An Approach for Analyzing Data in Social Networks

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Abstract— This paper presents a relation model of a database with the possibilities of automatic linking with external information on social networks. Such an approach enables a further search for information by using social networks until a needed level is achieved. The analysis is related to the improvement of companies’ marketing activities.

I. INTRODUCTION

Data Mining is one of the most frequently applied techniques for extracting useful pieces of information from a big volume of data. Also, it enables the user to find out data, starting from general information, only to be followed by detailed ones until they have reached the level they need. Such information, grounded on real data, further enables the formation of the bases on which companies’ important business decisions would be based and the assessment of which alternatives could be taken into consideration in the future.

The research in this paper has the aim of forming a model of a database and a software solution for identifying users of social networks and analyzing the most significant data about them. On the basis of the formed database with the most important information significant for a company, a software solution enables one to connect with their profiles on social networks and to obtain more detailed information about them. The computer support enables a large number of different possibilities of analyzing information, starting from those the most significant for a company, then reaching the depth of the needed level.

The Data Mining methodology in social networks is being faced with a wide range of application from different aspects:

- Data mining and social network analysis based on cloud computing [1]
- Text mining system in social network analysis [2]
- Exploration of social networks via fuzzy based data mining [3]
- Finding social network data using a graph mining [4]
- Models for social networks and chat data mining [5]
- Mining newsgroups [6]

Marketing activities of an enterprise represent one the most important factors of a social network analysis. Numerous researches are indicative of a significant influence of social networks in an enterprise’s marketing activities [7] - [10]. A possibility of analyzing buyers’ attitudes and an influence on them represent a dominant factor in that sense. In that sense, Bonchi (2011) [11] stresses the importance of identifying potential users with the purpose of implementation of marketing activities. Also, research on the use of social networks in some companies indicate the significant potential for improving customer services [12].

II. DESIGN OF DATA AND THE SOFTWARE SOLUTION

The presented tables make the basis for the creation of an integral relational database model, Fig. 1. By connecting the accounted-for tables into the relational model, one is enabled to analyze initial data in a number of ways and from different aspects. Starting from cities, as the initial data of the analysis, one is enabled to obtain data about companies registered in them, then about the corresponding persons, their capabilities, education and work experience.

![Database relational model](image)

Figure 1. Database relational model

Analyses can be carried out from different original bases, starting from an analysis of capabilities, education and work experience, then obtaining relevant information about persons, companies and so forth. The most important reason for which the tables are significant for the analysis of these data, which is certainly the goal of this paper, is their capability of automatic connecting with social network pages and of obtaining further more
detailed information on the corresponding social networks themselves.

The most important Hyperlinks for connecting with them are as follows:

- Company’s social network link
- Person’s social network link
- Labor capability social network link
- Faculty’s social network link
- Work-experience group social network link
- Link of the group on a social network

One of the possibilities of analyzing data is to begin with recording cities, as the basic element of the analysis, as has indeed been explained in the Introduction. The relational model of connecting the tables enables information about cities to connect with more detailed data about corresponding companies. On the basis of this model, then, a large number of more detailed information about companies is obtained through connecting with companies’ websites and their corresponding social networks. One of the forms for the analysis of this information is demonstrated in Fig. 2.

A further possibility of information analysis also allows the inclusion the Persons table, by using the formed relational model. In that manner, an analysis is enabled by beginning from cities and companies as the basis, and then the obtaining of more detailed information about corresponding persons. Connecting with certain persons’ social network pages, one learns a huge amount of current and more detailed pieces of information about them and also gains an opportunity to establish contacts with them. Fig. 3 accounts for a large number of possibilities of the analysis of these pieces of information, as well as the automation of connecting with profiles on corresponding social networks. Fig. 4 presents the continuation of search for information by further analyzing companies’ and persons’ social network webpages.

The following analysis of information is based on data of social network groups. Beginning from social network groups and the possibilities of their automatic viewing in real time, additional information about persons and their interests are obtained, together with the possibility of connecting with pages on their social networks in the form of the ultimate result. Fig. 5 demonstrates the form with one of the numerous possibilities of analyzing information in this manner.
The following analysis, which is mentioned in this model, is related to the obtaining of more detailed pieces of information starting from work experience, as the basis of consideration. By means of the relational database model and by making an inquiry over it, information about work experience and corresponding persons are connected. Beginning from an analysis of work experiences and corresponding Web pages, one is enabled to connect information with persons and to further analyze their pages on social networks, Fig. 6.

The program code which interprets the creation of an inquiry over the relational database for obtaining information beginning from work experiences is as follows:

```sql
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An information analysis is also based on education, as initial data for obtaining more detailed information about the persons themselves. Connecting information about education with corresponding persons enables one to analyze external data on the websites of educational institutions, conclusive of their pages on social networks. Fig. 7 accounts for one of numerous possibilities of such an analysis. Fig. 18 demonstrates external information on the example of an educational institution.

The program code interpreting the creation of an inquiry for obtaining information beginning from education is as follows:

```sql
SELECT Persons.Name, Persons.Surname, Persons.[Place of Residence], Persons.Mail, Education.[Faculty Name], Education.Vocation, Education.[Link DM of Faculty] FROM Persons INNER JOIN Education ON Persons.[ID of Education] = Education.[ID of Education];
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One of the possibilities of analyzing information is based on capabilities, too, as initial data. In that sense, data about capabilities are connected with corresponding persons. A link on social networks which relates to capabilities and certain persons’ social-network link represent external data for a further search for information. Fig. 8 accounts for one of the numerous possibilities of analyzing information in this sense.

The program code interpreting the creation of an inquiry for obtaining information beginning from capability is as follows:

```sql
SELECT Persons.Name, Persons.Surname, Persons.[Place of Residence], Persons.Mail, Capabilities.[Name of Capability], Capabilities.Description, Capabilities.[Link DM Capabilities] FROM Persons INNER JOIN Capabilities ON Persons.[ID of Capabilities] = Capabilities.[ID of Capabilities];
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As we can conclude, the discussed relational model of the formed database enables us to have a large number of different approaches in the analysis of information. Fig. 9 accounts for the analysis of data based on information about persons, education, and companies, as one of the other numerous initial models for analyzing information.

III. CONCLUSION

This paper demonstrates a methodological reference to the development of the computer support, which can universally be applicable in companies’ business. The key elements of the rational database model for recording basic data have been presented. By means of Hyperlinks, it is possible to move on and continue searching for information on social networks in different segments. On the basis of the discussed relational database model, it is possible to form different information analyses. The paper reveals some of them, while the user is enabled to have a broad range of own approaches in an analysis.

The analysis of information in this paper is based on using the Data Mining methodology, which enables us to connect with external information on social networks and search for them as long as the needed level is reached.

REFERENCES


