Tagmantic: A social recommender service based on semantic tag graphs and tag clusters

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ABSTRACT

Tagmantic is a web based social recommendation and search service which exploits the rich information within folksonomies. By developing multiple layers of organizational structure on top of folksonomies the relations between tags, users and resources can be utilized in order to create advanced recommender engines. The first layer of organizational structure is a tag graph which relates different entities within the folksonomy to each other. Its nodes are the concepts of the folksonomy presented by tags and the edges describe the relationships between these concepts. The second layer of organizational structure are tag clusters, which are build on top of the above mentioned tag graphs and represent the ontology of the underlying folksonomy. These Ontologies as well as the less complex tag graphs are utilized by the recommender algorithms within tagmantic in order to provide a unique and intuitive user experience of exploring and searching content in the internet. The methodology can be applied to different types of folksonomies which implies an enormous potential for future development of new recommender engines.

1. Recommender Engines on the basis of Tag Clusters

Tag clusters group tags which are either semantically related to each other (e.g. "Predictive Modelling" and "Forecasting") or synonymously used (e.g. "MBA" and "Master of Business Administration"). They enable the development of ontology based recommendation engines for arbitrary types of entities. The prerequisite to provide a recommender engine for any two types of objects is that each entity is projectable onto a tag cluster. For example for a recommender engine which includes the entity "resource" (e.g. an URL), a function which projects a resource r onto a tag cluster c is necessary:

$$w_{resource}(c,r) = \sum_{t \in T(r)} w_{tag}(t,c) \ \forall \ c \in C \qquad (1)$$

where $T(r)$ is the set of tags that resource r has been annotated with and $w_{tag}(t,c)$ is the association-weight for the tag t towards cluster c.

2. Main Use Case

A user wants to interactively browse and explore a broad topic, for example "Venture Capital", without knowing exactly what she wants to find and what the specific terms are that she might be interested in. Therefore the user enters the term "Venture Capital" into the search box available on the tagmantic platform. This produces a number of website recommendations as well as suggestions for related topics in the form of tag recommendations:
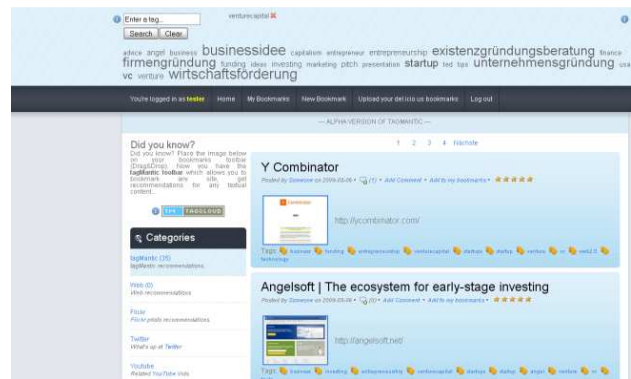

Figure 1. tagmantic.com screenshot tag recommendations nr.1

These "related topic"-recommendations encourage the user to vertically or horizontally explore (depending on the selection of further tags) the broad topic "Venture Capital". In this example the user realized that she wants to explore the subject "pitch" (= "presenting a business idea to potential investors") further. The user therefore enters the suggested tags "pitch" and "presentation" (both of which would not appear if the user had entered the term "Venture Capital" into a google-search) which results in further recommendations of web-content and related topics:
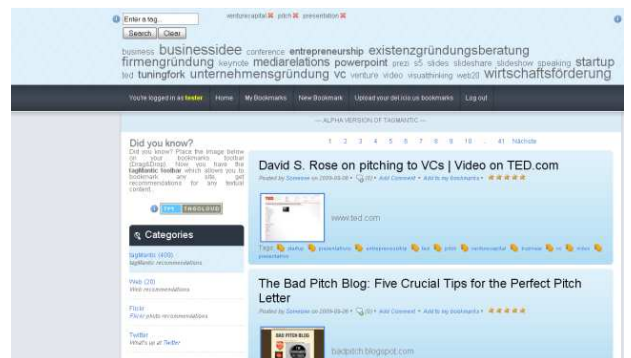

Figure 2. tagmantic.com screenshot tag recommendations nr.2

SUMMARY

The demo system consists of the web based prototype www.tagmantic.com. It implements state of the art, folksonomy based tag and content recommender systems to provide a unique and intuitive user experience.

The two main use cases which will be presented are the tag based search on the platform itself and the tagmantic bookmarklet which allows the user to not only annotate interesting webcontent but also gain recommendations on similar content while surfing.

The project has been started by the four authors for a private purpose in the mid of 2009 and in the meantime has gained financial support by the "Pro-Ideenfonds" (http://www.pro-ideenfonds.de) , a regional pre-seed technology fund which itself is funded by the "Freie und Hansestadt Hamburg" and the "European Regional Development Fund" (ERDF) in equal parts.

János Moldvay, formerly working as the Team Leader Customer Intelligence at XING, currently participates in a post-graduate MBA Program at the University of Cape Town, South Africa. He has many years of practical experience in the field of data mining and business analytics.

Ingo Bax, previously employed as a Principal Software Architect at XING, has recently been appointed to a professorship at the University of Applied Sciences in Münster, Germany. He is an expert in the field of web engineering and has research experience in the field of neuro-informatics and machine learning.

Alexander Frerichs is currently employed at XING as a Senior Manager Business Intelligence. During his career he acquired a distinct expertise in the field of data mining and recommender systems.

Concerning the project Tagmantic.com János Moldvay, Ingo Bax and Alexander Frerichs have developed the underlying data mining and recommender algorithms.

Mirko Schuh is currently employed at XING as a Manager Business Intelligence and has an intensive experience in the development of software systems. Relating to the project tagmantic.com, Mirko Schuh has been responsible for developing the web application and IT-infrastructure.

The requirements for presenting the demo-system are a PC or Laptop with internet-connectivity and possibly a projector.

An additional demo video can be viewed via the following link http://www.youtube.com/watch?v=qM8XOLRLDeE.