Web of Documents, Web of People, and Web of Creativity

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Joint work with Masahiro Hamasaki (AIST)

Outline

- Community Web
  - The model for Community Web
  - Social media
  - Massively collaborative creation
- Social analysis of massively collaborative creation on a video sharing site
- Conclusion
The new iMac.
With iTunes + CD-RW drive.

Information Circulation

Collect → Create → Donate

Google  HTML editors  WWW Servers

• A new cycle is emerged!

Modified from Ben Shneiderman’s matrix of human activities (“Leonardo's Laptop”)
Information Circulation

- Collecting information
  - Past: Libraries (limited just for books)
  - Now: Google
- Creating new information
  - Past: creating from the scratch
  - Now: creating with knowing other existing information
- Donating (publishing) information
  - Past: Books, Journals, Mass Media (difficult part for ordinary people)
  - Now: WWW

Internet as Information Activities
Change of Information Circulation System

- **Pros:**
  - Change of power: from limited people to everyone
  - Change of scale: from limited sources to unlimited sources
  - Change of content: from qualified contents to everyday/everyone contents

- **Cons:**
  - Lost of control
    - Even criminal information can be distributed
  - Lost of quality assurance

Information and Communication Activities

- Two layers for our activities
  - *Information layer* concerns how information is explicitly represented and processed.

Information Layer

- Collect
- Create
- HTML editors
- WWW Servers
- Donate

Google

something is missing

People!
Information and Communication Activities

- Two layers for our activities
  - Information layer concerns how information is explicitly represented and processed.
  - Communication layer concerns how relationship among people are organized and maintained, which is potential route for information.

Web as Communication

- Web was created for research community
- It is designed mainly for data and information exchange
- But it was soon used for communication too
Web as Communication

- Typical Web Page
  - Data and information on research
  - Information for self introduction
  - What’s new
  - Links for colleagues
  - Pages for groups

Information for Communication

Weblog(Blog)
SNS
Wiki
Blog

- Publishing information through identification over time

Information Layer

- Collect
- Create
- Donate

Communication Layer

- Relate
- Collaborate
- Present

Blog as Identity for individual

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SNS

- Communication and publishing with personal network

Information Layer

- Collect
- Create
- Donate

Communication Layer

- Relate
- Collaborate
- Present

SNS
Publishing with collaboration

Information Layer

- Collect
- Create
- Donate
- Present

Communication Layer

- Relate
- Collaborate

Community Web

- Explicit support for both layers
- Seamless support over two layers
- Compound support over two layers: social media and its extension
Social Media

- Media consists of interaction among massive participants that are widely distributed in the society.
  - Via Social Network
  - Via Communities
- Examples
  - Mass Media (TV, News Papers) …No
  - Web … No in general
  - BBS … Yes
  - Blogs … Yes
  - SNS … Yes
  - Social tagging (Social bookmarking, Social news)… Yes
  - Video Sharing … Yes

Massively Collaborative Creation

- Creative activity through social media
- Examples
  - BBS
  - Q&A Sites (Yahoo! Answers[usa], Yahoo!Chiebukuro[jp], Naver Knowledge iN [kr] …)
  - Wikipedia
  - Nico Nico Douga (Video sharing site) cf. Youtube
- Features
  - Massive participation
  - Generating new contents
  - Interaction affects generation of new contents
Massively Collaborative Creation (cont.)

- Different ways of affections by interaction to content creation
  - Contents = Interaction
    - Interaction logs are used as contents
    - Ex.) BBS, Q&A, etc
  - Interaction influences content generation
    - Content \(!=\) Interaction
    - Contents are generated under the influence of interaction
    - Ex.) Flickr (images vs. tags), Youtube (movies vs. comments),
  - Interaction is embedded into content generation
    - Contents are created collaboratively
    - Ex.) Wikipedia, Nico Nico Douga

What is “Nico Nico Douga”?

- **Nico Nico Douga** is the one of the most popular video sharing website in Japan
  - The most interesting function is the direct overlaying of comments on videos
Three types of interaction on Nico Nico Douga

- **Embedded interaction on the system**
  - Audience and Audience
    - Sharing comments to same video
    - Feeling pseudo synchronization
      - Users feel they watch a video together!
  - Audience and Creators
    - Good feedback for creators
      - Creators can get pin-point comments from users
  - Creators and Creators
    - Audience become a creator

Hatsune Miku

- *Hatsune Miku* is a version of singing synthesizer application software ("vocaloid")
  - A user can make a singing song by giving a music note with lyric (piano roll)
- It has inspired many people to produce various music, picture, and video compositions
Example!!

- Title: **Shooting star –short ver.- like an ending movie**
- Creator: **ussy**
- URL: [http://www.nicovideo.jp/watch/sm2030388](http://www.nicovideo.jp/watch/sm2030388)

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Re-using network on Nico Nico Douga & Hatsune Miku

- **Many pictures** by many authors
- **Song**
- **3D model**
- **Movie**
- **Picture**
- **Shooting star**
- **3D Miku sings ‘01_ballede’**

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**Shooting star –complete ver.-**
Creator: **FEDis**

**Shooting star –short ver.-**
Like an ending movie
Creator: **ussy**

**3D model**

**3D Miku sings ‘01_ballede’**
Creator: **kiokio**

**melody… 3D PV ver1.50**
Creator: **ussy**

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A part of network of re-using relationship among creators using Hatune Miku on Nico Nico Douga

Our interests
• What types of social network do creators have?
• How different types of creators interact to create new content through their social network?

Our approach
• We adopted a method of social network analysis

Findings
• The creator’s network consists of a large and sparse component
• Different categories of creators have different roles in evolving the network
• Creators’ behavior is similar to audiences’ one
  ■ It likes Web2.0 style (A consumer is a creator!)
• Some of communities in the network are centralized, and have specific tags
• The characteristic (“a few popular creator and others”) becomes stronger with time
Social Data of Hatsune Miku on Nico Nico Douga

- 36,709 videos with tag ‘Hatsune Miku’ (31 May 2008)
- Select 7,138 videos viewed more than 3,000 times
  - Crawled during 1–5 June 2008
  - The metadata include view times, uploaded date, uploader name, tags, and a description
- 7,138 videos were uploaded by 2,911 unique contributors
  - Note:
    - We regard the uploader as the video creator
    - On Nico Nico Douga, only the uploader is identified
    - The uploader may not be the creator of the video

How to make networks among movies

- The description of the movie often includes hyperlinks to other videos showing trail of the video’s creation
  - On Nico Nico Douga, a creator often cites other videos if a sound, image, or any part of another video is used as acknowledgement
- By tracing these hyperlinks, we generated a reference network of videos
- Among the collected videos, 4,585 videos include hyperlinks in the description
- Movie network
  - 4,585 nodes (videos)
  - 12,507 links (hyperlinks)
How to make network among creators

- We set a relation from creator of video $A$ to creator of video $B$ if video $A$ has link to video $B$
  - It implies that Creator $A$ uses contents of Creator $B$
- In this way, we generated a network among creators

- Creators network
  - 2,164 nodes (creators)
  - 4,368 links (relationships among creators)

- We regard this network as a social network of creators
Characteristics of the Creators Network

- The network is large and sparse
  - The diameter of this network is 21

- Scale free network
  - A few nodes (creators) gather many links (citation)

- Network centrality correlated to the number of play times
  - Many cited videos are popular for users
  - Creators’ behavior is similar to audiences’ one
Category of Creation Activity

- We classified creative activities related to Hatsune Miku into four categories:
  - **Songwriting**
    - Create an original song (lyrics and melody)
  - **Song creation**
    - Tune the software to create singing songs
  - **Illustration**
    - Draw pictures, textures, and create 3D models
    - Produce many different scenes and facial expressions
  - **Editing**
    - Choice videos and package them to one video

- We classify creators semi-automatically using tags on videos

Relationship among categories of creation

- Many creators re-use **Songwriting creators’** contents
- Many **Illustration creators** re-use others’ contents
Community on Creators Network

- We analyze the creators’ community
  - The term ”creators’ community” means a tight group of nodes within social network of creators
  - We adopt Newman clustering to detect such communities from the social network of creators

- Newman clustering generated 83 clusters (communities) from the social network of creators
- We especially investigated 7 clusters of which the size is greater than 50
Structure of the biggest clusters

- **Centralization**: an index of the centrality of a network
- **$X^2$**: a degree of bias of tags in the clusters
- **Key person**: a node that has the most links
  - The number of links of the node should be more than 10 percent of the cluster

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W: SongWriting, C: Song Creation, I: Illustration

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Structure of the biggest clusters

- Songwriting is often a key person, meaning that Songwriting triggers creative activity
- Centered clusters often have a high degree of bias of tags
  - Centralized community often have community specific tags

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W: SongWriting, C: Song Creation, I: Illustration
Cluster 1

- **Type**
  - Centered
- **Key person**
  - **Songwriting**
- **Majority**
  - **Illustration**

Cluster 2

- **Type**
  - Messy
- **Key person**
  - none
- **Majority**
  - **Illustration**
Cluster 3

The key person of this cluster introduced a character called "Hachune Miku" (an infantilized version of the Hatsune Miku mascot) with leak

- Type
  - Centered
- Key person
  - Illustration & Song creation
- Majority
  - Illustration, Song creation

Cluster 4

- Type
  - Messy
- Key person
  - None
- Majority
  - Illustration
Cluster 5

- **Type**
  - Centered
- **Key person**
  - **Illustration**
- **Majority**
  - **Illustration**

The key person of this cluster developed the tool to program complex motions to 3D model.

Cluster 6

- **Type**
  - Centered
- **Key person**
  - **Songwriting** & **Illustration**
- **Majority**
  - **Song creation**
Cluster 7

- Type
  - Centered
- Key person
  - Songwriting
- Majority
  - Song creation

Conclusion

- Our use of Web is shifting
  - Web of Documents: Linking documents is New! Cool!
  - Web of People: Linking people is New! Cool!
  - Web of Creativity: Linking creative activity is New! Cool!
- The model
  - “Community Web” model
    - 3 Information activities and 3 Communication activities
    - Creative activity is a composite of the above 6 activities
- Massively Collaborative Creation
  - A new style of creation
  - A natural extension of our use of web
  - A full use of “community web” activities