Sistemi Distribuiti
Corso di Laurea in Ingegneria

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Part 19 – Overview of social Network

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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

User Generated Content

- **Cons and problems**
  - 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

- **Wikipedia (2006)**
  - 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

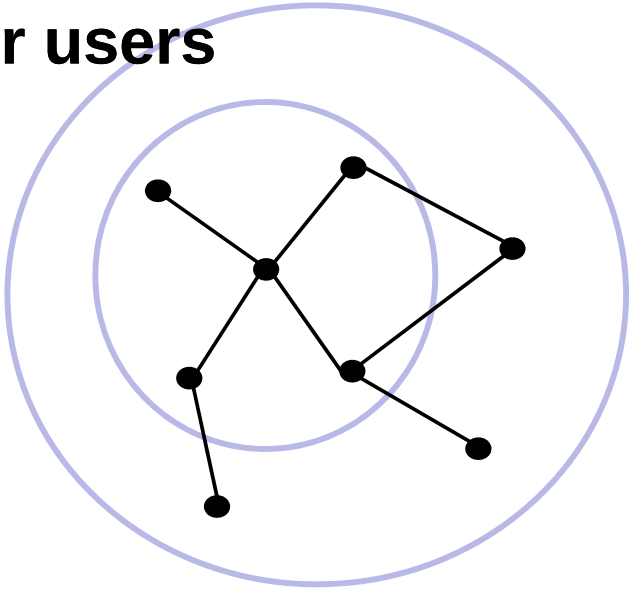
- **Since the 90% is managed by a small percentage of active users:**
  - Votes are also produced with the same small part of the community
  - Comments are also produced with the same small part of the community
  - Pushers are frequently needed to create activities and waves into the Social Networks,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

The centrality of User profile

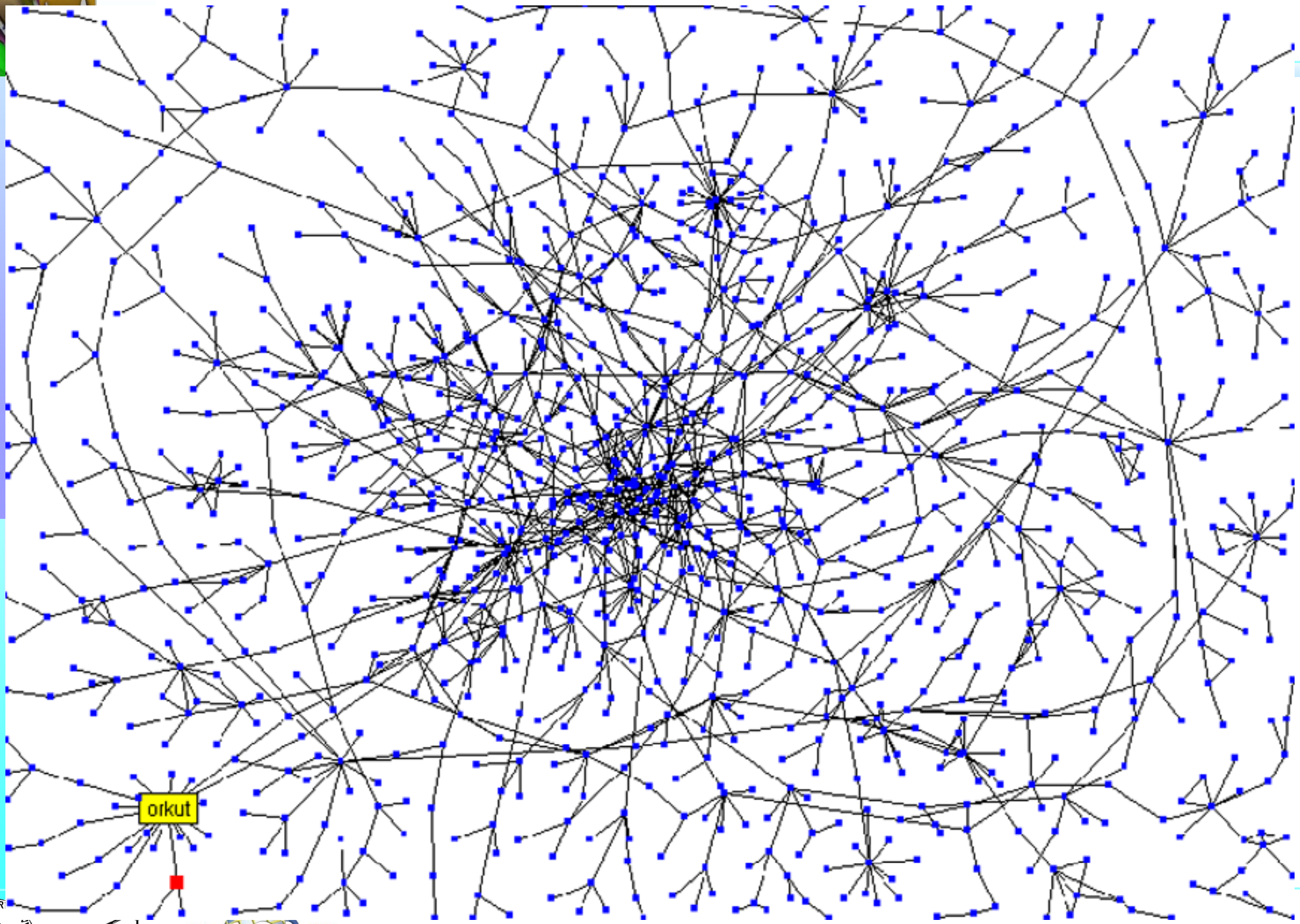
- **User Profile Static information**
  - Name, surname, Nationality
  - Genre, age, languages, etc..other personal info,..
  - School, work, family, etc.
  - photo, etc..
  - Economical data
- **User Profile Dynamic Information**
  - Explicit Preferences in terms of content, friends, votes, ranks, recommendations, 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



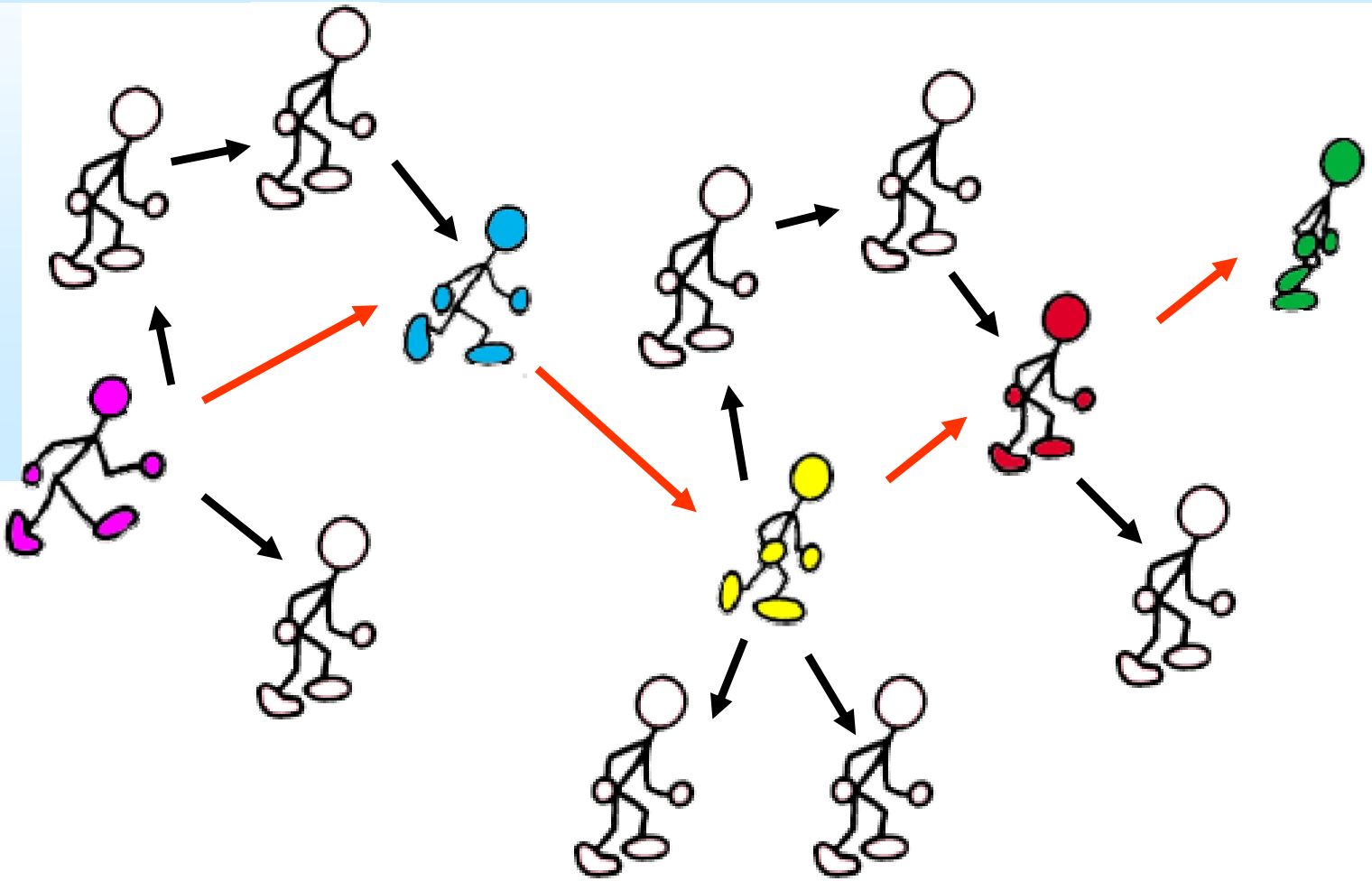
Stanford Social Web



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 Centrarlity 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:
  - Reciproco 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 quantita' 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

	YouTube	Flickr	FaceBook	LikedIn	MySpace	XMF
User profile, descriptors	Y	Y	Y	Y	Y	Y
Friends	Y	Y	Y	Y	Y	Y
Query on Users			Y	Y	Y	Y
Groups and Forums	Y	Y	Y	Y	Y	Y
Multilingual pages	Y	Y	Y	Y	Y	--
Invitations of users	Y	Y	Y	Y	Y	Y
Chats, on line, messages	Y	Y	Y	Y	Y	N
Recommendation U→U	N	N	Y	Y	Y	Y
User Relevance, User,Obj,Group	Y(UO)	Y(OG)	Y(UG)	Y(UG)	Y(UG)	N
User Lists, gen rec. of users	Y	N	Y	Y	Y	Y(G)
Taxonomy on Users	N	N	N	N	N	Y
Direct call, SMS, Email	Y	Y	Y	Y	Y	Y(SE)
Privacy support, Black List users	Y	N	Y	Y	Y	N
Events	N	N	Y	Y	Y	N

SN Comparison on Content

	YouTube	Flickr	FaceBook	LikedIn	MySpace	XMF
Multimedia, crossmedia UGC	Y(M)	Y(M)	Y(M)	N	N	Y(MC)
Audio, Video, Images, Doc	V	I, V	I, D, V	I, D	I, V	A,V,I,D
Moderated UGC	Y	N			N	(Y)
Query on content	Y	Y	N	N	Y	Y
Comments on Content	Y	Y	--	--	Y	Y
Ranking and voting	Y	N	--	--	Y	Y
General Recommendation O	Y	Y	Y	Y	Y	Y
Recommendation O→U	Y	Y	--	--	Y	Y
Recommendation O→O	Y	N	--	--	N	(Y)
Taxonomy for content/profile	N	N	N	N	N	Y
Play Lists of content	Y	N	N	N	N	N
RSS Feeds for content	Y	Y			Y	N
Links with other SN	Y	Y	Y	Y	Y	(Y)
Mobile Support	Y	Y	Y	Y	Y	Y
DRM/CAS Support	Y(D)	N	N	N	N	Y (D)
GeoTagging	Y	Y	N	N	N	N

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

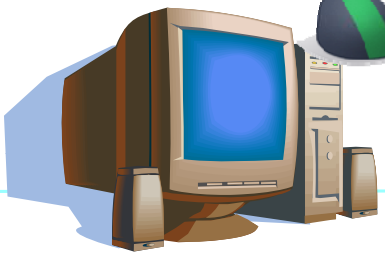
Automated Back office

Complex content

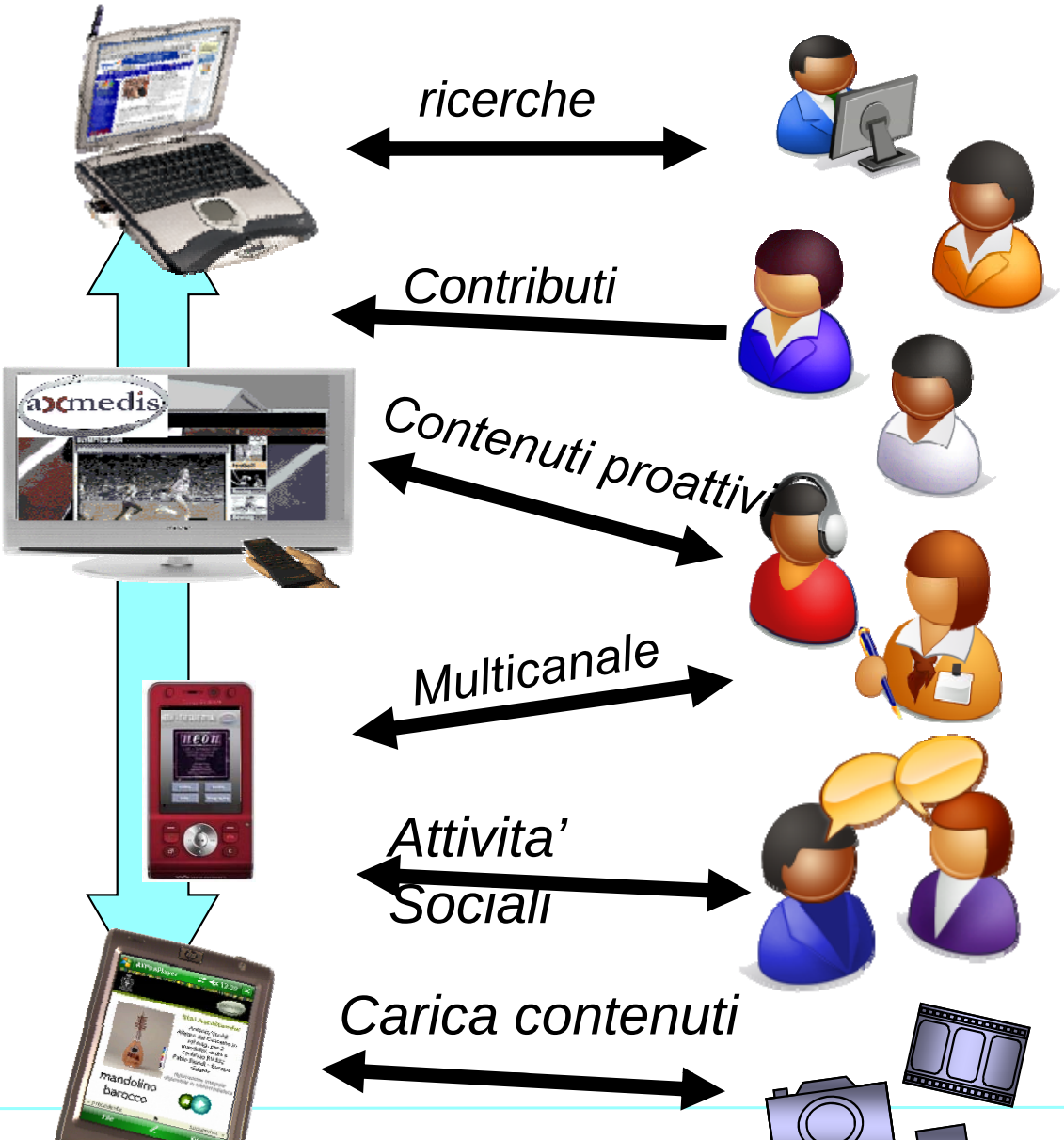
-PC, MACos, linux, …

-iPhone, iPod, Windows Mobile, Android(

UGC, web page, comments



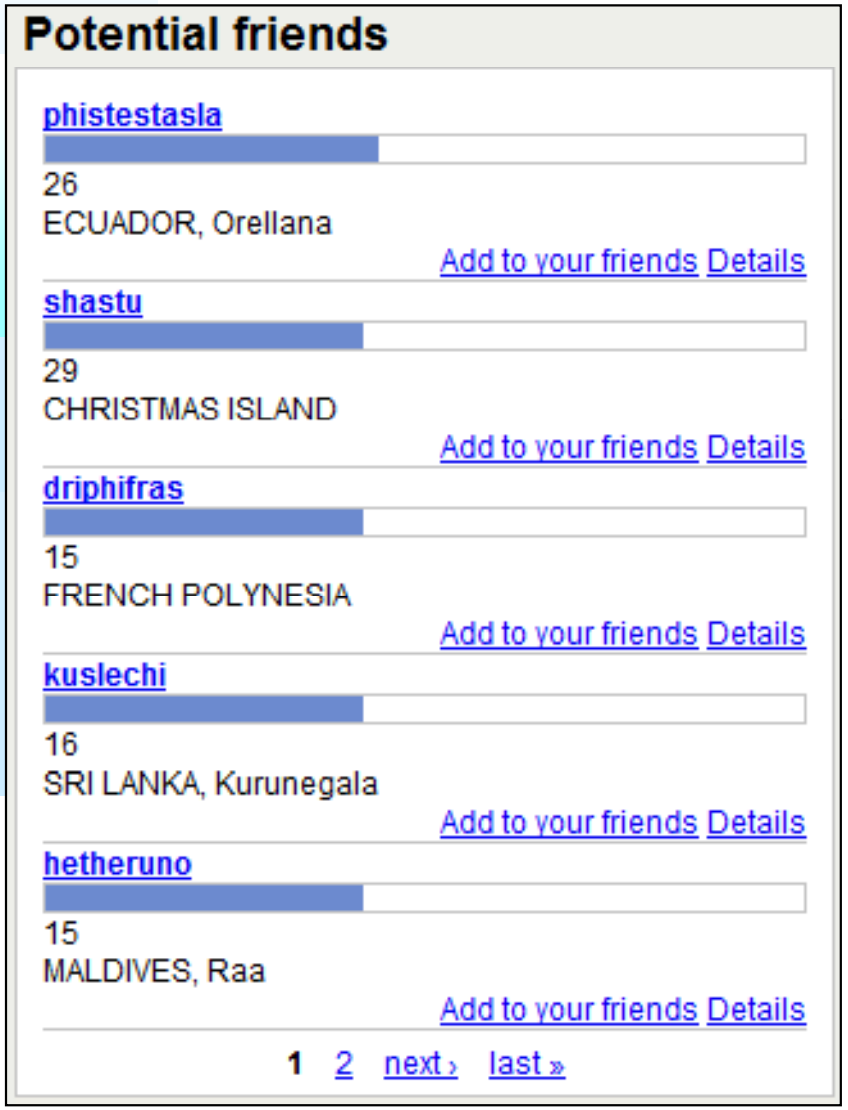
XMF: CrossMediaFinder

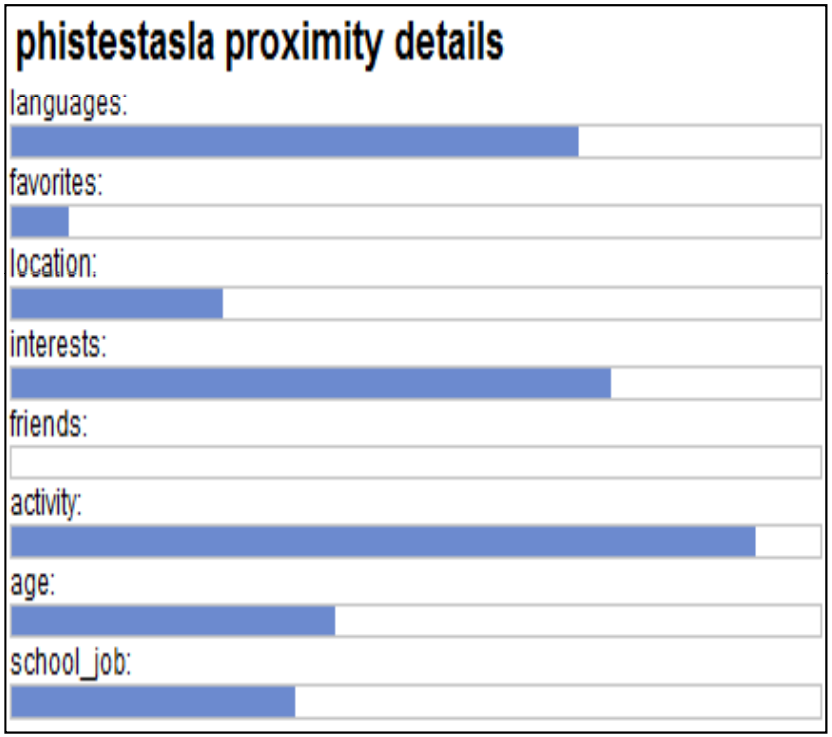


Feature principali

- **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

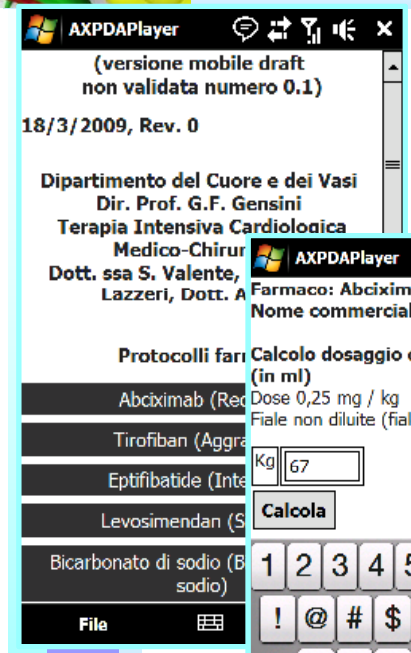


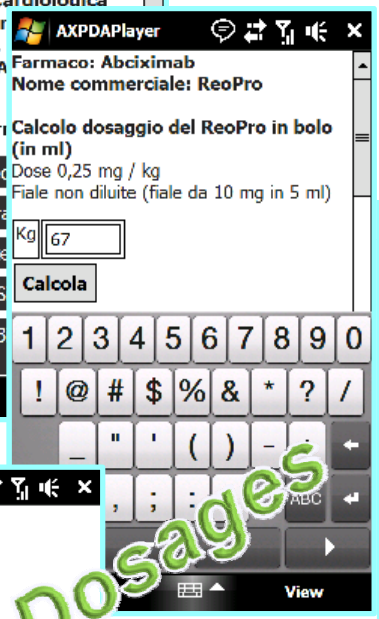


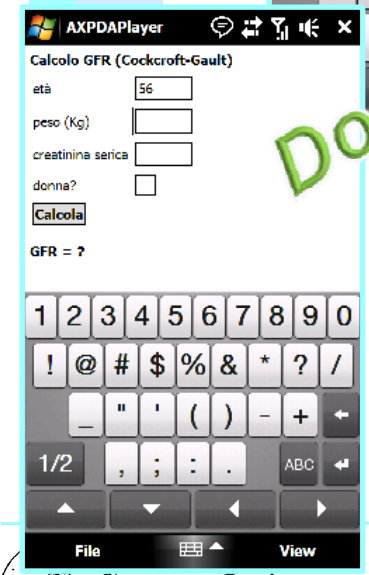
Intelligent Cross Media Content

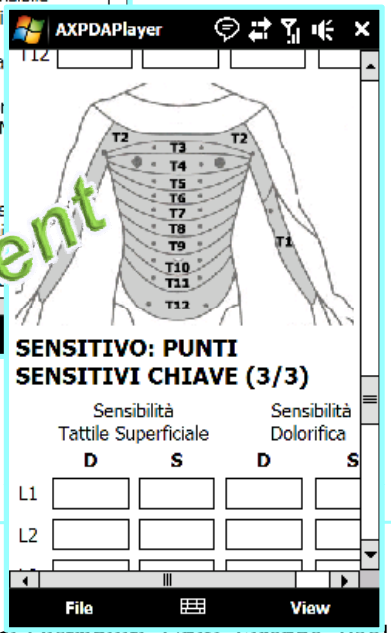
- **Evolved Business Models**:
  - **Educational**:
    - Sliding Shows, video, document, audio, images…
  - **Procedures/protocols**: (mini applications)
    - Assessing conditions: emergency..
    - Guidelines, routines/procedures, flows, …
  - **Calculators** for several aspects: (mini applications)
    - 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

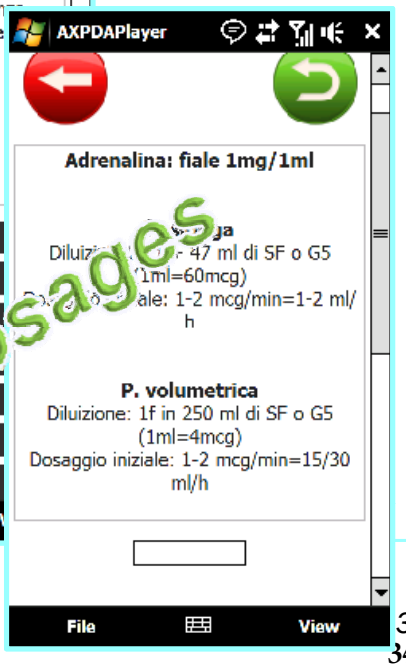
Mobile Medicine Conten











procedure

DOC

Slide

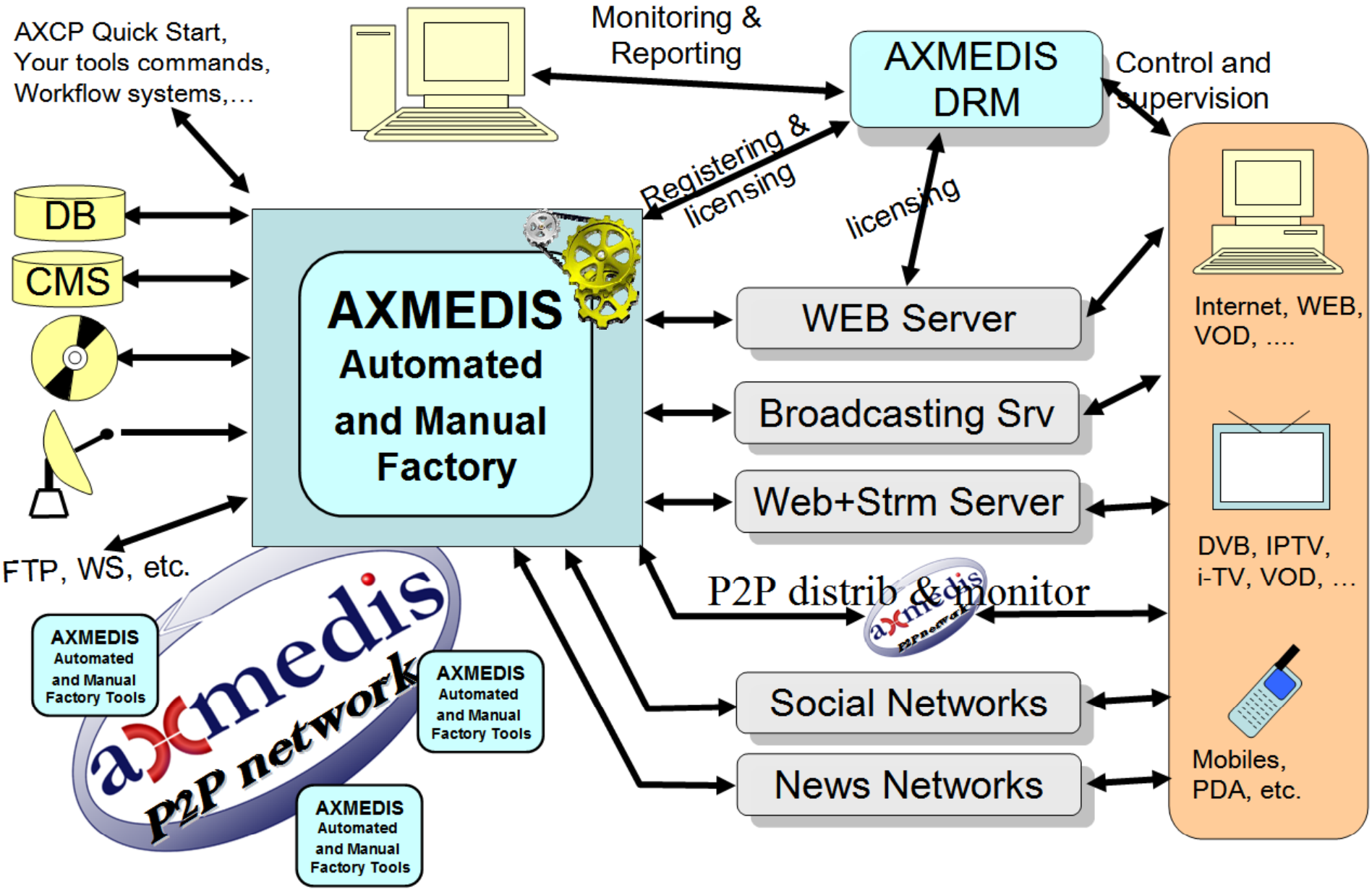
video

Dosages

Assessment

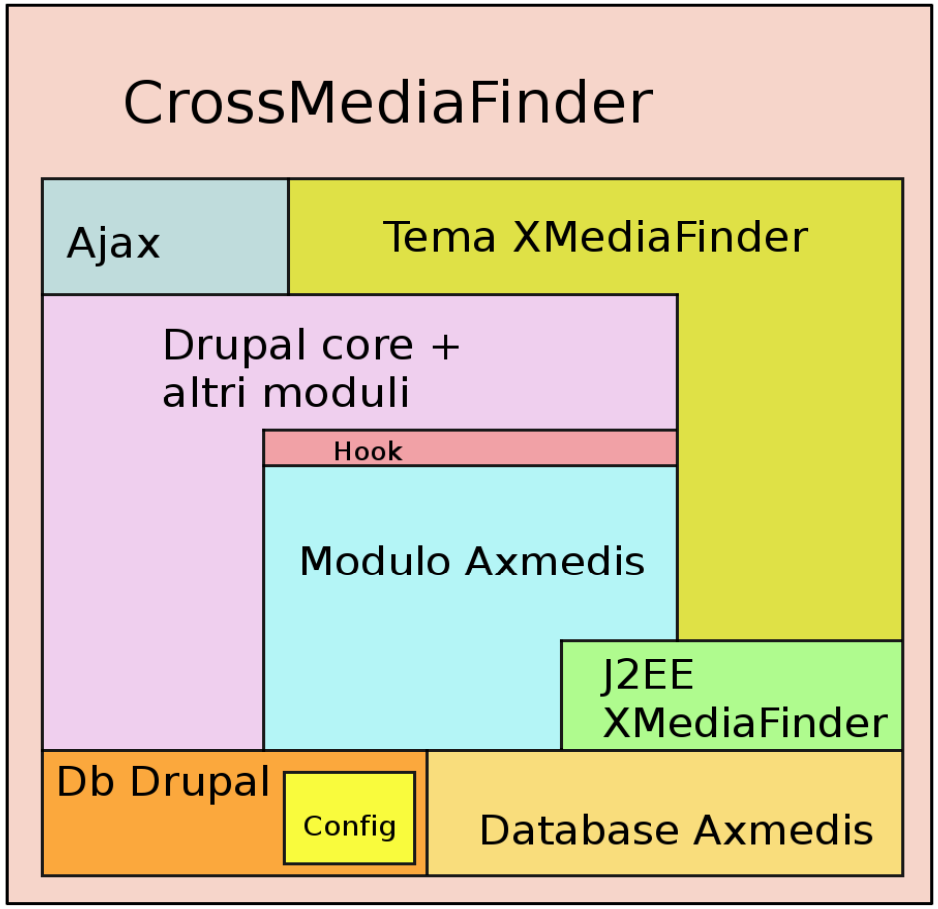
Dosages

Factory and integration



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

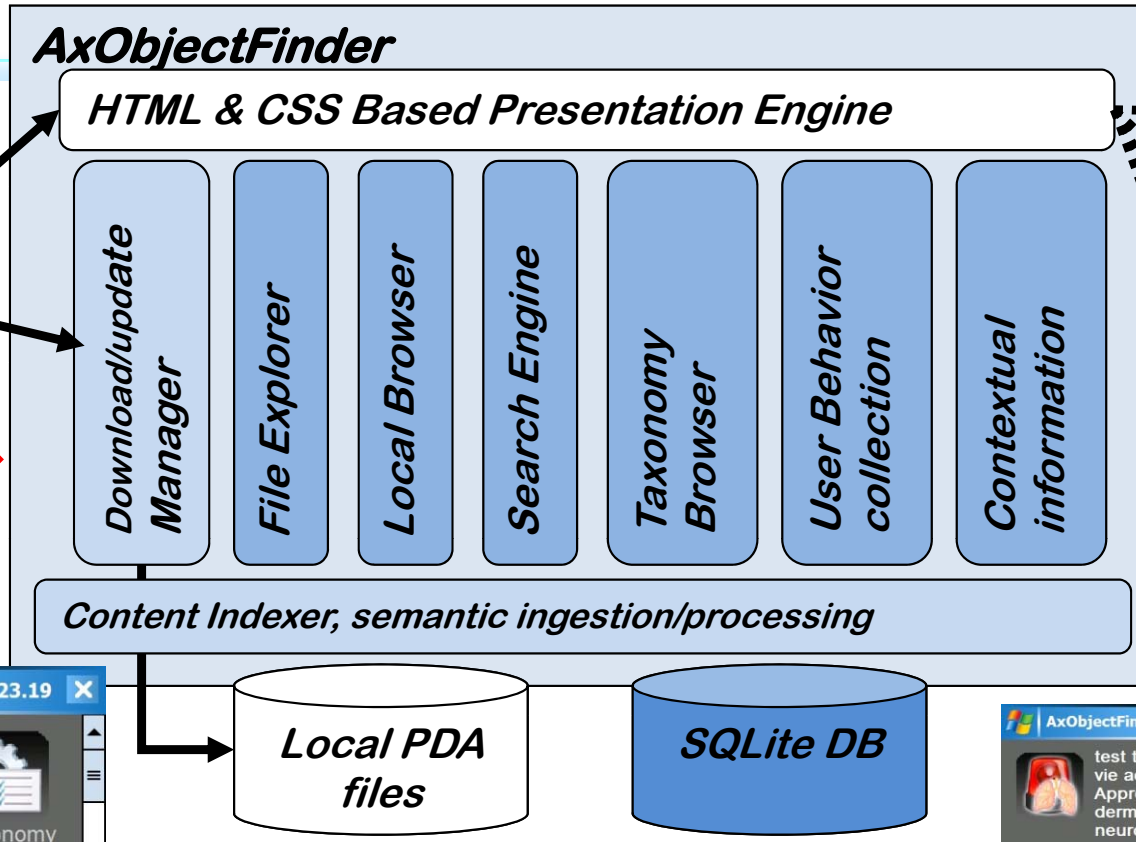
Local User Profile ←
Local User behavior ←
Local Use data ←

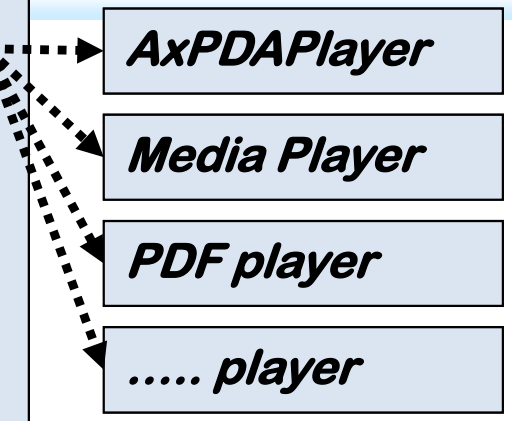
+ Content action data →

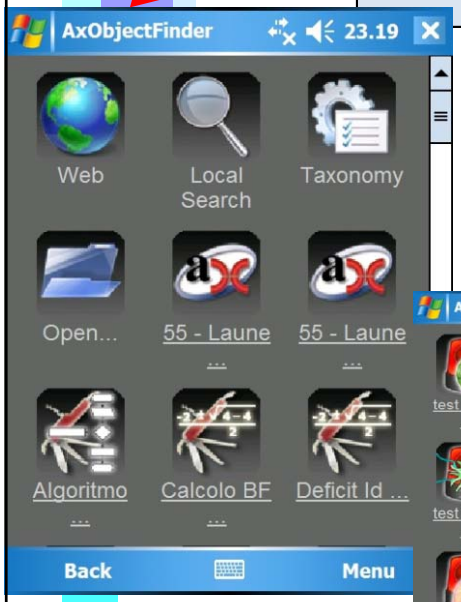
Content →
- *DC+IDs*
- *AXInfo: ver, prod, rights, ...*
- *Descriptors*
- *Taxonomy*
- *Groups*

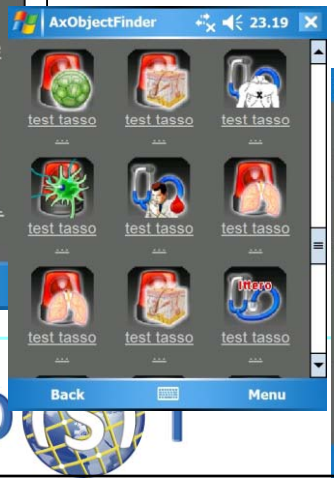
Recommendation →
Suggestions on the basis of user behavior ⇢ *Local Suggestions on the basis of user behavior and local content* →

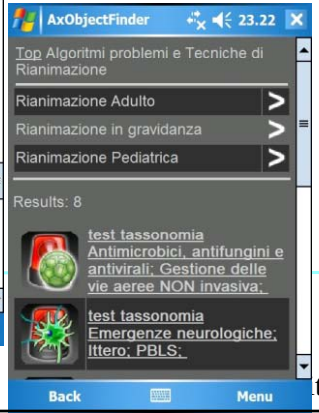
Personal Mobile Social Intelligence

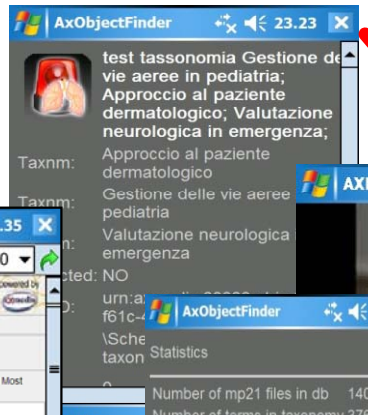


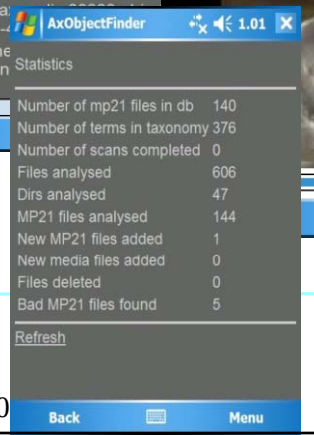


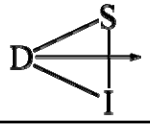












Links For Further Research

- Flickr: photo sharing community http://www.flickr.com/
- YouTube: video sharing community http://www.youtube.com/
- Myspace. www.myspace.com
- Facebook. www.facebook.com
- Friendster. www.friendster.com
- Orkut. www.orkut.com
- CrossMediaFinder, XMF. http://xmf.axmedis.org/
- Mobile Medicine: http://mobmed.axmedis.org
- Last.FM: social networking through music interests http://www.last.fm/
- create your own social network http://www.ning.com/
- MOODLE: open source e-learning system http://moodle.org/