

Social Media, a new Challenge for Database Design

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Abstract:

The community social networking applications are the way to socially interact these days, with a strong emotional impact. This paper discusses social media ideas and the social media promotion of digital content and other aspects such as future development.

It also discusses the advantages, appearance and the importance of social media in promotion but also the methods of social media promotion.

Finally, our paper presents a new model of a database, as a foundation of the social media application implemented in a group of friends, colleagues and relatives.

Keywords — **Social Media, Database, Design, Relational database.**

I. INTRODUCTION

The Information and Communication Technology has changed dramatically in the last 20 years, and for this, the development key has been the emergence of social media.

The development of mobile technology has played an important role in shaping the impact of social media. All over the world, mobile devices dominate all human existence.

The reasons why people have chosen to use social media in exchange for information are the desire to disclose valuable and fun content to others, to define themselves, to develop and maintain their relationships, and in addition to put highlight the brands and causes they like or support.

New applications, tools and methods are constantly being developed to increase productivity, each platform comes with its own characteristics and its specifics, so each tool is specially created to meet all the requirements we have.

Our application aims to be a small contribution to what already exists on the market, a database and an application for the management of pictures, added by the group of friends, families and colleagues.

The paper is structured as follows. In Section 2 we will briefly discuss the foundation for our study, the background. We will describe our proposal of creating a database.

Related work to the conceptualization of our model and the new technology will be presented in Section 3. The impact of social media is briefly described in

Section 4. In Section 5 implementation details as well as benefits of this conceptual modeling approach are described. We start with the prototype, then we define the attributes, managing rules, we define tables and relational data model and finally we design the queries.

The paper will conclude with the discussion of the results.

II. BACKGROUND AND STATE OF ART

The use of social networks has become a useful means of keeping in touch with friends and family until they are used in ways that have a real impact on society.

The Social media has reached to be used in other ways that shape politics, business, world culture, education, careers, innovation and more (as we see in figure 1).

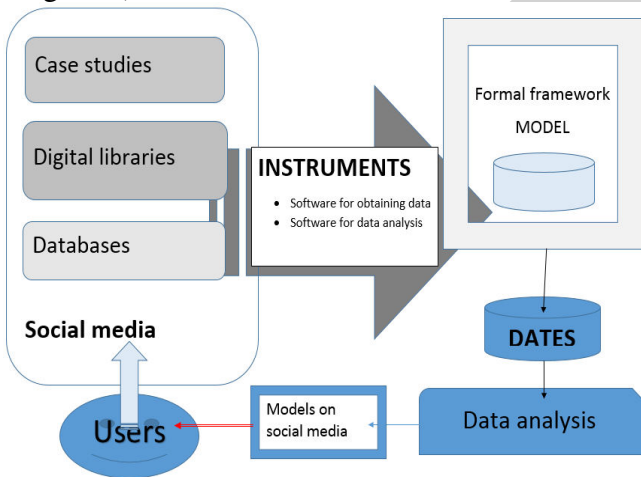


Fig. 1. Models of social media usage

In the recent years, due to a new wave of technologies and practices, the impact of social media has been reflected lately in content, in communities and in Web 2.0 and 3.0 technologies. Thanks to the Internet, people could find each other through social networks and can do wonderful things.

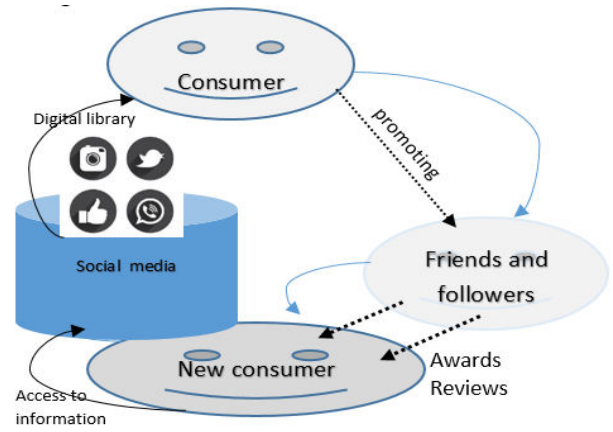


Fig. 2. Promoting of digital content on social media

Several authors have thought of creating various forms of social networks and databases or applications. We quote a few of them.

”When you are planning to make a social networking website or mobile app, you should have a good database set up. Now, this is probably one of the hardest tasks. Constructing a database is not as easy as one might imagine”, state the authors of [7]. In paper [8], the authors lead us to the idea that the features like data storage and fast retrieval phase of query processing are given primary importance.

When we propose a database for social network, we must take into consideration that “the most common database designs for social networking sites include quick reference functions, features for the addition and removal of social media sites and channels to your own database and the ability to filter sites based on multiple features”[9].

We find a key idea in paper [10], “first, it depends on your goal why do you want to build that application”, idea that will guide us throughout our approach.

III. THE IMPACT

Without the social media - the social, ethnic, environmental and political networks, all the world issues would have a minimal visibility. The increased visibility of the world problems has changed the balance of power.

The impact of social media is reflected in many levels of knowledge. The level of specialization is reflected on five main levels: beginner, intermediate, expert, leader, visionary (see figure 3).

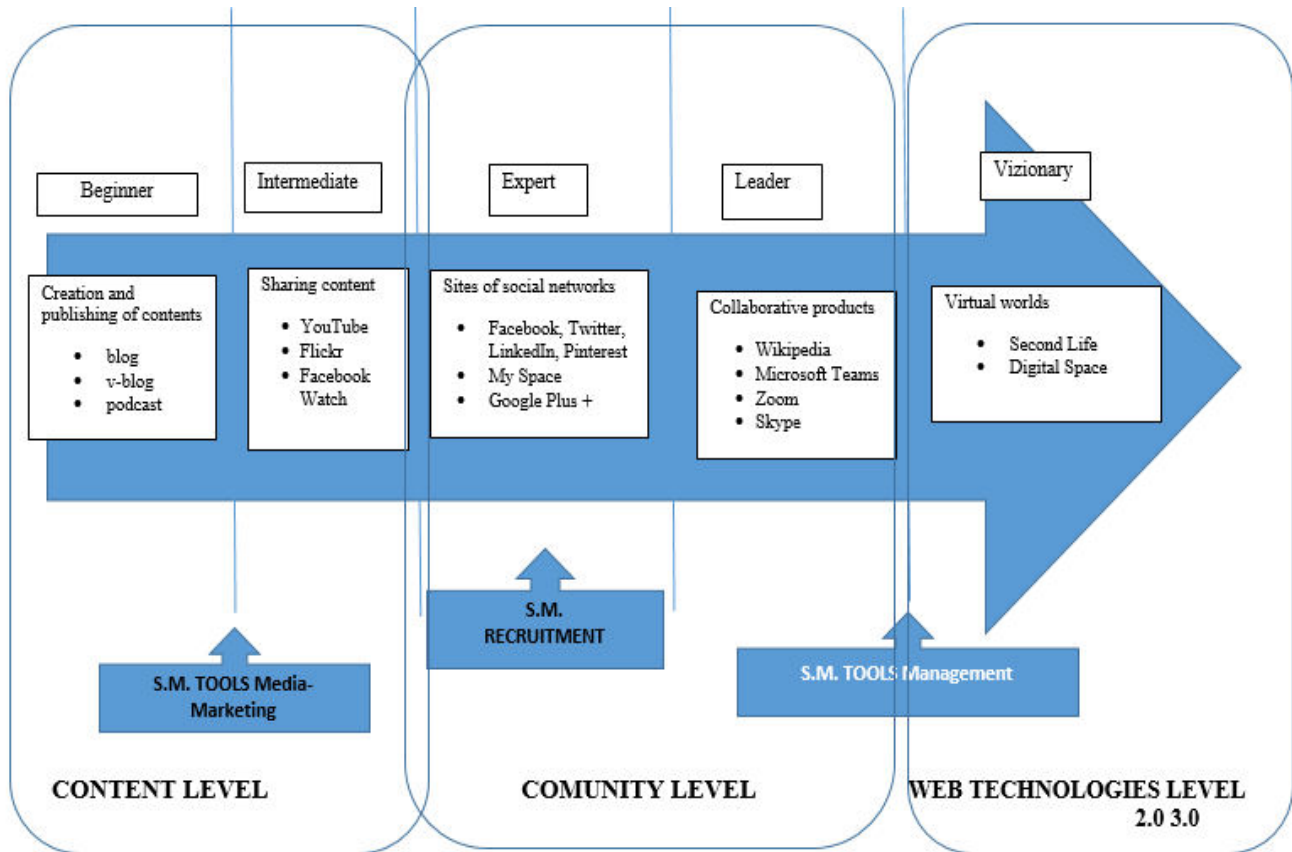


Figura 3. The levels of specialization in the use of social networks

While social media activism brings increased awareness of society's problems, some questions remain as to whether this awareness will ultimately lead to real change.

Some researchers expose that social sharing has encouraged people to use computers and mobile phones to express their concern about the social issues, without having to actively engage in real-life campaigns. Their support is limited to appreciation or content sharing.

This is a very human reaction when people are offered options that remove them from the responsibility to act.

When people are given the option of appreciating a social cause, they use it to give up the actual use of time and money for a charitable cause.

On the other hand, when people are allowed to show support in private, they are more likely to show significant support in terms of financial contribution.

Researchers have found that public approval is an action designed to satisfy the opinions of others, while those who give in private do it so because the cause is aligned with their values.

The impact of social media on humanity is reflected on two important levels: on society and on business.

The networks intervene on society and the information intervenes on business (as in figure 4).

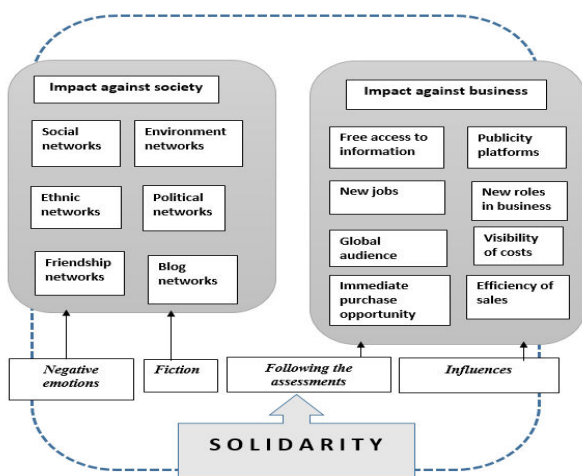


Figure 4. The impact of social media on humanity

The growth of social media means the habit of not finding any organization that does not reach its customers and its prospects through one social platform or another. The companies see the importance of using social media to connect with customers and build revenue.

The companies have realized that they can use social media to generate information, stimulate the demand and create targeted product offerings. This is important in traditional companies with and obviously in the world of e-commerce.

The implementation of social networks in the workplace can strengthen the exchange of knowledge.

Before the social media era, the humanity had to pay to get business information. Now, every person

and company is their own media brand and there are significantly fewer barriers to reaching people. This has made it easier for smaller brands to gain access to the market.

Before the smartphones and the social applications, it was much more difficult (and expensive) to advertise, especially if the location of the business was not on a main street. One or two small companies are not enough to create a big brand, but several together can have an effect on the market.

The social media is deeply linked to a number of platforms (*Facebook, LinkedIn, YouTube, etc.*) that control distribution. The traditional advertising model has changed, and these platforms have become some of the most widespread in the world. Even if these platforms dominate, they also offer a whole new system for entrepreneurs.

New jobs have emerged due to the increased use of digital marketing in customer involvement and awareness. New roles in business have been created to manage and operate the presence of brands on social platforms.

Most companies have a social media manager position in the organization chart. He knows very well how to target and involve customers online. He has special skills to be able to create a new awareness about a business brand on social platforms. It is a demanding job, because creativity is needed to generate new marketing ideas. This is to capture the attention of customers.

The social media influencers are currently very popular. The consumers follow the posts promoted by brands. They are the new ways to reach users. Most consumers base their buying decisions on whatever is popular. From start-ups to big brands, funds have been set up to pay for posts to promote the brand.

A single post can reach a global audience in seconds. A brand that is expanding to new frontiers is becoming better known thanks to social networks. It can target and reach new users in minutes without a sophisticated marketing strategy. The Internet has made the world a village, and social platforms have connected the user to interact.

Billions of people use the platforms which shows the growing power of social media, people are actively accessing their pages to buy or check the recommendations of the best products.

Each media platform offers an opportunity for advertising (television, newspapers, radio, magazines, etc.) and each offers a certain level of targeting.

As Facebook, Twitter, Instagram, Pinterest, YouTube, (even Amazon) collect more and more personal data about us, the ads we see become more relevant as companies use this data to choose and choose who sees your ads.

IV. THE PROTOTYPE

In the following paragraphs we propose a simple but very efficient example of application, which is implemented within a group of users and allows the sharing of pictures between members of that community.

It is created the database that allows the updating of photo albums, by categories, to which network users have access, view them and add comments.

We propose to store the photos in albums. Their types will be stored in a table called *Album* with the following items: *Nature, Arts, Holidays, Food, Friends, Cats, Castles*. Albums have a generic *ID* called *Album_ID*, the application allowing you to add new albums whenever needed.

ID_Album	Title
213	Nature
354	Arts
420	Holidays
445	Food
564	Friends
866	Cats
923	Castels

Figure 5. The structure of *Album* table

Users can create an account and have a password stored in the *User* table, with the following structure: *ID_User, UserName, Password, No_phone, Email, Address, ID_follower*(as we see in Figure 6).

Field Name
ID_User
UserName
Password
No_phone
Email
Address
ID_follower

Figure 6. The structure of *User* table

We begin to define the relational model through the normalization process, using the matrix of functional dependencies. The steps are described in the next points :

a. Identifying the attributes to be memorized and the management rules.

User-defined dictionary is built on the following fields:

Dictionary (*IdLocation, LocationName, Abbreviation, Id_Picture, Description, Date_Upload, Id_User, Id_Location, Id_Tag, Title, Id_Album, TitleAlbum, Description, Id_User, Username, Password, No_Phone, Email, Address, Id_Follower, Id_Comment, Date, Hour, Content*)

The attributes with primary key role are: **Id Location, Id Picture, Id Tag, Id Album, Id User, Id Comment.**

b. Defining tables and integrity constraints

The tables used are presented in the database structure diagram, the *Tag_picture* table is used as an intermediate table and the database structure diagram is presented in figure 7.

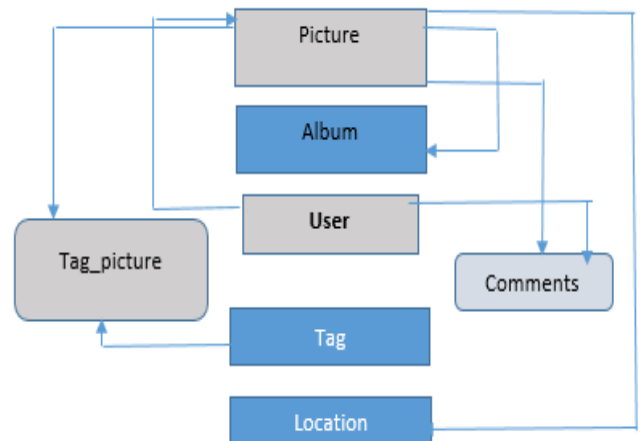


Figure 7. Database diagram

Based on the database diagram we can already prepare the database structure, as we see in figure 8.

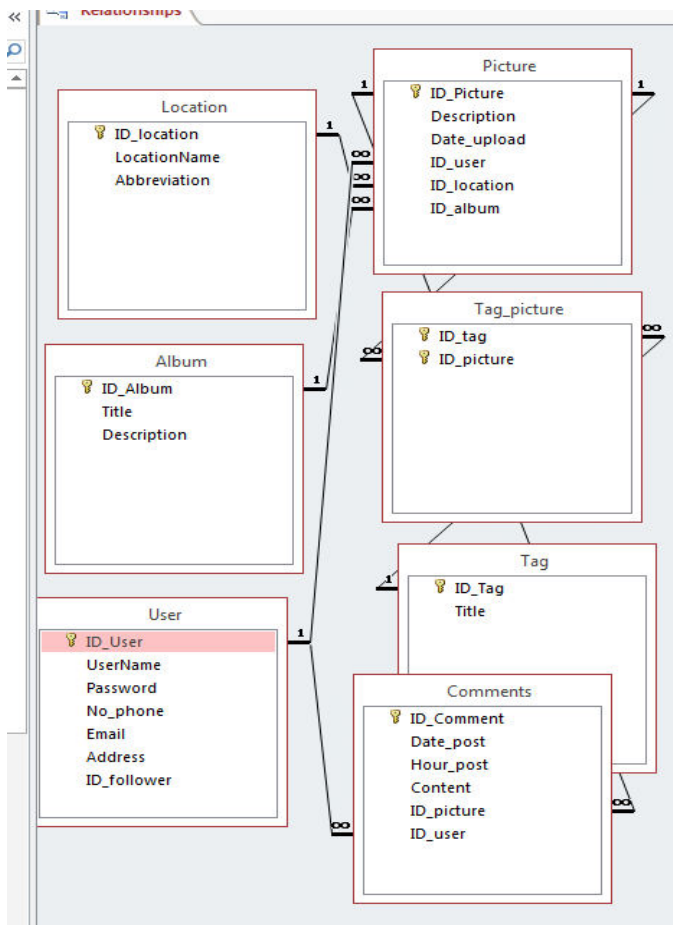


Figure 8. Database structure

The relational data model is created for the correct construction of the database. Contains the following items:

LOCATION (Id_location, LocationName, Abbreviation)

PICTURE (Id_picture, Description, Date_upload, ID_user, ID_location, ID_album)

ALBUM (ID_Album, Title, Description)

USER(ID_User, Username, Password, No_phone, Email, Address, ID_follower)

COMMENTS(Id_Comments, Date_post, Hour_post, Content, ID_picture, ID_user)

TAG_PICTURE(ID_tag, ID_picture)

TAG (ID_tag, Title)

The definition of integrity constraints takes into account the existence of structural constraints, first of all. The primary keys appear underlined in each table, with the role of uniquely identifying the records in that table. Primary key values must be found among foreign key values.

Domain restrictions in the initial phase are not placed.

The purpose of a database management system is to provide an environment that is both convenient and efficient so that it can be used to store and retrieve information from the database.

In our database we reach at a time a very large amount of information, it must ensure the description of the data in the most accurate way, and very important to update and query the database.

In the following paragraphs we will give some examples of data extraction. Several users have logged in, after that we extracted results.

A first question to ask, how many pictures did each user add? We can use a query and the generated result to be a pivot table. The SQL code is:

```

TRANSFORM Count(*) AS Expr1
SELECT Picture.ID_user, Count(*) AS TotalFoto
FROM Album INNER JOIN Picture ON
Album.[ID_Album] = Picture.ID_album
GROUP BY Picture.ID_user
PIVOT Album.[Title];
    
```

And the result, with the data entered so far would look like this:

ID_user	TotalFoto	Arts	Castele	Food	Friends	Holidays	Nature
1	1			1			
2	1					1	
3	1						1
4	1						1
6	1					1	
7	1		1				
8	1	1					
10	2				1		1
11	1				1		

Another interesting search would be the one that determines the pictures that have comments and how many comments they have. The SQL code of the query is written below.

```
SELECT Picture.Description,
Count(Comments.ID_Comment) AS CountOfID
FROM Picture INNER JOIN Comments ON
Picture.[ID_Picture] =
Comments.[ID_picture]
GROUP BY Picture.Description
HAVING Count(Comments.ID_Comment)>1;
```

Description	CountOfID
Cascada Cailor	2
Turnul cu ceas	2

The total number of photos attached by users can be found by the following query:

```
SELECT User.UserName,
Count(Picture.ID_Picture) AS CountOfID
FROM [User] INNER JOIN Picture ON
User.[ID_User] = Picture.ID_user
GROUP BY User.UserName;
```

UserName	CountOfID
Ana Niculescu	1
Anton Rusu	1
Camelia Nita	1
Denis Lupu	2
Eugenia Costir	1
Ionela Antone	1
Marius Lupescu	1
Rodica Popa	1
Tudor Banciu	1

A selection of the comments we can see with the help of following query.

```
SELECT User.UserName, User.Email,
User.No_phone, Comments.ID_Comment,
Comments.Content
FROM [User] INNER JOIN Comments ON
User.[ID_User] = Comments.ID_user;
```

UserName	Email	No_phone	ID_Commen	Content
Marius Lupescu	marius.lupescu@gmail.com	0257 526 792	6437	Cata bucurie!!))
Rodica Popa	rodica_popa@yahoo.com	0762 401 045	2353	Foarte spectaculos.
Tudor Banciu	tudor_banciu@yahoo.com	0257 466 833	7514	Si noi am fost aici.
Ana Niculescu	ana.nicu@gmail.com	0257 835 503	2983	Ce seara incredibila!
Ana Niculescu	ana.nicu@gmail.com	0257 835 503	6535	Incredibil!
Anton Rusu	anton.rusu@gmail.com	0257 300 876	5425	Amintiri extraordinare!
Denis Lupu	denis_lupu@yahoo.com	0757 551 963	8744	Un urcus stranic.

We can find the followers with the next query, and the result is:

```
SELECT User.ID_User, User.UserName,
User_1.ID_User AS IDFollower,
User_1.UserName AS NumeFollower
FROM [User] INNER JOIN [User] AS User_1
ON User.ID_follower = User_1.[ID_User];
```

ID_User	UserName	IDFollower	NumeFollower
10	Daniela Calinescu	1	Marius Lupescu
10	Denis Lupu	1	Marius Lupescu
7	Eugenia Costiniu	4	Ana Niculescu
6	Anton Rusu	7	Eugenia Costiniu
4	Ana Niculescu	8	Ionela Antonescu
2	Rodica Popa	9	Daniela Calinescu
5	Sorina Gherea	9	Daniela Calinescu
8	Ionela Antonescu	10	Denis Lupu
3	Tudor Banciu	11	Camelia Nita

With the help of these queries we can request different results of the data from the database and actions on the data. The queries will give us answers to simple questions, performing calculations, combining data from different tables, adding, modifying and deleting data.

5. CONCLUSIONS

The social media advertising is also more effective because the opportunity to buy is immediate. An ad on social media immediately offers the opportunity to purchase the article in seconds with just a few clicks. Not only do what we see about others on social media influence us to buy, but we often buy. It doesn't take long for a new company or product to be recognized by making a presentation on social media. Companies and brands that used to spend time and money and goodwill building a brand can now do it in less than 24 hours. Influencers are available for rent and can provoke conversation almost immediately around a new trend.

Our study aimed to present a model through which we can use social networks to promote digital content. We thought of proposing a digital photo album to be shared between members of a social network. A database model has been created for collaborative access to digital content.

Based on the data structure presented in the new database schema, the aim was to create a test application that implements some ideas presented in the theoretical part described previously in the section 3 and 4. Finally, some examples of data extraction were given.

Numerous studies have been done and the research continues. The social media generally does not make us feel better about ourselves. For many of the reasons stated above, the social media users tend to report higher levels of depression, loneliness, and self-doubt. These emotions of isolation and dissatisfaction often lead to therapy or unjustified product purchases.

The social media is here to stay. And the platforms that are being built and expanded offer wonderful opportunities to enrich our lives. But like the invention of fire, society will take some time to figure out how to use them for good and not for evil.

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