
Problem A: Group Affinity and Fashion Sense:

Color-Wheel Model

New York University (Team 2)

Ji Na You, Mian Wang, Sanford Lu

Coach: Ziyi Ye

Overview



Question: Reaction on fashion trends: conform to particular expectations? Follow mainstream? Maintain uniqueness?



Factors:

1. How similar their style is to the mainstream trend
2. How "extreme" or unique their style is
3. The amount of interaction between individuals and the extent to which an interaction influences and convinces the person to change their style.

Assumptions

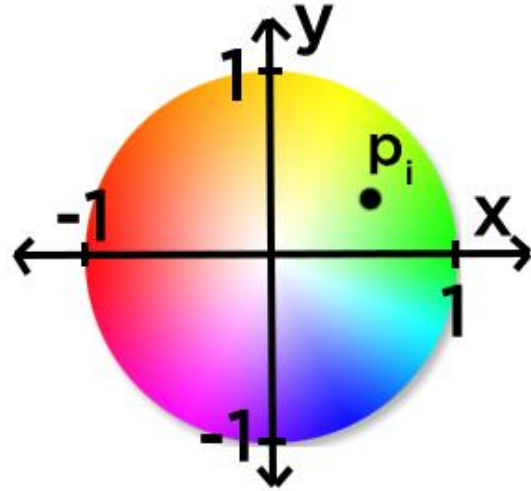
- Population = P = constant (Continuum Hypothesis)
 - Constant number of hipsters, conformists
 - Each individual identifies trend in the same way by observing others' styles
 - No delay
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Model Introduction (Color-wheel Model)

Person i : $\vec{p}_i(t)$

Change: $d\vec{p}_i(t)/dt$

Domain: $x^2 + y^2 \leq 1$



Notations

1. Trend $\vec{T} := \frac{1}{P} \sum_{i=1}^n \vec{p}_i$

2. Influence by interaction = $(\alpha_i * \beta_i)$

α_i : how easily they are convinced by interactions to change their style;

β_i : the amount of interaction by person i

Equation



If person i is a hipster,

$$\frac{d\vec{p}_i}{dt} = -\frac{(\vec{T} - \vec{p}_i)}{|\vec{T} - \vec{p}_i|} f(|\vec{T} - \vec{p}_i|) (1 - |\vec{p}_i|) \alpha_i \beta_i k_h$$

If person i is a conformist,

$$\frac{d\vec{p}_i}{dt} = \frac{(\vec{T} - \vec{p}_i)}{|\vec{T} - \vec{p}_i|} g(|\vec{T} - \vec{p}_i|) \alpha_i \beta_i k_c$$

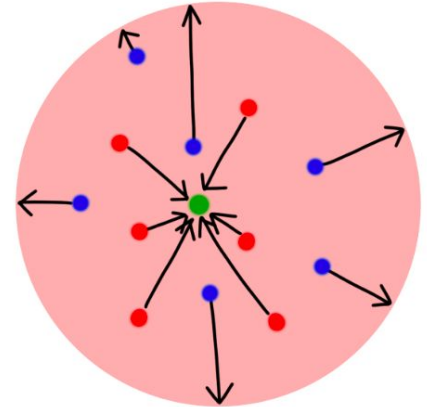
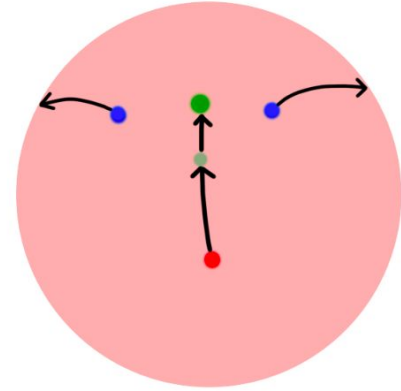
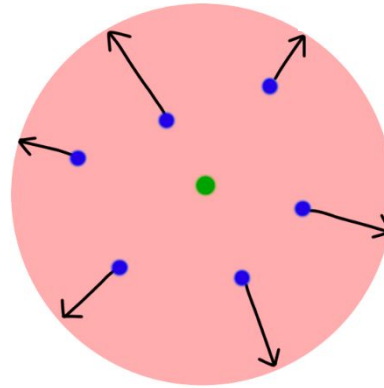
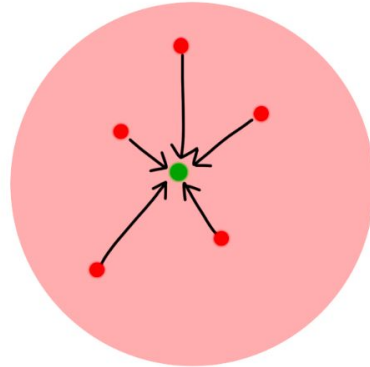


$$f(|\vec{T} - \vec{p}_i|) = 2 - |\vec{T} - \vec{p}_i|; \quad g(|\vec{T} - \vec{p}_i|) = |\vec{T} - \vec{p}_i|$$

Long-term Behavior

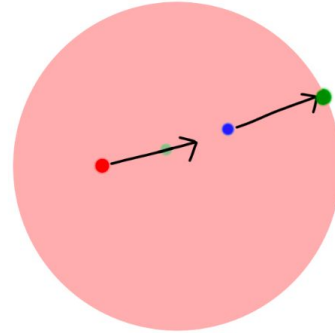
- Hipsters diverge
 - Reach equilibrium on the boundary
- Conformists converge
 - Reach equilibrium at \vec{T}

- Hipsters
- Conformists
- Trend Equilibrium
- Trend Movement

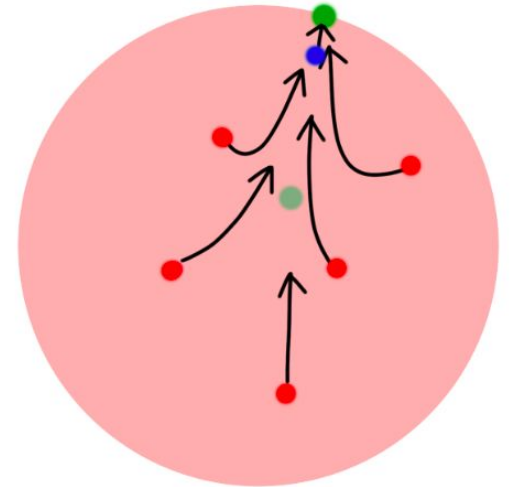


Long-term Behavior




- Conformists chase hipsters
- Hipster gets cornered
- Hipsters = celebrity



$$\vec{T} = \vec{H}$$



Further Development

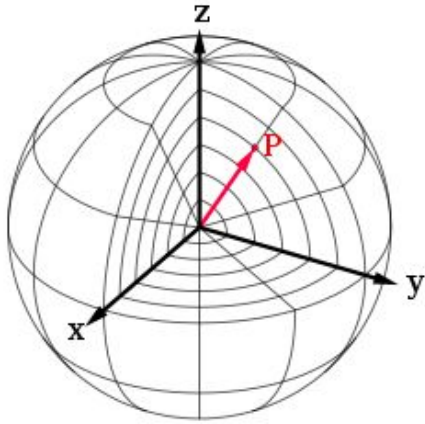
-  The model can be changed to account for the idea that different types of social interaction might be more convincing than others.
Ex) Are you willing to do a makeover based on what people tell you face-to-face?
 -  In the age of internet trolls, how representative of general opinion is social media? Will many people try to buck the trend for the lulz? How?
 -  Studying this interdependence is a promising and relevant
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1. Company's Strategy



- Increase demand
 - Fashion trends change quickly in the Age of Information
 - The trend is dependent largely on hipsters, so keep track of the hipster trend.
 - Advertise by getting hipsters to use their product so conformists will follow them (ie. celebrities)
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2. Additional Aspect of Style



- Sphere: Increase the dimension of the model for each additional aspect of style . (Assuming that the aspects are related)
 - Two separate color wheels to represent two different aspects of styles. (Assuming both aspects are independent)
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3. Dependence on Initial condition

- In our analysis, we randomized the starting trend.
 - End-behavior is the same
 - What changes is the equilibrium point of T (i.e. the adopted).
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Reference

Touboul, Jonathon, “The Hipster Effect: When Anticonformists All Look The Same,”
<https://arxiv.org/abs/1410.8001> . Accessed October 2019

Thank you!

Ji Na You, Mian Wang, Sanford Lu
