Overview of Social Network

- Definition of Social Network
- Terminology and Social Networks
- Classification of Social Networks
- User Generated Content, UGC
- Measures of Social Networks
- Recommendations and complexity
- Mobile Medicine
  - A view inside a social network
Introduction

- With the users demand in collaborating and sharing information some Social Networks have been created

- **Social Networks** are (OECD, Organisation for Economic Co-operation and Development) web portals that:
  - Allow users to provide and share User Generated Content
  - Allow users to valorize their creative effort, the content should be originally produced by the users, take a picture, compose a set of images, sync. images and audio, etc.
  - Allow users to produce content by using solutions and non professional techniques

- Other solutions using UGC are Blogs, Wiki, Forum, etc.

Terminology

- **Social Network**
  - A paradigm of user interaction and behavior on the web

- **Social Media**
  - A Social network based on media

- **Social TV**
  - A TV based on Social Networking principles, with the support of UGC, etc.

- **Social Network Analysis**
  - The discipline to analyze the social network in terms of user clustering and relationships, metrics for SN assessment, etc.
  - It can be used to better understand motivation and rationales of success and/or problems.
Classification of Social Networks

**Content Based Social Network:**
- Collect content and show them to users according to their preferences
- Content correlation
- Content recommendations
- Examples: YouTube, Last.fm, Flickr

**User Based Social Network:**
- User collection, user profiled
- Audio and video are used to better describe the user profile, in some cases, they are only visible to their friends
- User Recommendations, taking into account a large number of user description aspects
- Examples: FaceBook, Orkut, Friendster
- MySpace is a mix of both categories.

Votes/ranks, Comments, preferred

**Users may leave on Content and Users:**
- Comments
- Ranks and Votes

**Comments may be left as:**
- Text or content

**User may mark the preferred content and users (friends):**
- Preferred content are accessible with a direct list to shortening the time for their play
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### User Generated Content, UGC

#### Conditions that Facilitated the grown of UGC
- Reduced costs for equipments which allow the personal content production: cameras, smart phones, etc.
- Reduced costs of connection, increment of broadband diffusion
- More Web Interactive capabilities: Ajax, JSP
- Creative Commons Licensing/formalisms, increment of confidence

#### Pros and Facilitations
- Growing of WEB sites that host your content and provide some tools to make them accessible on web for your friends
- Natural selection/emergence of better UGC items, increment of visibility for some of UGC users…
- Annotation and reuse of UGC of others
User Generated Content

Cons and problems

- Restricted social penetration since only IT skilled and a certain economical capability may access now
- Lack of formal Privacy control
  - Too many information are requested
  - Some people do not expose their true personal info
- IPR problems:
  - Violation of IPR of third party, free usage of UGC
  - Lose of control of your own UGC
  - Reuse and annotation of professional content

- Lack of interoperability for users and content among different social networks:
  - Initially performed to keep connected the users
  - Secondly a point of cons since users tend to pass from one SN to another
- Content is not completely defined in terns of Metadata
- Competitions of UGC against professional content, producers are against their support and diffusion
- Growing costs for the SN providers
  - Content volume in the hand of the SN organizers is growing
    - Users would like to see older content still accessible
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User Activities on Social Networks

  - 68000: active users
  - 32 millions of lurkers
  - While the 1000 more active users produced the 66% of changes.

- Similar numbers in other portals:
  - 90% lurkers
  - 9% occasional users
  - 1% active users
  - 90% is produced by the 1% of active users
  - 10% is generated by the 9% of users including the occasional
Social Network Activities meaning

- Since the 90% is managed by a small percentage of active users:
  - Votes are also produced with the same small part of the community
  - Comments are also produced with the same small part of the community
  - Pushers are frequently needed to create activities and waves into the Social Networks, they create fashions and interests among the lurkers, etc...

- Number of plays are produced by the whole community

The centrality of User profile

- **User Profile Static information**
  - Name, surname, Nationality
  - Genre, age, languages, etc..other personal info,..
  - School, work, family, etc.
  - photo, etc..
  - Economical data

- **User Profile Dynamic Information**
  - Explicit Preferences in terms of content, friends, votes, ranks, recommendations, etc..
  - Actions: play, comments, votes,
  - Frequency of access
  - Etc.
Relevance of Users

- **Number of Connections with other users**
  - Direct connections,
  - Second and third level connections,
  - Etc.

- **Number of accesses to their**
  - Profile page (if any)
  - Posted and/or preferred content
  - Comments
  - Groups

- **Users’ Activities**
  - Number of posted content
  - Number of posted comments
  - Number of votes, etc.
  - Number of accesses

**Stanford Social Web**
Issues on Communitie Graphs

- Presence of a main Center of gravity
  - Presence of dense groups
- Presences of remotely located smaller Groups
  - Self connections among these people
  - Some of these smaller remote groups are linked with the rest via 1 or more chains of single people
    - Depending on their activities, there is a risk of losing those communities is evident
- Number of Connections
  - Distribution of connections

Shortest path from one person to another

MIT: 6.4 hops

Stanford: 9.2 hops
Metriche per le Social Network

- Social Network Analysis
- Degree of Centrality per un Nodo:
  - Numero di collegamenti incidenti sul Nodo
- Eccentricity of Centrality per un Nodo:
  - La dist. massima fra le distanze minime di tale nodo e ogni altro nodo della rete
- Closeness of Centrality per un certo Nodo:
  - Reciproc della somma delle distanze tra il nodo e tutti gli altri nodi
- Betweenness Centrality per un certo nodo:
  - Quanta informazione passa per quel nodo. Somme delle quantità di informazione che passa fra tale nodo ed ogni altro nodo della rete.

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Recommendations

- They are a means for the
  - Usage of content/object info to find/propose users
  - Usage of users info to find/propose content
  - Usage of users info to find/propose other users
  - Etc..

- Different Recommendations
  - U → U: a user to another user on the basis of his profile
  - O → U: an object at a user on the basis of his profile
  - O → O: an object on the basis of a played object of a user
  - G → U: a group to a user
  - Etc…

- Objects can be Advertising, Ads, Content, Events, Groups, etc…..

Different Recommendations

- FOR YOU: Suggesting Users to another Users since they
  - have similar preferences
  - like/prefer what you like/prefer
  - are friends of your friends
  - are in one or more of the your groups
  - are new of the SN!
  - are the most linked, the most grouped, etc.

- FOR THE SN: Suggesting Users to another Users since they
  - are important for the SN and do not have to left alone, the new entry
  - are the only contact path for Connecting a remote group, if the path is left a peripheral group will be completely disjoined with respect to the rest of the SN
  - …
Complexity of Recommendation

- **Each day N new users** reach the SN,
  - The SN has to suggest its possible friends immediately:
    - 1 Million of users in the SN (number of users, U=10^6)
    - N*U distances to be estimated in real time/per day
    - Complexity is an O(NU)
  - Thus: 10^12 estimations of 10ms, thus 10^10s, 317 years !!!
- **Each day M new UGC items** are posted on the SN,
  - The SN has to estimate the distance of that content with respect to all the other items/objects and users:
    - 1 Million of content in the SN (number of content, C=10^6)
    - M*C distances to be estimated in real time/per day
    - M*U distances to be estimated in real time/per day
    - Complexity is an O(MC+MU)
  - Thus: 10^12 estimations of 10ms, thus 10^10s, 317 years !!!

SN Comparison on Users

<table>
<thead>
<tr>
<th></th>
<th>YouTube</th>
<th>Flickr</th>
<th>FaceBook</th>
<th>Linkedin</th>
<th>MySpace</th>
<th>XMF</th>
</tr>
</thead>
<tbody>
<tr>
<td>User profile, descriptors</td>
<td>Y</td>
<td>Y</td>
<td>Y</td>
<td>Y</td>
<td>Y</td>
<td>Y</td>
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<td>Friends</td>
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<td>Y</td>
<td>Y</td>
<td>Y</td>
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<td>Query on Users</td>
<td>Y</td>
<td>Y</td>
<td>Y</td>
<td>Y</td>
<td>Y</td>
<td>Y</td>
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<tr>
<td>Groups and Forums</td>
<td>Y</td>
<td>Y</td>
<td>Y</td>
<td>Y</td>
<td>Y</td>
<td>Y</td>
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<td>Multilingual pages</td>
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<td>Y</td>
<td>Y</td>
<td>Y</td>
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<td>Invitations of users</td>
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<td>Chats, on line, messages</td>
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<td>Y</td>
<td>Y</td>
<td>Y</td>
<td>Y</td>
<td>Y</td>
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<td>Recommendation U-&gt;U</td>
<td>N</td>
<td>N</td>
<td>Y</td>
<td>Y</td>
<td>Y</td>
<td>Y</td>
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<td>User Relevance, User,Obj, Group</td>
<td>Y(UO)</td>
<td>Y(OO)</td>
<td>Y(UG)</td>
<td>Y(UG)</td>
<td>Y(UG)</td>
<td>Y(G)</td>
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<td>User Lists, gen rec. of users</td>
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<td>N</td>
<td>Y</td>
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<td>N</td>
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<td>Y</td>
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<td>Direct call, SMS, Email</td>
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<td>Y</td>
<td>Y</td>
<td>Y</td>
<td>Y(SE)</td>
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<td>Privacy support, Black List users</td>
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<td>Events</td>
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SN Comparison on Content

<table>
<thead>
<tr>
<th>Multimedia, crossmedia UGC</th>
<th>YouTube</th>
<th>Flickr</th>
<th>FaceBook</th>
<th>LinkedIn</th>
<th>MySpace</th>
<th>XMF</th>
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<tr>
<td>Y(M)</td>
<td>Y(M)</td>
<td>Y(M)</td>
<td>N</td>
<td>N</td>
<td>Y(M)</td>
<td></td>
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<td>Audio, Video, Images, Doc</td>
<td>V</td>
<td>I.V</td>
<td>I.D, V</td>
<td>I.D</td>
<td>I.V</td>
<td>A.V,I,D</td>
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<td>Moderated UGC</td>
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<td>N</td>
<td>N</td>
<td>Y</td>
<td></td>
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<td>Comments on Content</td>
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<td>Y</td>
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<td></td>
<td>Y</td>
<td></td>
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<td>Ranking and voting</td>
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<td>N</td>
<td></td>
<td></td>
<td>Y</td>
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<td>General Recommendation O</td>
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<td>Y</td>
<td>Y</td>
<td>Y</td>
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<tr>
<td>Recommendation O→U</td>
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<td>Y</td>
<td></td>
<td></td>
<td>Y</td>
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<tr>
<td>Recommendation O→O</td>
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<td>N</td>
<td></td>
<td></td>
<td>N</td>
<td>Y</td>
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<td>Taxonomy for content/profile</td>
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<td>N</td>
<td>N</td>
<td>N</td>
<td>N</td>
<td>Y</td>
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<td>Play Lists of content</td>
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<td>Y</td>
<td>N</td>
<td>N</td>
<td>Y</td>
<td></td>
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<td>RSS Feeds for content</td>
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<td>Y</td>
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<td></td>
<td>Y</td>
<td>N</td>
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<td>Links with other SN</td>
<td>Y</td>
<td>Y</td>
<td>Y</td>
<td>Y</td>
<td>Y</td>
<td></td>
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<tr>
<td>Mobile Support</td>
<td>Y</td>
<td>Y</td>
<td>Y</td>
<td>Y</td>
<td>Y</td>
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<tr>
<td>DRM/CAS Support</td>
<td>Y(D)</td>
<td>N</td>
<td>N</td>
<td>N</td>
<td>N</td>
<td>Y</td>
</tr>
<tr>
<td>GeoTagging</td>
<td>Y</td>
<td>Y</td>
<td>N</td>
<td>N</td>
<td>N</td>
<td>N</td>
</tr>
</tbody>
</table>

Numbers of YouTube (2009), it is true?

- Google is spending > $2Million per day on YouTube
  - Lose $1,4 – 1,6 million per day on the video site
- $1 Million of bandwidth per day
  - 375 millions of visitors in the 2009, each of them get a video at 400kbit/s
  - Taking into account a rate of 50% of the lowest market rate for mbps per service
- $710.000 for the content acquisition per day
  - They have to pay for Sony, BMG, CBS, etc.
- $66.000 revenue sharing with third party content providers, per day
  - See above, the sharing for the same content of majors
- $36.000 data center: HW, power, SW, location, …., per day
  - Every minute, 15 hours of video are uploaded, 86.000 new full video per week, 20-40 Mbyte for each video
  - storing about 5 PetaByte, $2 per Gbyte, thus $13 million per year of storage.
- $252.000 administrative costs per day
  - which is a percentage of the business, more or less, 38,4 % as the mother company YouTube
YouTube Numbers

- **In the 2006:**
  - 15 million movie per day
  - 2-3 minute per video

- **From Credit Suisse** according to the previous page:
  - Google is losing $470 Millions in 2009 with YouTube
  - YouTube pays
    - $191 Million/year for Royalties on content
    - $399 Million/year for network infrastructure
  - YouTube collects
    - $182 Million/year on advertising
  - Thus YouTube would distribute also Sony Picture Video
    - Asking to user a small fee for each video, 5cents each

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Mobile Medicine

Automated Back office

Complex content

-PC, MACos, linux, ...
- iPhone, iPod, Windows Mobile, Android

XMF: CrossMediaFinder

ricerca
Contributi
Contenuti proattivi
Multicanale
Attività Sociali
Carica contenuti
**Feature principali**

- **Utenti e Servizi:**
  - registrazione via email, profilo utente, …
  - ricerche di altri utenti per stabilire relazioni sociali, …
  - upload di contenuti, User Generated Content, UGEsperiences, …
  - conversioni automatiche dei loro contenuti per la distribuzione multicanale, …
- **Aspetti Sociali, Social Network:**
  - commenti su contenuti, creazioni di discussioni sui contenuti, etc.
  - gestione Contenuti Preferiti, visione dei contenuti caricati/preferiti da/di amici, …
  - gestione dei propri Amici, Gruppi (ancora non attivo), …
  - Produzione raccomandazioni per trovare altri amici
  - Produzione raccomandazioni per trovare contenuti, … (ancora non attivo), …

**Visualizzazione di Suggerimenti e dist**

**Potential friends**

<table>
<thead>
<tr>
<th>Phystestasia</th>
<th>29.0</th>
<th>ECUADOR, Orellana</th>
<th>Add to your friends Details</th>
</tr>
</thead>
<tbody>
<tr>
<td>Phystestasia</td>
<td>29.0</td>
<td>CHRISTMAS ISLAND</td>
<td>Add to your friends Details</td>
</tr>
<tr>
<td>Phystestasia</td>
<td>16.0</td>
<td>FRENCH POLYNESIA</td>
<td>Add to your friends Details</td>
</tr>
<tr>
<td>Phystestasia</td>
<td>16.0</td>
<td>SRI LANKA, Kurunegala</td>
<td>Add to your friends Details</td>
</tr>
<tr>
<td>Phystestasia</td>
<td>10.0</td>
<td>MALDIVES, Ras</td>
<td>Add to your friends Details</td>
</tr>
</tbody>
</table>

**Who's Near**

- phystestasia proximity details
  - language: ...
  - location: ...
  - interests: ...
  - notes: ...
  - age: ...
  - school: ...

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**Sistemi Distribuiti, Univ. Firenze, Paolo Nesi 2009-2010**

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**Sistemi Distribuiti, Univ. Firenze, Paolo Nesi 2009-2010**

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Intelligent Cross Media Content

- **Evolved Business Models:**
  - **Educational:**
    - Sliding Shows, video, document, audio, images…
  - **Procedures/protocols:** (mini applications)
    - Assessing conditions: emergency.
    - Guidelines, routines/procedures, flows, …
  - **Calculators** for several aspects: (mini applications)
    - Dosages and formulas for intensive therapy
    - Estimation of rule for assessing conditions
    - Risk analysis, …e.g.: pulmonary emboli….
    - Classification of conditions/damages, …
  - **Wizards:** active and proactive content
    - Self-unpacking, guiding the user

Mobile Medicine Content

- **Detectors:**
- **Procedures:**
- **Dosages:**
- **Assessment:**
**Architettura del XMF Social Network**

Per la realizzazione è stato usato il Content Management System Drupal, integrato con l’applicazione realizzata in tecnologia J2EE XMediaFinder.

- **Drupal:** Linguaggio PHP
  - Linguaggio PHP/Database Mysql
  - Struttura modulare
  - Gestione utenti: registrazione, permessi, profili
  - Gestione contenuti: nodi.
  - Libreria Javascript JQuery

- **Applicazione XMediaFinder:** applicazione che gestisce i contenuti Axmedis. Fornisce pagine per:
  - Visualizzare le liste di oggetti più/meno visti, più/meno votati
  - Ricercare (in modalità semplice e avanzata) i contenuti
  - Visualizzare un contenuto
  - Effettuare l’upload di un contenuto
Semantic flows

User Local Side

- User Profile
- User behavior
- Use data
- Content
  - DC+IDs
  - AXInfo: ver, prod., rights,...
  - Descriptors
  - Taxonomy
  - Groups

- Local User Profile
- Local User behavior
- Local Use data
- Content
  - DC+IDs
  - AXInfo: ver, prod., rights,...
  - Descriptors
  - Taxonomy
  - Groups

- Recommendations
- Suggestions on the basis of user behavior

Personal Mobile Social Intelligence

AxObjectFinder
HTML & CSS Based Presentation Engine

AxPDAPlayer
Media Player
PDF player

Content Indexer, semantic ingestion/processing

SQLite DB
Local PDA files
<table>
<thead>
<tr>
<th>Link Type</th>
<th>URL</th>
</tr>
</thead>
<tbody>
<tr>
<td>Flickr: photo sharing community</td>
<td><a href="http://www.flickr.com/">http://www.flickr.com/</a></td>
</tr>
<tr>
<td>YouTube: video sharing community</td>
<td><a href="http://www.youtube.com/">http://www.youtube.com/</a></td>
</tr>
<tr>
<td>MySpace</td>
<td><a href="http://www.myspace.com">www.myspace.com</a></td>
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<td>Facebook</td>
<td><a href="http://www.facebook.com">www.facebook.com</a></td>
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<td>Friendster</td>
<td><a href="http://www.friendster.com">www.friendster.com</a></td>
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<td>Orkut</td>
<td><a href="http://www.orkut.com">www.orkut.com</a></td>
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<td>CrossMediaFinder, XMF</td>
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<td>Mobile Medicine</td>
<td><a href="http://mobmed.axmedis.org">http://mobmed.axmedis.org</a></td>
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<tr>
<td>Last.FM: social networking through music interests</td>
<td><a href="http://www.last.fm/">http://www.last.fm/</a></td>
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<td>create your own social network</td>
<td><a href="http://www.ning.com/">http://www.ning.com/</a></td>
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<td>MOODLE: open source e-learning system</td>
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