Presentation for INFO I-501: Introduction to Informatics; Fall 2017
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Information Evolution in Social Networks

Lada A. Adamic, Thomas M. Lento, Eytan Adar, Pauling C. Ng
(2016)

Video Credit: BI Science (*https://www.youtube.com/watch?v=6iHZi-z7H4o*)

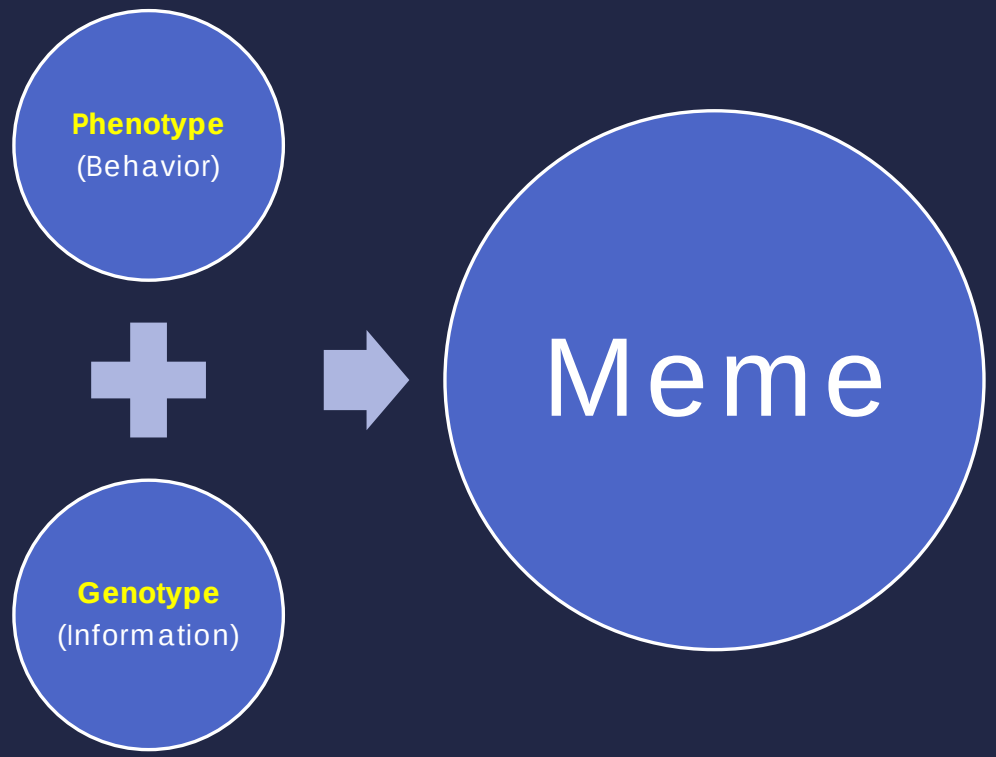
Focus of This Paper

- Chinese Whispers
- Studying the **Dissemination** and **Evolution** of ‘Memes’ to understand how we **INTERPRET** information that reaches us through social media.

PART I

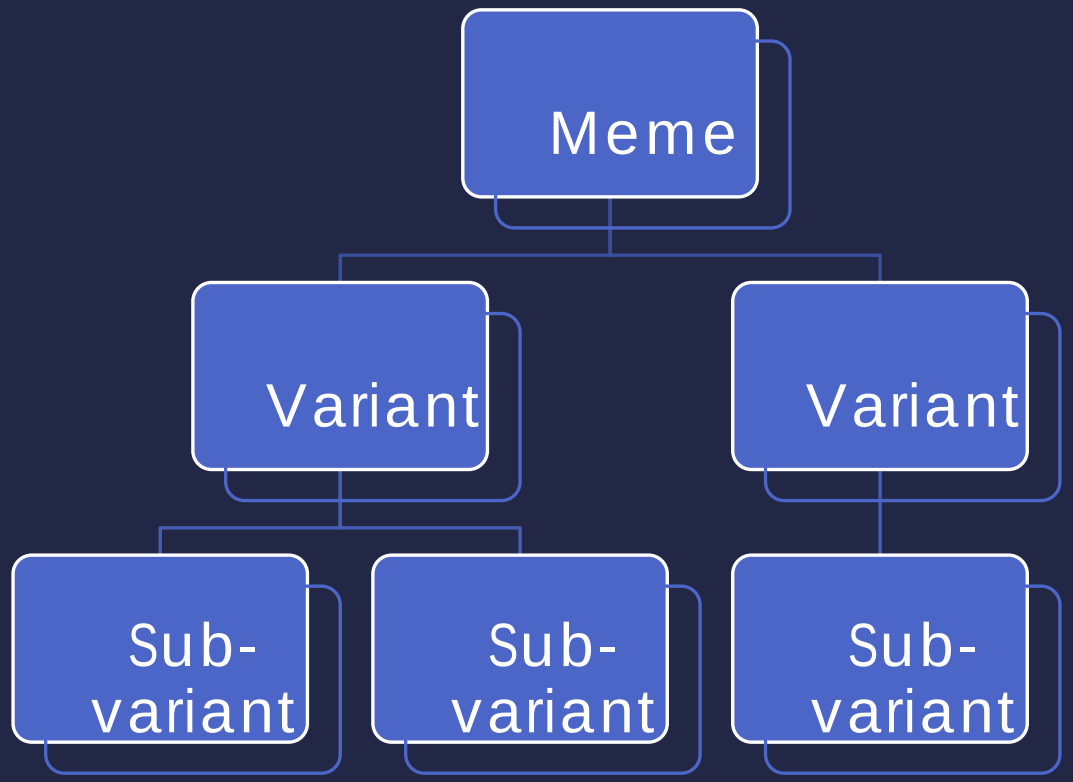
Exploring and Analyzing the Research Work

Introducing the ‘Meme’

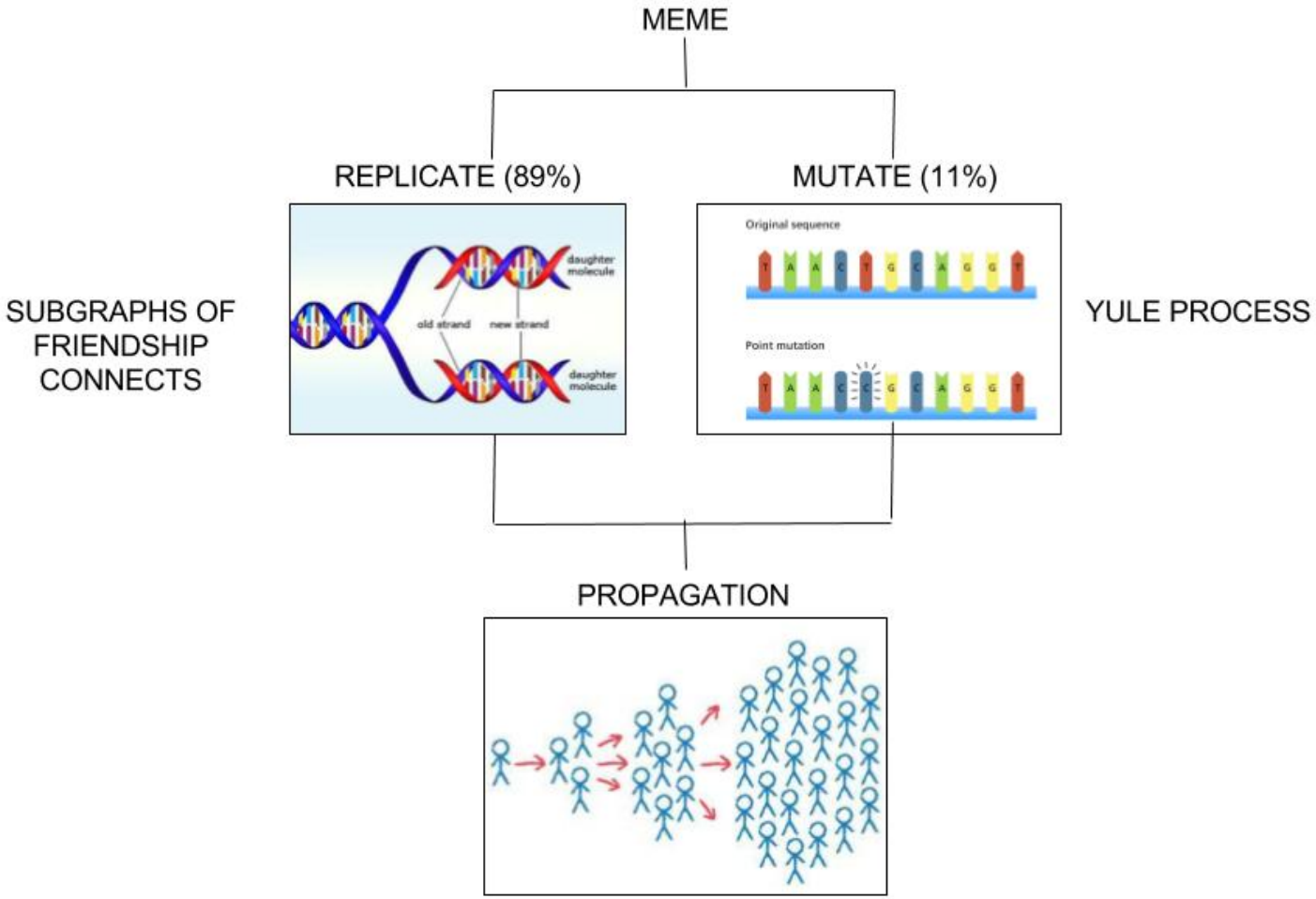


- Richard Dawkins in his famous 1976 book, ‘*The Selfish Gene*’
- Evolution can go beyond genetic level to behavioral level
- **‘Meme’ is the behavioral equivalent the Gene**
- We are interested in ‘Meme’ as a cultural unit

The Experiment



- **Memes propagate as variants**, not necessarily isolated
- Overall **meme popularity** is determined by the sum of popularity of individual variants
- The authors took **460 million variants** of thousands of **textual** memes on **Facebook only**, both copied and modified as the data set



Characteristics of Memes

Compound Effect of Mutation and Replication over several generation lead to

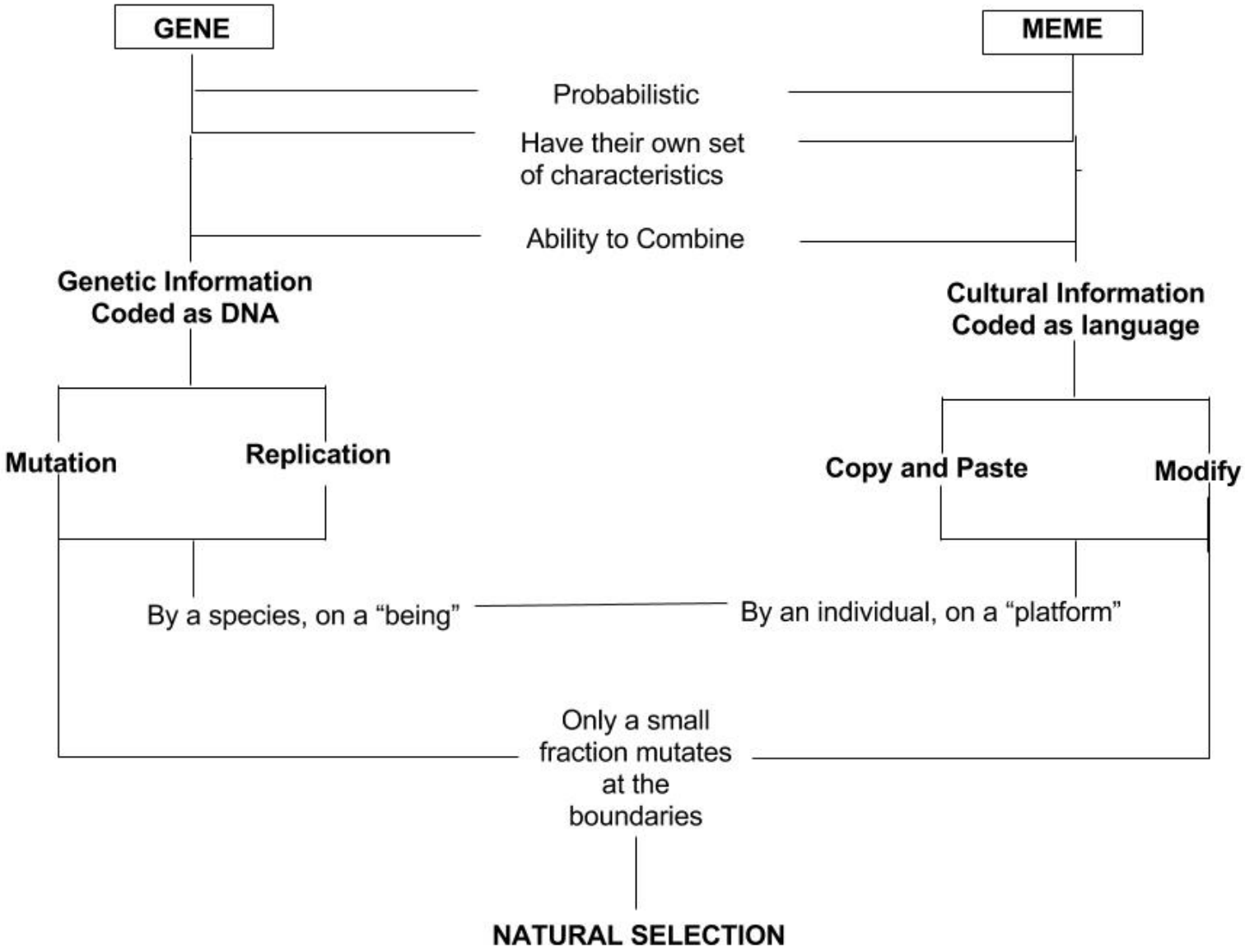
Evolution

Image Courtesy: wonderwhizkids.org, genome.org, newsocialmediageek.com

Darwin’s Theory of Evolution

- More individuals are produced each generation that can survive
- Variation is heritable
- Survival of the fittest
- New species will form when reproductive isolation occurs

- “Variants”
- “Variants” inherit certain properties from source
- Most popular variants populate newsfeed
- Each meme has its own set of variants (open to interpretation)



Similarity between Genes and Memes

Differences between Genes and Memes

GENE	MEME
Genetic	**Cultural**
Long Time to Evolve (Millions of Years)	**Short Time to Evolve (Few Years)**
Blind and ‘just’ fitness function	**Fitness function may depend on cultural factors**

Scaling in Networks for Memes (Theory)

Growth

- Replication Instructions
- Depends on
  - Length
  - **Message Completeness**
  - Frequency of posting
  - **Individual posting habits**
  - marketing campaign
    - **Facebook Ranking Algorithm**

Preferential Attachment

- Uneven popularity of variants (“Power Law”)
- Depends on
  - **Current affairs**
  - Relatability
  - **Source**
  - Type (Humor, Political satire)
    - **Study of political inclinations**

Reference - “Emergence of Scaling in Random Networks”, Barabasi and Albert (1999)

Outliers/ Exception Conditions Considered

- **Promoted** Memes
- Memetics that go **beyond Facebook** sharing
- Memes which encourage **customization** through template format
- (Not Included in Paper, but interesting to look at) How features like ‘tagging’ and ‘sharing’ keeps memes ‘**alive**’ beyond their lifetime
  - BUT paper says meme evolution is time-independent

PART II

Questions, Discussion and Future Scope of Study

INFORMATION EVOLUTION IN SOCIAL NETWORKS

WHAT OTHER KINDS OF INFORMATION CAN BE CONSIDERED?

News, Stories, Photos, Events, etc.

The data sets are from 2011 and majorly textual. Memes today are more image-based. How do memes evolve in image format?

WHAT ABOUT OTHER SOCIAL NETWORKS?

- What about inter-platform sharing?
- What about time-specific social networks like Snapchat?
- “Character limits on status updates …… curtailed replication ability of memes.” What about Twitter?

CAN INFORMATION EVOLUTION BE USED IN OTHER FIELDS OF INFORMATICS?

I believe this was partly ‘Social Informatics’ and partly ‘Complex Systems’?

- **Security** - Computer Virus/ Malware (Richard Dawkins)
- **Complex Systems** - Optimization problems

SOME OTHER QUESTIONS

Click to add text

- Application of Graph Theory in memetics? **
- Why not try the reverse? - Application of memetics to genetic theories (Is there any work being done?)

** "Automatic Theory Formation in Graph Theory", Piston &Wainer, 1999

Questions/ Comments?