Identifying The Influential Bloggers in a Community

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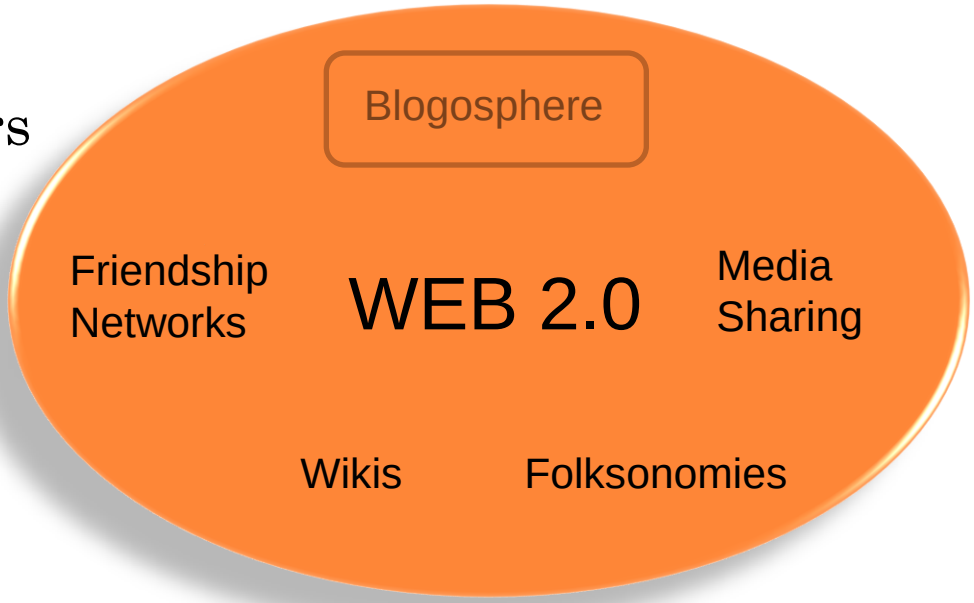
Outline

- Introduction
- Importance
- A Preliminary Model
- Challenges
- Experiments and Results
- Future Work

Introduction

- Past 15 years Computers and Internet have revolutionized the communication.
- People can connect with each other beyond all geographical barriers, across different time zones.
- Humongous mesh of social interactions: Social Network.



- Web 2.0 has catalyzed this process with easy-to-use interface and desktop like experience.

Blog Sites

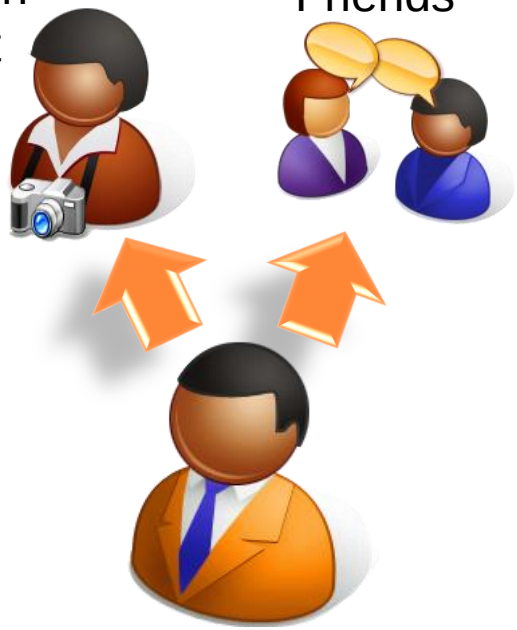
- Individual blogs
- Community blogs

Individual Blog Sites	Community Blog Sites
Owned and maintained by individual users.	Owned and maintained by a group of like-minded users.
More like personal accounts, journals or diaries.	More like discussion forums and discussion boards.
No or almost negligible group interaction.	High degree of group discussion and collaboration.
No or almost negligible collective wisdom.	Enormous collective wisdom and open source intelligence.

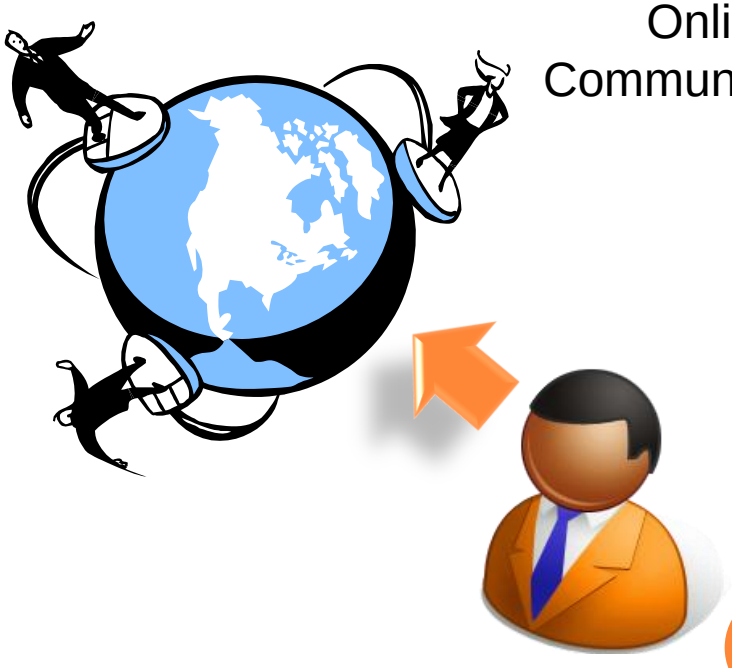
Physical and Virtual World

Domain Expert

Friends



Online Community



Physical World

Virtual World

Introduction

- Inspired by the analogy between real-world and blog communities, we answer:

  Who are the influentials in Blogosphere?

  Can we find *them*?

  ?

  Active Bloggers = Influential Bloggers

- Active bloggers may not be influential
- Influential bloggers may not be active

Why are the influentials interesting

- Market Movers: "*word-of-mouth", trust and reputation*
- Sway opinions: *Government policies, campaign*
- Customer Support & Troubleshooting
- Market research surveys: "*use-the-views*"
- Representative articles: *18.6 new blog posts per sec*
- Advertising

Searching The Influentials

- Active bloggers
  - Easy to define
  - Often listed at a blog site
  - Are they necessarily influential
- How to define an influential blogger?
  - Influential bloggers have influential posts
  - Subjective
  - Collectable statistics
  - How to use these statistics

Intuitive Properties

- Social Gestures (*statistics*)
  - Recognition: Citations (incoming links)
    - An influential blog post is recognized by many. The more influential the referring posts are, the more influential the referred post becomes.
  - Activity Generation: Volume of discussion (comments)
    - Amount of discussion initiated by a blog post can be measured by the comments it receives. Large number of comments indicates that the blog post affects many such that they care to write comments, hence influential.
  - Novelty: Referring to (outgoing links)
    - Novel ideas exert more influence. Large number of outlinks suggests that the blog post refers to several other blog posts, hence less novel.
  - Eloquence: "goodness" of a blog post (length)
    - An influential is often eloquent. Given the informal nature of Blogosphere, there is no incentive for a blogger to write a lengthy piece that bores the readers. Hence, a long post often suggests some necessity of doing so.
- *Influence Score = f(Social Gestures)*

A Preliminary Model

- Additive models are good to determine the combined value of each alternative [Fensterer, 2007]. It also supports preferential independence of all the parameters involved in the final decision. A weighted additive function can be used to evaluate trade-offs between different objectives [Keeney and Raiffa, 1993].

$$InfluenceFlow(p) = w_{in}\sum_{m=1}^{|\iota|} I(p_m) - w_{out}\sum_{n=1}^{|\theta|} I(p_n)$$

$$I(p) \propto w_{comm}\gamma_p + InfluenceFlow(p)$$

$$I(p) = w(\lambda)\times(w_{comm}\gamma_p + InfluenceFlow(p))$$

$$iIndex(B) = \max(I(p_l))$$

Understanding the Influentials

- Are influential bloggers simply active bloggers?
- If not, in what ways are they different?
  - Can the model differentiate them?
- Are there different types of influential bloggers?
- What other parameters can we include to evolve the model?
- Are there temporal patterns of the influential bloggers?

How to Evaluate the Model

- Where to find the ground truth?
  - Lack of Training and Test data
  - Any alternative?
- About the parameters
  - How can they be determined
  - Are they all necessary?
    - Are any of these correlated?
- Data collection
  - A real-world blog site
  - “The Unofficial Apple Weblog”

Active & Influential Bloggers

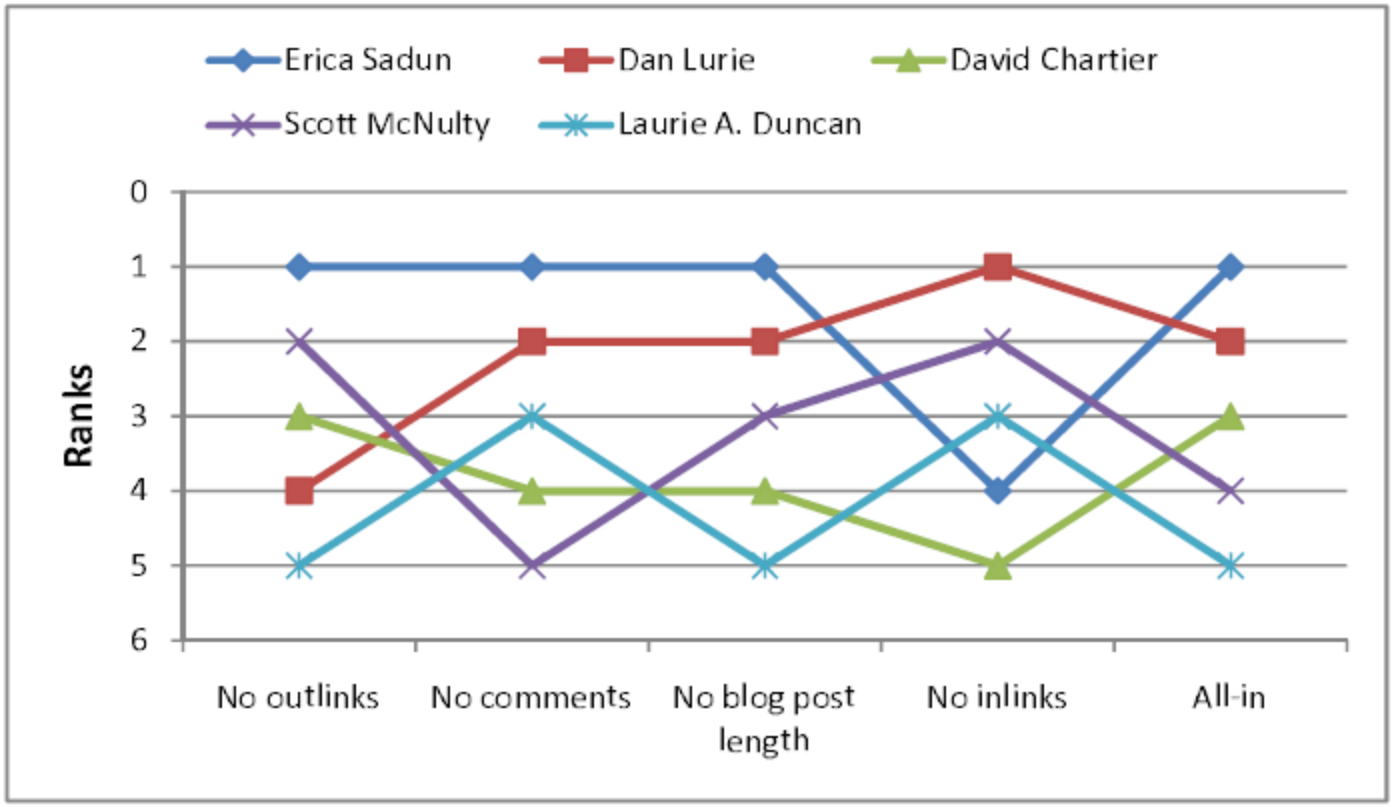
Top 5 TUAW Bloggers	Top 5 Influential Bloggers
Erica Sadun	*Erica Sadun*
Scott McNulty	Dan Lurie
Mat Lu	*David Chartier*
David Chartier	*Scott McNulty*
Michael Rose	Laurie A. Duncan

- Active and Influential Bloggers
- Inactive but Influential Bloggers
- Active but Non-influential Bloggers

- We don't consider "Inactive and Non-influential Bloggers", because they seldom submit blog posts. Moreover, they do not influence others.

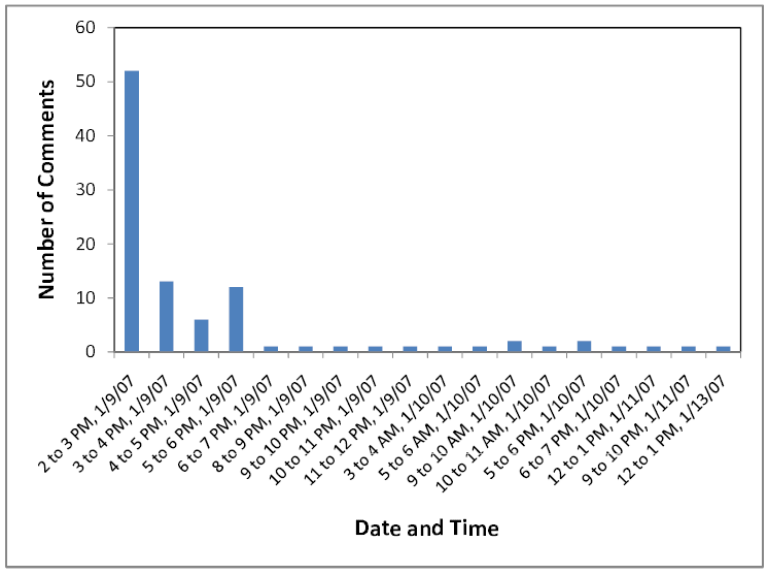
Lesion Study

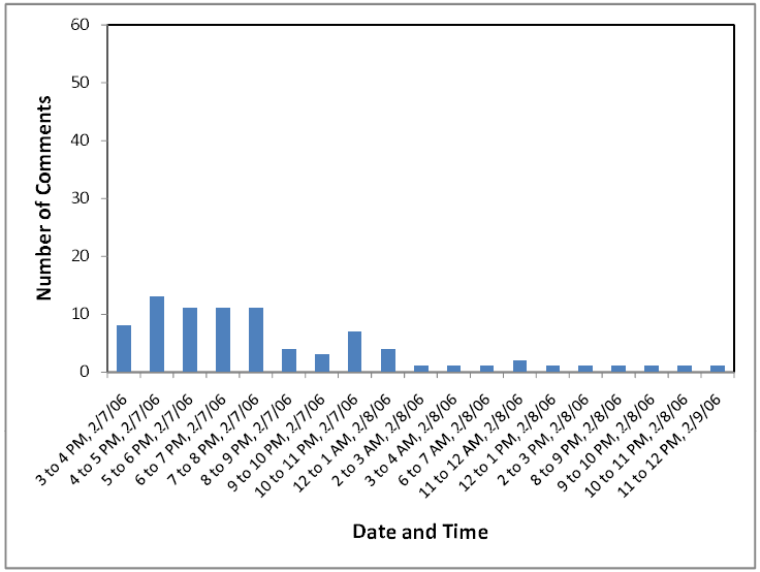
- To observe if any parameter is irrelevant.



Other Parameters

- Rate of Comments

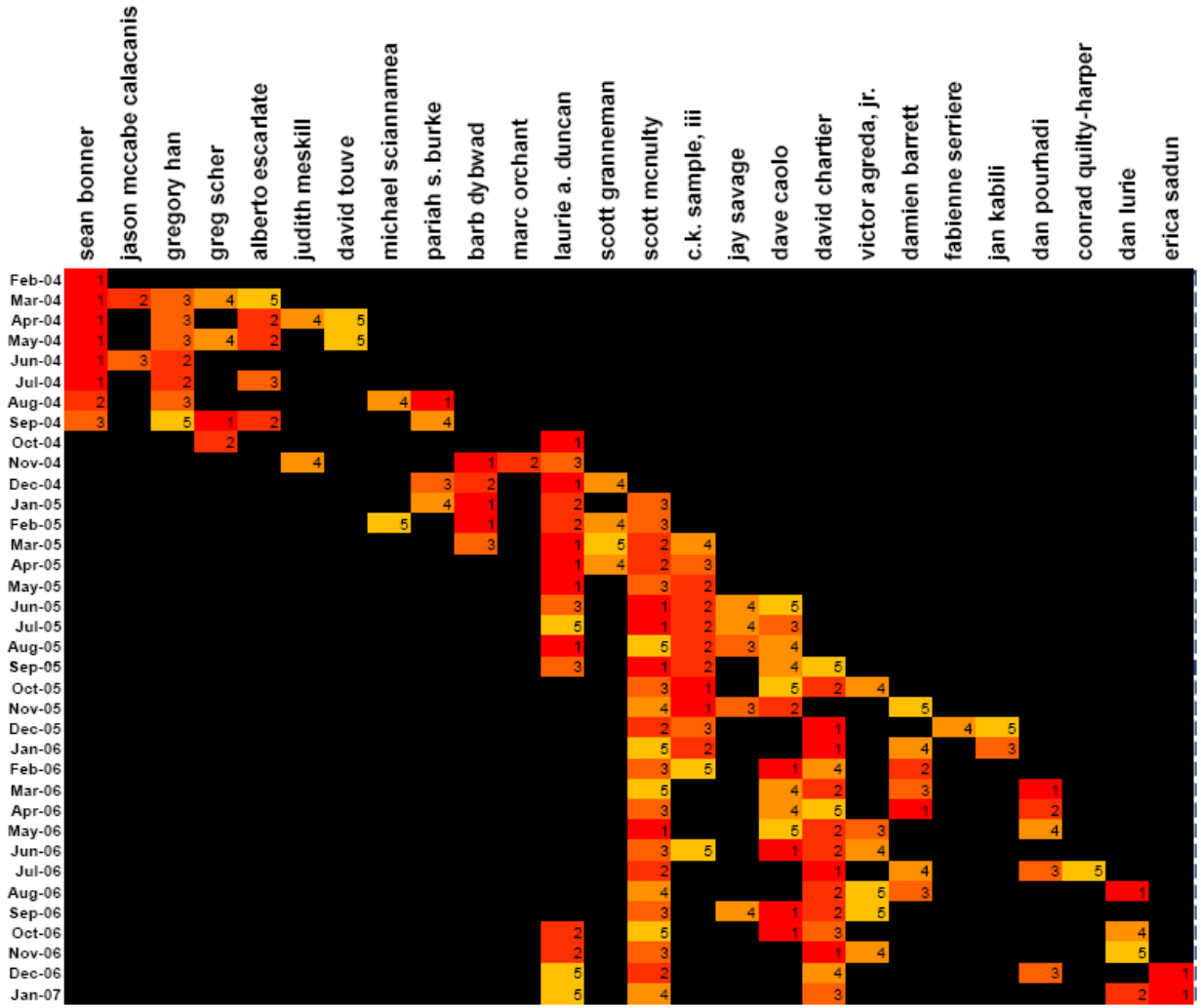




"Spiky" comments reaction

"Flat" comments reaction

Temporal Patterns of Influential Bloggers



- Long term Influentials
- Average term Influentials
- Transient Influentials
- Burgeoning Influentials

Verification of the Model

- Revisit the challenges
  - No training and testing data
  - Absence of ground truth
  - Subjectivity
- We use another Web 2.0 website, Digg as a reference point.
- "Digg is all about user powered content. Everything is submitted and voted on by the Digg community. Share, discover, bookmark, and promote stuff that's important to you!"
- The higher the digg score for a blog post is, the more it is liked.
- A not-liked blog post will not be submitted thus will not appear in Digg.

Verification of the Model

- Digg records top 100 blog posts.
- Top 5 influential and top 5 active bloggers were picked to construct 4 categories
- For each of the 4 categories of bloggers, we collect top 20 blog posts from our model and compare them with Digg top 100.

Bloggers	Active	Inactive
Influential	S1: 17	S2: 7
Non-influential	S3: 3	S4: 0/1

Bloggers	Active	Inactive
Influential	S1: 71	S2: 14
Non-influential	S3: 8	S4: 7

Bloggers	Active	Inactive
Influential	S1: 327	S2: 42
Non-influential	S3: 131	S4: 35

- Distribution of Digg top 100 and TUAW's 535 blog posts

Verification of the Model

- Observe how much our model aligns with Digg.
- Compare top 20 blog posts from our model and Digg.
- Considered last six months

	Jun 2007	May 2007	Apr 2007	Mar 2007	Feb 2007	Jan 2007
All-in	14	16	12	15	10	12
No Inlinks	3	4	3	3	1	0
No Comments	8	8	5	4	5	4
No Outlinks	11	8	5	4	4	7
No Blog post length	12	14	11	15	9	10

- Considered all configuration to study relative importance of each parameter.
- **Inlinks > Comments > Outlinks > Blog post length**

Potential applications

- Improving the preliminary model
  - Can we involve more parameters?
  - Quality vs. Quantity of comments
  - "Goodness" of blog post estimation techniques
  - Can we learn the model weights given various statistics
    - Each weight parameter likely follows its own distribution
- Community evolution
  - How does a community evolve around the influentials?
  - Do the influentials cause topic drift and how?
  - Can we experimentally study the roles and impact of the influentials?

Potential applications

- Trust and reputation
  - How can this work help in studying trust and reputation
    - Intuitively, an influential one is usually trustworthy
  - Trust initialization
    - Existing work focus on trust propagation
  - Is trust a serious issue on the blogosphere?
    - Splogs and collective wisdom
    - Important and sensitive in friendship networks
- Expert identification
  - Identifying the influentials on a set of blog sites of common topic theme: Experts
  - Comparing the influentials from different blog sites
    - Normalizing various collectable statistics across different blog sites

Concluding Remarks

- Ample opportunities for influential bloggers
- Influence: A subjective concept
- Challenges:
  - Model development
  - Evaluation & Verification
  - Data collection