

# Knowledge Management of Information Extraction from Social Networking System through WCF Service

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**Abstract:** Social Networking System is one of the most popular Internet applications. This paper presents an online information service model based on Social Networking Systems. “Knowledge management of information extraction from Social Networking System through WCF Service” demonstrates an effective and efficient technique for extract online information from staff members profile based on Social Networking System and automatically embeds that information in an education institution website through WCF, which can make the college database more light and accurate. The data mining in SNS profiles is done through K-means Clustering. A case study based on FACE KUTTER, a practice SNS for staff members of an education institution is implemented. The performance of FACE KUTTER is compared with other widely used Social Networking Systems.

**Keywords:** Social Networking System, Online Information Service, Knowledge Management

## I. INTRODUCTION

### A. Social Networking Systems

Social Networking System is an online community of people with a common interest who use a website or other technologies to communicate with each other and share information resources. Based on the potential users behind this network and the development of the web-based technology, more and more social network systems emerged like Facebook, Twitter, LinkedIn (Figure 1).

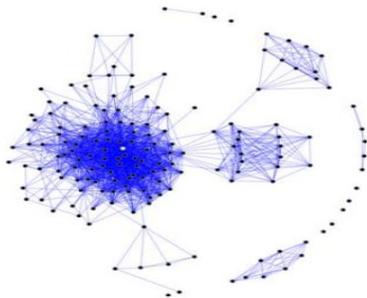


Figure 1. A Social Network Schematic

### B. Social Networking Service

A social networking service is an online service, platform, or site that focuses on facilitating the building of social networks or social relations among people like, share interests, activities, backgrounds, or real-life connections. A social Networking service consists of a representation of each user, his/her social links, and a variety of additional services. Most social networking services are web-based and provide means for users to interact over the Internet, such as e-mail and instant messaging. Social networking sites allow users to share ideas, activities, events, and interests within their individual networks.

### C. Emerging Trends

Social networks are being used by teachers and students as a communication tool. It creates chat-room forums and

groups to extend classroom discussion to posting assignments, tests and quizzes. Professional use of social networking services refers to the employment of a network site to connect with other professionals within a given field of interest. Educators tap into user-generated content to find and discuss curriculum related content for students. Social networking services can become research networks as well as learning networks.

## II. RELATED STUDY

The definition for online social network is be a system where (a) users are first class entities with a semi-public profile, (b) users can create explicit links to other users or content items, and (c) users can navigate the social network by browsing the links and profiles of other users. This definition is consistent with that used in previous studies [5]. With the rise in popularity of online social networks, many other types of sites began to include social networking features. Examples include multimedia content sharing sites (Flickr [8], YouTube [15], and Zoomr [16]), blogging sites (Live-Journal [11] and BlogSpot [1]), professional networking sites (LinkedIn [9] and Ryze [13]), and news aggregation sites (Digg [7], Reddit [12], and del.icio.us [6]). One of the primary reasons that have been noted for popularity of social networking sites is their user-centric nature. The content that is shared on social networking sites is often information about the users themselves, such as their statuses, photos, refer the work by boyd [4].

Full participation in online social networks requires users to register a (pseudo) identity with the network. Users may volunteer information about themselves (e.g., their birth date, place of residence, interests), all of which constitutes the user's profile [3]. Once an identity is created, users of content-sharing sites can upload content onto their

account. Many such sites enable users to mark content as public (visible to anyone) or private (visible only to their immediate “friends”), and to tag content with labels. All of the content uploaded by a given user is listed in the user’s profile, allowing other users to browse through the social network to discover new content [15]. There are two types of social networking services. One is Profile-based Social Networking Services which is primarily based on users’ profile information and the other one is Content-based Social Networking Services which gives more importance to posting messages than the users’ profile [2][8].

TABLE 1. LIST OF SOCIAL NETWORKING WEBSITES [10]

Name	Description /Focus	Registration	Global Page Ranking
Academia .edu	Social networking site for academics/researchers	Open	3,872
Classmates.com	School, college, work and the military	Open to people 18 and older	3,284
Facebook	General: Photos, Videos, Blogs, Apps.	Open to people 13 and older	1
Goodreads	Library cataloging, book lovers	Open	544
LinkedIn	Business and professional networking	Open to people 18 and older	3
Orkut	General. Owned by Google Inc.	Open to people 18 and older.	10
Pinterest	Online pin board for sharing	Open	4
Twitter	General. Micro-blogging, RSS, updates	Open to all ages	2
Shelfari	Books	Open	18,152

The Windows Communication Foundation (WCF) [14] is a runtime and a set of APIs (application programming interface) in the .NET Framework for building connected, service-oriented applications. Here it is used to support distributed computing where services have remote consumers.

### III. METHODOLOGY

#### A. Problem Formulation

Social Network System providing a convenient platform for social communication and activities can provide extraordinary even a little overwhelming information

service, because massive information from individual or organization is being uploaded or created every minute right now. Most of the current social network services are providing services through a particular application of social network system like Facebook, in that information can be only used within the websites and its applications (Games) however information stored in SNS may be very generous and complicated.

In case, building a particular system like an information service system for an education institution, there are many staff members working in both academic and administration.

The issues in maintaining the staff member details in a database are

- The administrator or the authorized user only can access to manage the information.
- The information extracted from the local database maybe out of date.
- Local database may contain wrong details.
- There is no means of any automatic updating.
- It increases man power and time consuming work.
- When database grow, it is very difficult to update each and every user.
- The data stored in the database is just displayed in the profile. The data are not processed in any form to get it as information.

The above stated issues are resolved as

- Building an SNS for staff members to store their profiles and to share their interests within the group.
- Building an education institution website.
- Building a real time technique to extract online information from SNS and embed it in the education institution website.

The communication and integration between the applications is very important. So, the web service can be applied for the real time application. But there are limitations with web services too.

- The major limitation with web services is that the communication can happen over HTTP only.
- A second limitation with web services is that it provides simplex communication and there is no way to have half duplex or full duplex communication.
- They work in an stateless fashion over HTTP and are hosted inside a web server like IIS

Windows Communication Foundation (WCF) comes to the rescue when we find ourselves not able to achieve what we want to achieve using web services like various protocols support and duplex communication. With WCF, we can define our service once and then configure it in such a way that it can be used via HTTP, TCP, IPC, and even Message Queues. The solution is extracting online information from social network system through WCF service in which K-means Algorithm is implemented to extract the data from database.

Nowadays education institutions are maintaining their own websites for various reasons like providing information regarding the institution, courses offered, events handled and more particularly maintaining the staff member details. The staff member information in the website is

viewed as a static page. This can be rectified and modified as dynamic by providing a service through which real time information that can be extracted from the SNS database and embedded into a website.

The phases in the model are

- 1) Social Network System
- 2) Education Institution Website
- 3) Windows Communication Foundation Service with *k*-means algorithm

### 1) Social Network System:

The SNS named *fk* FACE KUTTER is designed for the staff members with the features of Profiles, Contacts, Blogs and Chat. In this SNS the user can maintain their profiles, contacts, post articles through blogs and communicate within their community through chat. The new user can register their details in the sign up process.

The registered user can enter into the *fk* FACE KUTTER with their login details like user name and password. Within the SNS all the provisions are made available to the staff members. While editing profiles “update in education institution web site also” option is available for staff members. If staff members wanted to update the same information in college web site means, they can choose the above said option. So the updating is done on both SNS and institution website profiles.

### 2) Education Institution Website:

Here the simulated college website provides the necessary information regarding the institution including staff member details. Here the staff member details are maintained by the administrator. The staff members have to give the network id while registering their details in the website. The network id is provided by the SNS in the above said section. The administrator is only having the rights to register the staff members.

Once the registration is over, thereafter no need for asking website maintainer for updating help.

### 3) WCF Service with K-Means Algorithm:

In order to implement the *fk* FACE KUTTER, hosting a service through which online information can be extracted from the SNS database and embed it into the education institution website. The service here used is WCF Service. The communication between applications is very important, that is achieved through WCF service. With WCF, defining and configuring the service is done via HTTP, TCP, IPC and MSMQ and its supports even duplex communication.

The K-means clustering is implemented in WCF service to extract the online information from the SNS. It is the fastest algorithm in data mining; centroid based clustering to cluster the large datasets.

Here in this K-means algorithm, the points are the data which the service taken from the SNS *fk* FACE KUTTER, then the resulted object is embed in the institution website. According to the model the designing process is

**Step 1:** The education institution website administrator have to provide FACE KUTTER, the data structure of the staff member’s information, and points out specifically

what information shall the *fk* FACE KUTTER should provide.

**Step 2:** Apply a portal from the *fk* FACE KUTTER, and use WCF service technology to achieve the real-time connection between the *fk* FACE KUTTER and the education institution server.

**Step 3:** Design and implement the education institutions required user interface.

Figure 2 is the simulated website of Kongu Arts and Science College. For updating staff profiles in the website, the WCF service has to extract staff member’s information from the personal website at FACE KUTTER shown in Figure 3.

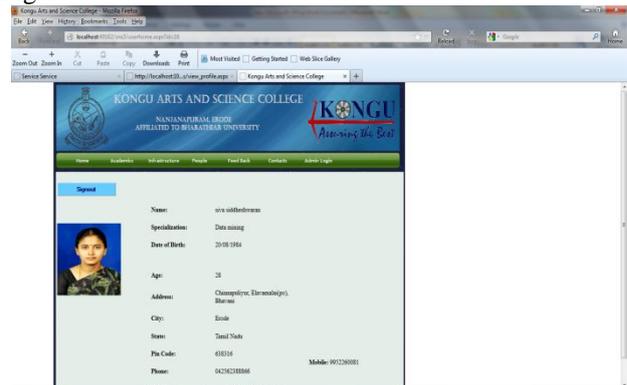


Fig. 2. Online Information from *fk* FACE KUTTER Embed in the Education Institution Website

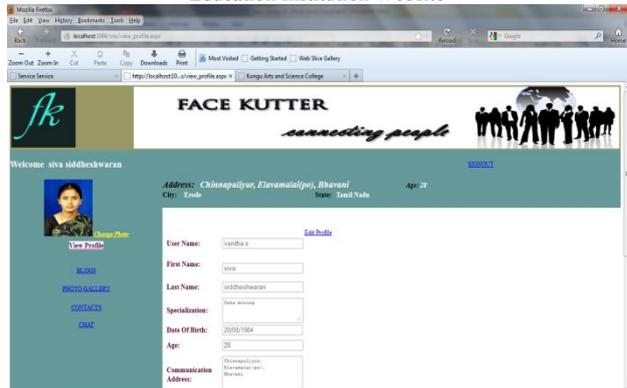


Fig. 3. Staff Profile in the SNS *fk* FACE KUTTER

After Updation, the staffs members profile in both *fk* FACE KUTTER and education institution website are same. Applying this model to create an organization’s website will make the website more concise, reduce the burden of the server in the meantime, can also improve the accuracy and reliable of the staff members information.

### B. System Implementation

The basic processes of information service based on SNS through WCF is shown as

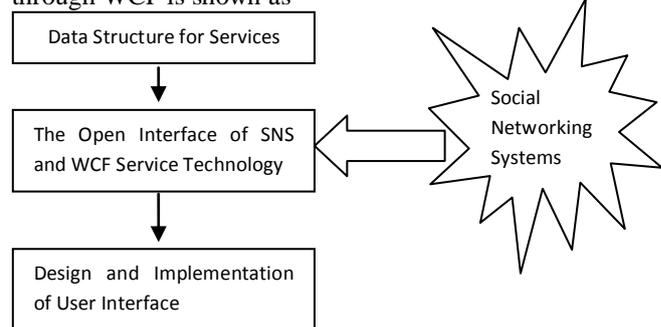


Fig. 4. The implementation model of WCF service based on SNS

1) *Data Structure for Information Service:*

Data Structure is crucial for retrieving the information later on. The first step is designing the data structure to meet the requirements of the service application, as well as, specifically listing the information needed from the social network system, which we called online information.

2) *Online information extracting from Social Network System:*

The online information extracting from SNS have to match the data structure of the information service. A technical problem here lies on two points. There is a need for open-portal from the SNS. Another one is application WCF-service techniques. Here two kinds of data are required: one is the application data and other one is the online information from the social network system.

3) *The User Interface Design and Implementation of the Service:*

According to different requirements from universities and education institutions, designing suitable user interface is a challenging task to meet the user requirements.

The system implementation of this current work includes

1) *Social Network System (fk FACE KUTTER)*

The social network system implemented here is *fk* FACE KUTTER, a practice SNS for staff members. This system has to be implemented in the Web server. The database is

implemented to store the staff profile details. This SNS has to provide an open portal to extract information from the database through WCF service.

2) *Education Institution Website:*

This application is developed and implemented in the web server and the database is maintained by the administrator of the institution. The extracted data from the SNS is embedded here through WCF service.

3) *WCF Service:*

This module describes how to host and run the WCF service in IIS. This procedure consists of the following steps:

- Create a base address for the service.
- Create a service host for the service.
- Enable metadata exchange.
- Open the service host.

IV. EVALUATION

A. *Evaluation chart*

Here Social Network System *fk* FACE KUTTER is compared with other Social Network Systems like Bebo, Facebook, Flickr and You Tube with the parameters general information, groups, design customization, viewing and moving content.

The Social Networking Evaluation Chart is as follows:

	<i>fk</i> FACE KUTTER	Bebo	Facebook	Flickr	YouTube
<b>General Information</b> About	<i>fk</i> FACE KUTTER is a social networking site focused on connecting staff members for sharing information within the community and also to update the profiles in website. The features are Profiles, Blogs, Photo Gallery, Contacts and Chat. A practice SNS for College Faculty.	Bebo is a commercial social networking site. Onsite activity is organised around member's profiles, and content sites. A news feed on users' Home pages updates them of their direct friends' activity	Facebook is a commercial social network site. Initially restricted to US university students, it has opened its membership to any individual with an email address and, to businesses and groups.	Flickr is a commercial online photo sharing site that has a range of social networking features that support the sharing of pictures. Owned by Yahoo. Applications are available in Facebook, pre-loaded mobiles.	YouTube is the world's largest video sharing web site, and allows to upload, watch and share videos. YouTube content is quite diverse. It includes music and entertainment content as well as political, sports, cultural and educational video.
Profile Privacy and Moderation Settings	Privacy settings are highly customizable, updating profiles in education institution website is done automatically on demand only. The updating is done only with user permission. So high level of privacy is maintained here.	All new profile pages are private by default and visible to friends only. Members can also connect with their college or school network, which means that their profile becomes visible to other site members within that network. Members can also opt in to make their profile	Facebook has a high level of permissions, mainly controlled via member's privacy settings.	All adult profiles are public by default. Photographs can be assigned as public, private, or available to friends or family groups. Members can select from a range of permissions for others to download and use their pictures.	YouTube members can choose not to display their personal information to other users. YouTube members who upload video can manage the way those videos are presented to the community.

		public so that anyone can view it. Contact details are only visible to selected direct friends.			
Members Toolkit	News feed updates on wide range of colleague activities, including changes made to profiles. Members have a blogs to post and view articles, post comments. Contact details maintenance and having a provision to chat online.	Members have a blog; can upload photos, post comments; create polls and forums; use on site mail; use Skype; create and select widgets; create mini-events, playlists and quizzes; upload videos. There is a news feed on user's home page which provides them with friends activity updates.	News feed updates on wide range of friend's activities, including changes made to profiles, status updates. However, the huge variety of third party applications makes it possible to import content and a massive range of tools. Free classified ads.	Members can organise their pictures in to sets, map the location of their pictures, create slideshows, add notes and create favourites lists. Post pictures to external blogs and sites, either using the onsite tools or a third party application.	Members profile pages are called Channels. Members can choose to display the Posted or favourite videos, bulletins, subscriptions, message board, comments attached to each video.
File upload	Photos, articles	Photos, video, third party applications.	Photos, video, media players or links to external media.	Photos. Upload non-photographic images and screenshots.	Video.
Groups Group Settings	Members can be grouped based on their specialization.	Members can register a group, book or band. They can also create a fan group for a band.	Members can join and create open, closed or secret groups. Members can sort their friends into private groups, in order to message particular collections of friends.	Groups can be public, moderated, or private. Moderators can hide discussion and photos. Moderators can remove troublesome members and create posting rules.	Members can join and create public, private or member-moderated groups;
Group Tools	Photos, blogs and online chatting.	Group space tools include photos, blog, polls, forums; white boards; Widgets; video; quizzes; wall (notice board), songs, music albums comments.	Members can join and create open, closed or secret groups. Group members can be given permission to upload videos, post forum topics or replies.	Member messaging, assigning permissions or roles to members.	Group members can upload videos, Post forum topics or replies.
Search	Staff members profiles are available only to the education institution website	Onsite search powered by Yahoo! Members' profiles are available to external search engines.	Onsite search within people, pages, groups, events and applications. Members can choose to make their profile stubs searchable to external search engines.	Members can restrict their pictures from appearing in some search engines.	Onsite search within video, channels, play lists, and groups.
Design and Customisation Content	Members can upload their own graphics for their profile picture.	Profile page modules can be selected, de-selected and	No template customisation. Extensive selection of third	There are limited options for organising page layout. Some	Members can choose from a range of content modules to

and/or Design Customisable		ordered. There is an extensive selection of third party widgets. Members can choose a maximum of 8 applications to be displayed on their profile page.	party widgets.	HTML is allowed on the profile.	display on their channel.  Members can also upload their own graphics for their channel background.
<b>Viewing and Moving Content</b> Getting External Content In	Members can post content manually.	Upload pictures and video on site. Only code from Bebo partners can be added to profile widgets. Bebo pre-selects available widgets. Third party applications are also available.	Members can post or import items (web pages, embedded multimedia content) manually. Third party applications make it possible to import a wide variety of syndicated content.	Upload pictures via some mobiles and by email, or on the site. In addition to the default upload tool, there are a variety of more advanced of system- specific uploading tools available.	Upload video via the YouTube website, mobiles and digital camera/camcorder software.
Content Out	On demand, the Staff Members profile from FaceKutter can be updated on college website application through WCF service.	Videos via embedded code. All videos contain the Bebo logo.	RSS feeds are available for three activities: status updates, notes and posted items. Create Widgets for external sites which may contain status update, posts and various photos upload.	There are many Flickr applications that allow you to share your Flickr content in other SNS services, web pages and weblogs, even web browsers.	Downloading or copying of videos from the YouTube site is not permitted. Create custom YouTube players that will deliver selections of selected videos.

### B. Experiment Results

The automatic updation of staff member profiles is done via automatic activation whenever any message is received by the service. It then launches and fulfils the request without running in advance. The WCF service extracts online information from staff members profile based on Social Network System and automatically embeds that information in an education institution website, which could make the college database more light and accurate. So the education institution running WCF service with K-means algorithm always has the current data without manual work.

### V. CONCLUSION

Nowadays people are using SNS as a social communication tool. In this paper, we proposed a new idea which is based on SNS but it is providing more service by using *fk* FACE KUTTER. Research based on this model and the application shows that people can use SNS as a resource of information to embedding into a particular application system, which will make the target system more light and concise as well as more accurate and reliable.

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