions will Cluster; They will not become exactly the same, but will grow extremely similar.
- The number of clusters will be dependent on ϵ .
- Roughly the dependency is $n_c \sim 1/2\epsilon$.

Papers I referred to...

Bounded Confidence and Social Networks

- Paper discusses the influence of possible network topologies on the dynamics of bounded confidence model.
- Studies Basic mixing which is what I discussed previously.
- Also Studies how the model works when it is Scale free network topology. Refer to paper ([Bounded Confidence and Social Networks](#)).
- Analyses Clustering and how it changes due to network topology.
- Conclusions:
 - restricting influence by a network topology does not drastically change the behaviour of these models of social influence as compared to the well mixed case.
 - Well connected nodes are influenced by other nodes and are themselves influential. Most of them belong to the big cluster(s) after the clustering process.
 - Larger connectivities bring scale free networks dynamic behaviour closer to well mixed systems.

Modelling Group Opinion Shift to Extreme : the Smooth Bounded Confidence Model

- Propose new variation to account for the phenomenon of opinion shift to the extreme.
- This model presents a shift to the extreme when we introduce extremists (very convinced individuals with extreme opinions) in the population, even if there is the same number of extremists located at each extreme.
- The modification is based on the hypothesis of perspective taking (empathy) in the context of consensus seeking.
- Basically this new opinion influence model, the smooth BC model, which uses a Gaussian function instead of a step function to rule the opinion influence.

Other papers with similar studies

1. [Extremism without extremists: Deffuant model with emotions](#)
2. [The Bounded Confidence Model Of Opinion Dynamics](#)
 - a. Very hard read honestly.

Next steps?

Thank You