Personalized Information Services: the infoFACTORY Project

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PIA 2005 - UM'05, July 24 2005





#### Contents

- Problems and vision
- The infoFACTORY idea
- Intelligent Platforms for Personalized IA
  on the Internet
- Applications
- Research activities





#### **General Problems**

- Information Explosion
- E-Contents Overload
- Strategic Value of Information & Knowledge (IST)
- Information is the 'vehicle' of Knowledge
- Unstructured information



FACTORY Problems with (unstructured) Information (and Knowledge)

- Problems in searching, accessing, delivering...
- Two perspectives: PULL & PUSH
- Pull:
  - Oversupply, overload
  - Miss-retrieval (common accuracy of serach engines: 20%-30%)
  - Untimeliness
- Push:
  - Miss-delivery
  - Oversupply
  - Waste
  - Untimeliness

#### Two difficult linguistic phenomena: Polisemy, Sinonimity





The fundamental limitations of current approaches and tools

- Key-word based:
  NO semantic analysis of texts
- 'One-size-fits all' approach: *all users are treated the same way,*
  - NO comprehension of individual information needs and preferences
  - Presentation and delivery are the same for all users





#### Towards a Solution



**CISM COURSES AND LECTURES NO. 383** INTERNATIONAL CENTRE FOR MECHANICAL SCIENCES

#### **USER MODELING**

**PROCEEDINGS OF THE** SIXTH INTERNATIONAL CONFERENCE **UM97** 

EDITED BY

ANTHONY JAMESON CÉCILE PARIS CARLO TASSO



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### Automatic Personalization (in Information Access)

Personalization means delivering:

- the right content
- to the right user
- in the right moment and
- in the most suitable way





### **Adaptive Personalization**

- Adaptivity allows to automatically tailor system behaviour and processing to the specific characteristics of the (observed) user behaviour
- Machine Learning, Conceptual Linguistic Analysis, Knowledge Representation, User Modeling, HCI, Intelligent Agents, Semantic Web, ...



Carlo Tasso Paolo Omero

LA PERSONALIZZAZIONE DEI CONTENUTI WEB

e-commerce, i-access, e-government

Collana di informatica FrancoAngeli

#### *info*FACTORY

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#### **Content Personalization**



dei Contenuti WEB, © F.Angeli, Milano, 2002.)





FACTORY Semantic (content-based) Personalized Information Filtering

Filtering information by means of a 'semantic' analysis of a document and by matching it against an individual user profile

(Brajnik G., Guida G. and Tasso C. User Modeling in Expert Man-Machine Interfaces: A Case Study in Intelligent Information Retrieval. *IEEE Transaction on Systems, Man, and Cybernetics*, 20(1), 1990, pp. 166-185)





#### our view ...

"...Evaluating an interface for an information retrieval system can not rely only on standard precision and recall, but needs to take into account also user satisfaction..."

(Brajnik G., Mizzaro S. and Tasso C. Evaluating User Interfaces to Information Retrieval Systems: a Case Study on User Support. *Proceedings of the 19th Annual International ACM SIGIR Conference on Research and Development in Information Retrieval, SIGIR '96*, Zurich, CH, August 18-22, 1996, pp. 128-136.)



#### The IFT Algorithm (Minio & Tasso, 1996)



**info**FACTORY





#### The User Profile

(Semantic) network with lexical stems representing concepts associated to NODES and co-occurence information attached to ARCS.

M. Minio, and C. Tasso, User Modeling for Information Filtering on Internet Services: Exploiting an Extended Version of the UMT Shell, *UM96 Workshop on User Modeling for Information Filtering on the World Wide WEB*, Kailua-Kona, Hawaii, USA, January 1996.

Minio M. and Tasso C. IFT: una interfaccia intelligente per il filtraggio di informazioni basato su modellizzazione d'utente. *Supplemento di AI\*IA Notizie*, IX(3), 1996, pp. 21-25.





### **User Profile Construction**

- Through analysis of sample texts (positive or negative examples)
- Lexical stemming (Porter's algorithm)
- Stop word list
- Frequency of Concepts (lexical stems)
- Co-occurence information

# • No need for ad-hoc onthologies nor KB 28/07/2005





## Matching Documents against Profiles

- Weighted matching algorithm, taking into account frequency of concepts and frequency of co-occurence of concepts
- Assumption: Relevance = Topicality



# Experimental Evaluation <sup>MarcTORY</sup> of the IFT Algorithm: Precision





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# The TIPS Project in FP5 IST 2000-2002

- Innovative advanced services in electronic publishing (scholarly journals)
- Filtering service on new incoming information
- Application in the field of High Energy Physics

(Brajnik G., Mizzaro S., Tasso C., Venuti F., Strategic Help in User Interfaces for Information Retrieval, *Journal of the American Society for Information Science and Technology* 53(5), 2002, pp. 343-358)

(Mizzaro and Tasso, 2002)

tips.sissa.it





## The TORII Portal



## The infoFACTORY Project





#### **The Vision:**

personalized information services can help reducing information overload and can overcome some limitations of current approaches





## The infoFACTORY Concept

- Delivering personalized information services starting from any digital information source (E-Content)
- Adaptive personalization by means of contentbased individual profiles
- Overcoming information overload by filtering, categorizing, ranking, alerting, and monitoring digital sources
- "Delivering the right content, to the right user, at the most adequate time, and in the most suitable way"



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dei Contenuti WEB, © F.Angeli, Milano, 2002.)





## The infoFACTORY Technical Approach

#### Cognitive (content-based) Filtering

- Analysis of the conceptual content of textual documents
- Semantic networks for describing user interests
- Filtering obtained by matching documents against profiles
- Adaptive Personalization
  - Individual user profiles
  - Machine learning algorithms for automatically building and updating user profiles on the basis of positive (negative) examples





## **Intelligent Platforms**

#### for achieving flexibility, re-usability, interoperability, scalability, ...

# in providing personalized information services





#### Intelligent Platform1:

## 

## for Web Monitoring and Filtering





## Filtering Web Information

 Using the IFT algorithm for filtering information gathered from the Web by means of an opportunistic (automatic) human like navigation (crawling), relevant for a given user profile

(Tasso and Armellini, 1999)

• Integration of various technologies and tools





## Monitoring Web Information

- Periodically analysing the content of Web sites and portals for timely discovering new relevant information
- Search Engine monitoring





## **ifMONITOR Services**

Personalized Filtering Services based on conceptual analisys of textual Web documents:

- Automatic construction of personalized <u>THEMATIC DATA</u> <u>BANKS</u> of Web documents
- WEB MONITORING, continuous periodic control of online sources
  - and multichannel ALERTING





## What are they useful for?

- Technological monitoring
- Monitoring scientific and technical journals
- Reputation management
- Press review
- Competitive intelligence
- Keeping knowledge worker always updated
- Crisis management
- Monitoring events
- Monitoring financial funding open calls
- Discovering research groups belonging to other organizations in the same area of interests or research




## What advantages?

- Reducing manual activities for searching information (higher productivity 24/24, 7/7 and 365/365)
- Finding information published in sites not (or rarely) indexed by standard search engines
- Timely discovery and multi-channel delivery of new relevant information
- Much more precise than other competitors (90% vs. 20-30% of standard search engines)
- Innovative information services (personalized services, alerting, mobile access)







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#### EUbusiness - Liikanen urges EU-India IST cooperation

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EU Commissioner for Enterprise and the Information Society Erkki Liikanen urged more collaboration as he addressed the Euro-India cooperation forum on the information society on 25 March.

So far only one Indian organisation has signed a contract for participation in a project under the information society technologies (IST) section of the Sixth Framework Programme (FP6). "I think we can do much better, taking into account India's outstanding strengths in information and communication technologies," said Mr Liikanen.

An opportunity to redress the imbalance is likely with the publication of the next IST call for proposals. "The content of this call is not yet fully defined but should contain an emphasis on international cooperation," said the Commissioner. He then encouraged the forum's participants to visit the CORDIS web service for further information.

Mr Liikanen blamed the current dearth of links between the EU and India on international mobility issues, which, he said, have been addressed under FP6 and in a recent Commission proposal.

The Commissioner compared the number of Indian researchers in Europe with the number in the US, attributing the lower figure in the EU to language diversity and visa difficulties.

The Sixth Framework Programme's Marie Curie Incoming International Fellowships are aimed at attracting researchers from third countries and funding their stay in the EU for between one and two years. An equivalent is also available to facilitate mobility from the EU to third countries such as India. A new proposal on international mobility is now to be put before the Council. Its principal objective is to 'remove unnecessary red tape and to pave the way for the free flow of researchers between our respective regions,' said Mr Liikanen.

High level participants at the forum were expected to discuss India's participation in the Géant network. The high speed network currently connects over 3,000 research and education institutions in over 30 countries through 28 national and regional networks. The system allows Europe's researchers to share the "terabytes of important data" that they produce every day, and, according to Mr Liikanen, without it "many research projects at the forefront of their fields would simply not be possible." The Commissioner expressed his confidence that EU-India connectivity can be ensured "quite rapidly".

Finally, Mr Liikanen explained that collaboration with third countries is beneficial for the EU in that it assists the exploitation of research results on a global scale. Declaring that it is also of great value to international partners, the Commissioner declared stronger cooperation as 'a genuine win-win situation'. Next IST call for proposals Further information on the IST programme - CORDIS site EuroIndia2004 Co-operation Forum on the Information Society - further information Text and Picture Copyright © 2004 AFP. All other copyright © 2004 EUBusiness Ltd. All rights reserved. This material is intended solely for personal use. Any other reproduction, publication or redistribution of the material without the written agreement of the copyright owner is strictly forbidden and any breach of copyright will be considered actionable. Log in Name Password Forgot your password? New user? Sources Technology MarketPlace - R&D results for Companies Usuaides - E-commerce EUFunding - R&D Dutch R&D Presidency website European Space Agency European Patent Office SME TechWeb \* Advertise on EUbusiness \* Opportunities Resources | Companies

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Gruppo infoFACTORY, Laboratorio Intelligenza Artificiale, Dipartimento di Matematica e Informatica - Università di Udine. Tel. 0432-558446, info<u>emiofactorvit, www.infofactorvit</u> In collaborazione con il CONSORZIO FRIULI INNOVAZIONE

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European Union-India Economic Cross Cultural Programme (ENTRIXIE Project) Post Graduate Diploma in Business Entrepreneurship & M Management of NGOs (PGDMN) Amidst a scenario where myriad technological advances, to attain a truly global perspective, are occurrin new markets for their pro	Anagement (PGDBEM) Post Graduate Diploma in ing, it is indispensable for the small scale sector to find ⓐ & & Ø & &
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The Delegation of the European Commission to India has published a third Call for Proposals for the EU-India Economic Cross Cultural Pro proposals is the 3rd June 2004. The key objective of the ECCP is to promote and support links and joint ventures between civil society orgo of media, enterpris	ogramme (ECCP). The deadline for submission of ganizations in India and the European Union in the fields
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## **Mobile access**





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## Some technical aspect

## Filtering Technology:

- Very High precision by combining IFT contentbased filtering algorithm with key-word matching and regular expressions
- High recall, with notification of possible faults
- Innovation in the matching algorithm: conceptual matching





# **Conceptual Matching**

Matching based on:

- 1. Conceptual Coverage: how much the most relevant conceptual content of the profile is covered in the evaluated doc.
- 2. Match: how much relevant concepts are present in the evaluated doc.
- Rank: a 3-star ranking obtained as a combination of the previous two measures





## Some technical aspect/2

## • <u>Construction</u> of a personalized thematic Data Bank:

- Bulid the profile:

- Definition through: Key words, texts, URLs
- Refinement through: relevance feedback
- Meta searching
- Opportunistic navigation through hyperlinks based on relevance of Web documents against personal profile





## **Opportunistic Crawling**



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# **Notifying candidate faults**

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PURPOSE. 1) To compare macular thickness (MT) by optical coherence tomography (OCT) in diabetics and controls; 2) to asse stage of diabetic retinopathy (DR) and macular edema (ME); 3) to quantify MT changes after laser treatment for ME. METHODS patients with diabetes mellitus (216 eyes) were admitted to the study and examined by s	ss the relationship between MT and S. One-hundred and thirty-seven	
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# **Intelligent Platform 2:**



# for Expert Finding

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**info**FACTORY

## Representing human expertise and searching for it

- Using the same approach of the IFT algorithm for analysing text and matching against profiles
- 'Competence profiles' are built (and later updated) by analysing textual information describing personal expertise, projects, papers, and so on
- A 'premium service' of the MACSI-net Web site: matchmaking between requests for experts and an expert data base
- An 'innovative service' in the 'Portale TIROCINI (Stage Portal)', a portal for managing stages in industries for university students: match-making between stage requests and student competence & preferences.





## <u>www.MACSINET.org</u>: a WEB site exploiting the الإEXPERT platform







## Portale TIROCINI: a WEB portal exploiting the 4EXPERT match-making capabilities

## More than 36.000 Students, with their Competences, credits, preferences



Portale Tirocini

UNIVERSITA' DEGLI STUDI DI UDINE

HOME

Benvenuto

azienda e

Innovazione.

Udine.

ARCHIVIO STUDENTI

nel sito Web sull'attività di tirocinio in

azienda degli studenti dell'Università di

In questo sito si possono trovare gli

indirizzi dell'Ufficio Tirocini che si

occupa della gestione centralizzata degli

studenti e delle attività da loro svolte in

mantenimento dei rapporti con le Aziende.

Per ciascuna Facoltà presente in questo

sito è possibile consultare il regolamento

dei tirocini, il workflow delle attività

necessarie per attivare, svolgere e

terminare un tirocinio e tutta la

modulistica necessaria alla presentazione

Ciascuno studente può inoltre utilizzare

il suo usuale account per accedere all'Area

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riguardante le proprie competenze utile al

sistema ifEXPERT che potrà identificare

automaticamente alcune aziende che

meglio si adattano al profilo dello

Le aziende convenzionate possono

inserire nuovo progetti di Tirocinio. Le

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trovare tutte le informazioni sulle modalità

della domanda di tirocinio.

studente.

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ARCHIVIO TIROCINI

#### Elenco delle Facoltà

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ARCHIVIO AZIENDE

#### News

24-mar-2003 Presentazione del Portale Tirocini. al Magnifico Rettore il giorno 26 marzo verrà presentato a versione preliminare del Portale Tirocini. →

24-mar-2003 On-line la nuova versione del Portale Tirocini. E' finalmente disponibile la nuova versione del Portale Tirocini. →

#### 20-mar-2003 Aperto l'Ufficio Tirocini. E' stato aperto presso i Rizzi, l'ufficio tirocini. →

17-mar-2003 Inaugurazione dell'anno accademico 2002-2003. L'Università di Udine compie 25 anni. La cerimonia è prevista per venerdi 21 marzo alle ore 11 presso l'aula Magna di piazzale Kolbe. →

#### 20-feb-2003 Oggi presentato il portale Tirocini. E' stato presentato il portale tirocini in versione preliminare disponibile online. →

18-feb-2003 Nuovi moduli di richiesta tirocinio. Sono disponibili sul sito i nuovi moduli per la richiesta tirocinio dedicati agli studenti di Ingegneria CdL in Ingegneria Elettronica. →

Area Riservata	
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#### ➔ cos'è l'Area Riservata?

#### Rassegna Web

#### 22/3/2003 Il Gazzettino (Friuli) Università tra festa e timori: «Aiutateci»

È un''Università modello che «costituisce uno straordinario caso di successo nel panorama del sistema accademico nazionale». E per celebrare il suo 25º anno accademico il rettore Furio Honsell ha...

#### 22/3/2003 Il Gazzettino (Friuli) Il forte della pace diventa cantiere

Tarcento Da decenni si propone come un romantico relitto di guerra immerso nel verde e nelle rocce calcaree del monte Bernadia. Il suo destino sembrava quello di restare testimone non violato del...

#### 22/3/2003 Il Gazzettino (Friuli) Pace, appelli e bandiere

Bandiere arcobaleno e appelli alla pace hanno contraddistinto la manifestazione. All'esterno dell''aula magna gli studenti hanno organizzato un tavolo per raccogliere firme, ma bandiere arcobaleno...

#### 22/3/2003 Il Messaggero Veneto euro»

L'appello del rettore Honsell al sottosegretario Contento per ottenere il riequilibrio dei fondi euro» di GIACOMINA PELLIZZARI «Onorevole sottosegretario, ci aiuti a raggiungere...

#### 20/3/2003 Il Messaggero Veneto «I finanziamenti sono ancora insufficienti»

«I finanziamenti sono ancora insufficienti» Nonostante le buone performance registrate finora l'università di Udine resta sottofinanziata. «Sulla base delle verifiche effettuate dal...

## More than 1800 Companies and **Public Agencies**

> **FACTORY** R O U P

Portale Tirocini	HOME ARCHIVIO S	TUDENTI ARCHIVIO TIROCI	ARCHIVIO AZIENDE
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	Partita Iva		
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#### Elenco convenzioni

#### Elenco delle sedi per l'azienda

<u>Id</u>	<u>Indirizzo</u>	<u>Citta</u>	<u>Provincia</u>	<u>Nazione</u>	Competenze	<u>Sedelegale</u>	<u>Telefono</u>	<u>Fax</u>	<u>Tipologia</u>
<u>36</u>	Via Caduti del Lavoro	Susegana	TV	Italia	Electolux Zanussi Div. Freddo		0438/4581	0438/458790	Non Definito
<u>37</u>	Via Giardini Cattaneo, 3	Pordenone	PN	Italia	Electrolux Zanussi Elettrod. S.p.A - Div. Lavaggio				Non Definito
<u>38</u>	Corso Lino Zanussi, 30	Porcia	PN		Electrolux Zanussi Laboratorio Sperimentale		0434/395558		Non Definito
<u>39</u>	Via Segaluzza, 30	Vallenoncello	PN	Italia	Electrolux Professional S.p.A.		0434/3801		Non Definito
Nuo	Nuova Sede First Prev 1 of 1 Next Last								

#### Elenco Referenti per l'azienda

Id	<u>Titolo</u>	<u>Nome</u>	<u>Cognome</u>	<u>Telefono1</u>	<u>Telefono2</u>	<u>Cellulare</u>	Email	<u>Carica</u>
<u>28</u>	Dott.	Massimo	Sanita'	0434/395669				
<u>29</u>	Ing.	Dino	Baggio	0434/395678				
<u>30</u>	Sig.	Fabrizio	Grisenti	0434/395678				Ufficio personale
<u>31</u>	Ing.	Omero	Tuzzi	0434/3801	0335/5843858			responsabile R&S
<u>32</u>	Sig.	Massimo	Paronitti	0434/380644	0438/362398		massimo.paronitti@notes.electrolux.it	
Fir								

#### Elenco dei progetti di tirocinio relativi all'azienda

Id	Descrizione	Skill <u>D</u> i	<u>sponibilita</u>	<u>Settore Aziendale</u>	Data Pubblicazion
No re	ecords				
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## Structured information

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UNIVERSITA' DEGLI STUDI DI UDINE							
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K) and a	Scheda dettagliata dello studente						
world.com	Numero matricola		61080				
Duntie	Nome		ANDRE/	A			
	Cognome		BET				
Archivio Studenti	Sesso		М				
	Data di nascita		July 26, 1975				
➔ Elenco studenti	Comune di nascita		PORDENONE				
	Provincia di nascita		PN				
	Nazione d	i nascita	1				
	Cap reside	enza	33080				
SITO WEB E SERVIZI RALIZZATI DA	Comune d	i residenza	FIUME	VENETO			
in/oFACTORY	Provincia (	di residenza	PN				
GROUP	Nazione di residenza 1						
	Telefono		0434/9	59575			
	Cellulare						
	Email		Bet.Andrea.1@spes.uniud.it				
	Crediti		180				
	Esami sos	tenuti	31 0				
	Esami ma	ncanti					
	Media		26.56				
	Indirizzo r	esidenza	VIA FO	RMENTINI,17			
	Ultimo anr	no di iscrizione	2001				
	Ultima qua	alifica	RG				
	Facoltà		INGEGN	IERIA			
	Laurea		INGEGN	IERIA MECCANICA, CLA	SSE N. X (SEDE PN)		
	Stato carr	iera	R				
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# **Unstructured** information



**UEXPERT** automatically identifies the best matching projects, taking into account unstructured information

Portale Tirocini UNIVERSITA' DEGLI STUDI DI UDINE

R O U P

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### 

ARCHIVIO STUDENTI ARCHIVIO TIROCINI

Il sistema automatico **ifEXPERT** ti consiglia di valutare questi progetti di tirocinio che sono stati selezionati in modo personalizzato in base alle tue capacità inserite nella scheda Skill.

ARCHIVIO AZIENDE

Progetti di tirocinio consigliati							
Descrizione	Competenze richieste	Azienda					
installazione ed avviamento delle nuove applicazioni per la gestione centralizzata dei call-center sparsi nel territorio nazionale	Programmazione Java e conoscenza ORACLE	BOFROST ITALIA Via Clauzetto 4 33078 - S. Vito al Tagliamento PN Tel: 0434/859511 Fax: 0434/85455 segreteria@bofrost.it www.bofrost.it					
Progettazione, sviluppo e testing di un'applicazione CAD scritta in linguaggio Java	Conoscenza approfondita di Java ed utilizzo di JSP per l'interfaccia Web	DEIMOS ENGINEERING Via Cotonificio 129/B 33100 - Udine UD Tel: 0432/421000 Fax: 0432/482965 info@deimositalia.it www.deimositalia.it					
Manutenzione delle precedenti applicazioni per la gestione centralizzata dei call-center sparsi nel territorio nazionale	Programmazione PHP e database Informix	BOFROST ITALIA Via Clauzetto 4 33078 - S. Vito al Tagliamento PN Tel: 0434/859511 Fax: 0434/85455 segreteria@bofrost.it www.bofrost.it					
Sviluppo sofware in Java per l'automazione dei processi di business		Elettrolux SPA Via Giardini Cattaneo, 3 33170 - Pordenone PN					





# **Intelligent Platform 3:**



# for Mail Filtering and Antispam

28/07/2005





Cignini, M. Mizzaro, S. and Tasso C. E-mail Categorization, Filtering, and Alerting on Mobile Devices: The ifMail Prototype and its Experimental Evaluation. In A. Cappelli and F. Turini (Eds.) *AI\*IA 2003: Advances in Artificial Intelligence - Proceeding of the 8th Congress of the Italian Association for Artificial Intelligence*, Pisa, I, September 2003, Springer Verlag, Berlin, LNAI 2829, 2003, pp. 523-535.

Cignini, M. Mizzaro, S., Tasso C. and Virgili A. E-mail on the Move: Categorization, Filtering, and Alerting on Mobile Devices with the ifMail Prototype. In F. Crestani, M. Dunlop and S. Mizzaro (Eds.) *Mobile and Ubiquitous Information Access - Mobile HCI 2003 International Workshop*, Udine, I, September 2003, Springer Verlag, Berlin, LNCS 2954, 2004, pp. 107-123.





## Filtering and Classification of e-mail Messages

- Filtering incoming e-mail messages, discarding the not interesting ones (spam)
- Automatically categorizing messages into user-defined categories of specific interest
- Category profiles are learned automatically, by observing user's behaviour
- Identifying the most relevant messages and alerting on Mobile devices

🖆 ifMail - Microsoft Inte	rnet Explo	orer	F		80
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				data: sab 13/7/02 (18:59)	cartella attuale: <u>note</u>
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### **info**FACTORY



## F1 in both نماله FACTORY operation modes for collection E







## Evaluation over time <sup>infeFACTORY</sup> of users' vs. system actions (over groups of 60 messages): i.e. how much effort is required from the user






# **Intelligent Platform 4:**

myTWM

# E-Learning Platform for delivering value-added services to University students





## Personalization in the TWM Portal for valueadded services to University students

- The TWM portal provides several services for University students
- Several services are supporting learning activities
- The student can personalize the portal and access only to the preferred services, and associate alerting
- Fully XML-SCORM compliant



🖥 Portal	e TWM - Microsoft Internet Explorer				
<u>-</u> File <u>M</u> odif	fica <u>V</u> isualizza <u>P</u> referiti <u>S</u> trumenti <u>?</u>				
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SLIDE	DESCRIZIONE	LINK	DIMENSIONE	nr. 1 - ★★ - Knowledge Representation Link: http://www-lia.deis.unibo.it/Research/Areas/knowrep.html	
19/02/2003	Introduzione all'Information Access	scarica	115 Kb	nr. 2 - ★ - Extending ATMS with Order of Magnitude Reasoning	
19/02/2003	Strumenti Tradizionali per l'Accesso alle Informazioni Web	scarica	90 Kb	Link: http://www.dcs.edinburgh.ac.uk/teaching/cs4/projects/proposals/99/ProjFiles/qiangs9900-proj4.html	_
	Modellizzazione d'Utente e Personalizzazione dei Contenuti		952 Kb	nr. 3 - 🛪 - PostScript document Link: http://www-ksl.stanford.edu/people/vemuri/quail/cs221b/lecture7.ps	
22/02/2003	Information Brokering	scarica	430 Kb	nr. 4 - ★ - Truth Maintenance System	
22/02/2003	Strumenti basati sulla Modellizzazione d'Utente	scarica	68 Kb	Link: http://stallion.jsums.edu/~dmitra/artint/Fall00.d/Tms.html	_
22/02/2003	Information Filtering	scarica	91 Kb	nr. 5 - 🛪 🛪 - A Situated Assumption-based Truth Maintenance System Link: http://www.ipsj.or.jp/members/SIGNotes/Eng/02/1989/066/article004.html	
	I servizi personalizzati di InfoFactory			nr. 6 - ★★ - Problem Solving and Truth Maintenance Systems Link: http://yoda.cis.temple.edu:8080/UGAIWWW/lectures/tms.html	
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19/02/2003	Esercizi 1 e 2	scarica	26 Kb	Link: http://www.cs.cf.ac.uk/Dave/AI2/node81.html	
19/02/2003 19/03/2003	Esercizio 3 Esercizio 4	scarica scarica	24 Кb 24 Кb	nr. 9 - ★★ - TRUTH MAINTENANCE SYSTEMS(TMS) Link: http://www.dimi.uniud.it/~tasso/tms/index.htm	
				nr. 10 - ★★ - Thesis Summary Link: http://ksl-web.stanford.edu/people/axf/thesis-summary.html	
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LINK A DOCU	IMENTAZIONE ESTERNA A QUESTO SITO WEB:				
<ul><li>Sito</li><li>Sito</li></ul>	Web infoFACTORY Personalization.it				

**FACTORY** 





## **¿FORUM:** an advanced forum, with personalization and tools for anaysing social interaction

## in e-learning and knowledge management

## **Standard Forum Capabilities**

#### Forum

### 📝 Elenco dei forum disponibili > Nome Forum: Esempio di Forum > Nome Argomento: Esempio di Argomento con voto

#### Messaggi

⊟Inizio discussione - Andrea Admin		
□Continua discussione - Andrea Admin		
Altra risposta - Tosca student		
Risposta al messaggio di Andrea - Tosca student		
Questa è una risposta con citazione - Andrea Admin		
NEW! GInizio discussione - Tosca student		
Inizio discussione - Andrea Admin		

Titolo	Risposta al messaggio di Andrea
Creatore	Tosca student
Data	11/03/2004 18:39
Allegato	Developing an Asynchronous Learning Network41801.doc
Voti	****
	modifica   elimina   esporta   rispondi   rispondi citando   vota

#### Questo è un mesaggio di <u>prova</u>

.

- Questo è un elenco
- 2. numerato

Questo è un testo con giustificazione a destra

Questo è un testo di diverso colore e con diverso sfondo





## Message exchange network



## Centrality measure: discovering 'leaders'

Messages Network

#### Eigenvector Centrality



## PCA and clique analysis: discovering groups



Analisi delle Componenti Principali con Visualizzazione Cliques di livello 10

### Discovering users that are 'information bridges'



Exploiting personalization and filtering for proactive Recommendation

in e-learning and knowledge management



Tasso, C., Rossi, P.G., Virgili, C., and Morandini, A., Content-based personalization for asynchronous communication tools: the ifFORUM system.

In L. Aroyo and C. Tasso (Eds.) AH 2004: 3rd International Conference on Adaptive Hypermedia and Adaptive Web-Based Systems – Workshop Proceedings, Technische Universiteit Eindhoven, Eindhoven, August 23rd, 2004, ISSN 0926-4515, pp. 324-330.





## **Current Research**

- Personalization in Knowledge Management and e-Learning systems
- Social search, collaborative filtering (Districts of SMEs)
- 'Personalizing' the Medicine Library (BIBLIOMED Project)







an initiative of the Artificial Intelligence Laboratory,

University of Udine, prof. Carlo Tasso

www.infofactory.it