

Social Media as Assistive Technology for Elderly

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Abstract: An enormous amount of data is being pooled through the use of social media which is being mined to get benefits in different areas such as healthcare, business, and learning. Providing care to elderly at their home environment is understood as a complex problem and different types of systems are being proposed which can eliminate the presence of caregiver. Social media is acting as the superlative tool to provide elderly a mean of entertainment, communication and information exchange. The data contributed by them can be served to them after converting it into the knowledge. Healthcare professional are interested in the data of elderly so that they can propose solutions to assist them. The organization collecting health data needs the data of elderly activities so they can correlate with other types of activities for their betterment. This work aims to use social media as an assistive technology for elderly which can help them to spend a better life. Different views such as caregiver, healthcare professionals, organization, etc. collecting health data can be benefited through this work. Modern technology such as mobile technology, database, data mining techniques, cloud servers, and user interfaces aiding to make this work possible.

Keywords: Knowledge Management, Assistive Technology, Elderly, Social Media, Data Mining.

1. INTRODUCTION

Data mining approaches can be used to find the correlation of data using different aspects. The result taken from data mining can be valuable in many different facets, depending on the application and context in which the targeted information may help. Data mining can bring to light many unexpected results which are hidden in the data and then come to surface. Knowledge discovery from the relational database can be used to extract information which can not only bring revenue to the organization but also can underpin for better decision making [1]. Facebook and Twitter are the two most commonly used social media sites which generate a huge amount of data on a daily basis. Social media data mining depending on some user attributes done by Rahman and Mahbubur in [2]. Using Facebook APIs the data has been collected and stored in a database and then this text data is converted into discrete data using data mining techniques. Hence intellectual knowledge has been created which can help in different user intended tasks such as social mapping and product monitoring.

Knowledge is created when individuals share their thoughts and experiences. According to Nonaka *et al.* [3] the knowledge can be converted into explicit form when tacit knowledge is shared. Nonaka described in detail how this conversion takes place through the SECI model. The sharing of tacit knowledge held by individuals who are using social media sites can be

converted into explicit knowledge by the use of data mining techniques. It is a universally accepted fact that interpretation of information is required for knowledge creation. Juvonen H. [4] used knowledge and emotions contributed through social media for the organizational knowledge creation process. 72 % of online users use Facebook and 23 % of online users use Twitter, which clearly reveals that a significant portion of the online community likes to spend time on social media. This work intended to use the communication and usage pattern of elderly for their support. Elderly can get benefits from their own activities and elegance of using social media [5].

This work is organized as follows. In Section-1 introduction to the topic is given. Section-2 highlights the background and elaborates literature review. In section-3 we propose our methodology and proof of the concept. Section-4 conceptually describes the proposed work. Section-5 discusses the usability factor role in the proposed work.

2. BACKGROUND AND LITERATURE REVIEW

This section is objected to discuss the background and literature review which is done by research community in different aspects supporting the main theme of this work.

2.1. Aging

Increase in elderly population has been observed in Pakistan [6]. Due to the increase in life expectancy throughout the world, as well in Pakistan, the population of elderly is increasing constantly and creating different problems. By 2023 the life

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expectancy will increase to 72 years [7]. Although Pakistan is considered a cohesive society country but during the last few decades a clear decline in the extended family system has been observed. Elderly population is spending life in their home not in nursing homes and in assisted living environment which is creating need of the dedicated caregiver presented at home 24 hours. Young generation has become more powerful and productive as compared to the older generation. Families are moving towards nuclear family system. Most of the families do not like to live together as they think they become burdened due to the responsibilities of other family members such as the elderly. Most of the young generation is busy in their professionals as well as in their social life and do not want to spend time with their old age parents and family members. The most prominent cause of this dilemma is communication gap. Elderly do not like to participate in the activities of young generation and young generation do not like the activities of elderly. In Pakistan a significant portion of population has left the country to find more attractive professions of their choice and left the country leaving their old parents behind them. As result parents do not get much care and attention as they ought to be. Furthermore old parents do not like to migrate with their children as they find it difficult to leave their beloved homeland in which they have spent almost their whole life and also they feel that mixing with new environment in a new country will be challenging for them. In Pakistan the retirement age is 60 years. After the retirement most of persons spend sedentary life because they think in the age of 60 they could not get any other job/work to do. Although most of them can be engaged with some jobs but mostly people think that they are not fit for any job now. This inactive life style creates a lot of physical, mental and financial issues.

2.2. Problems for Elderly

Elder people face a lot of issues in which retirement is considered a great change in the life of elderly. After the retirement they have to spend most of their time doing nothing in their home environment. Retirement from work may be due to their physical conditions also. In this case elderly are considered not fit for the job they were doing from past. This becomes more troublesome for the elderly when they also have a fear of not getting enough money for their daily expenses. Psychological fears differ from person to person in elderly. Some elderly get more depressed as compared to others, some elderly feel more unsafe than others. Most elderly start to feel that they are burden on their

families and try to avoid discussing their needs with their caregivers. In some cases elderly demand more time and support from their caregivers and if this support is not provided to them they feel extremely depressed. They start resentment their caregivers. In most of the cases the caregivers of elderly are out of the time and do not have enough time to spend with them. In this situation elderly feel that they are neglected and unkempt by their family members. Their communication with their family members is also compromised [8]. Political instability, low saving of the elderly, lack of economic growth, weak pension system are some of the factor which also influence negatively on the elderly life [7].

Feeling loneliness is another major issue felt by elderly, most elderly feel alone at their environment as their family members spend time in their own activities. Tough job schedules, studies engagement and other social activities take the family members away from their loved ones. And as the result elderly feel that they do not even have a person to talk from which they can share their problems and thoughts. Lack of company takes them to more badly depressed situation [9]. After the loss of friends and family, less mobility and small/no income is a great cause to feel loneliness in elderly. Research shows that between 5 and 16 % of the elderly, aged above 65, feel loneliness and this percentage is expected to grow in future [10]. Depression is also an immense psychological problem of elderly population of Pakistan. A high prevalence of depression is found in the elderly population of Pakistan. Female elderly member is more depressed than male elderly and elderly who are living without their spouse are found more depressed [11] Ahmad K. [12] described that reduced decision making power and poor participation of elderly in socio-cultural activities is also a problem for the mental health of elderly and make them less productive and active day by day. Participation in decision making, relation with relative and neighborhood, feeling inferior, entertainment, liability on family, non-functionality, strange urban environment, and inability to play a strong economic role are a few problem listed by Muhammad *et al.* in [13].

2.3. Issues Faced by Caregiver

As the elderly population is increasing throughout the world the problem of providing care to elderly is also increasing. The ultimate responsibility to provide care goes to close family members such as spouse, son(s) or daughter(s). Unavailability of caregivers

makes it difficult to cope with the situation. Although older people are key person of a family in Eastern families and providing care to them should be the first priority of their family members but due to the speedy life of 21st century, this has become very difficult to young generation. The main cause of this dilemma is the inevitable working schedule and the deficiency of proper care tools, most of the young populations remains busy in their professional life earning money for their families. In eastern countries most of the young people want to pay direct care to their loved ones but unfortunately due to their professional and social involvement they cannot provide absolute care to them. Ashfaq and Muhammad in [14] discuss the problem of elderly care in detail and provided a report which reflects that most of the care to elderly is provided by family members but still a portion of elderly population in Pakistan feel unsatisfied with the care provided to them. Strain, experiences and problems faced by informal caregiver in Pakistan highlighted by Ahmad K. in [15].

Mobile technology is being used by caregiver in order to inform them the current activities of their loved one as well as their health condition. Different types of systems have been proposed in literature to provide instant care to elderly and to inform caregiver in case of any emergency situation. For example in order to provide continuous care to elderly and to minimize the burden and psychological issues of caregivers a caregiver support system is proposed in [16]. The system continuously monitors the activities of elderly and decides which type of support can be provided to them and in which situation the caregiver should be informed to take appropriate action. The system eliminates the need of continuous presence of caregiver and provides assistance to elderly.

Chew *et al.* in [17] proposed a hybrid technique which combines GPS technology and cellular network technologies to inform the caregiver about the current location of their loved one in emergency situation. Yuce and Gulkesen in [18] developed a mobile app which enable elderly and caregiver to remain in contact and thus can communicate different type of messages and services. The current status of elderly can be viewed by caregiver ubiquitously. The mobile app can be used by hospital staff in order to maintain the record of elderly activities, medication taking behavior and to their wellbeing.

Although caregivers are being facilitated by the use of mobile technologies, location based services and

wireless sensor technology but social media is one of the neglected technologies which is rarely used by the researchers in order to provide assistance to caregiver and elderly. Social media is a power full tool which can be used as an assistive technology to provide assistance to elderly. Social media can be used as a knowledge creation tool for the assistance of elderly. A huge amount of data is being shared by individuals in the form of text and graphics. This massive data can be converted into information and then can be transformed into knowledge which can be used by individuals as well as organizations to provide wellbeing to elderly. Caregiver can use this knowledge for the better handling of elderly and organization (such as diabetic associations) can use this knowledge to provide heightened and improved services.

2.4. Information Significance

Information is extremely critical to the growth of any organizations. Through the effective use of information the organizations may enhance their decision making power and can achieve economic gain, augment their efficiency and can attain a competitive advantage. Most of the organizations spend a massive amount of time to manage how they can use information within the organization. It is a basic tool which can help to evaluate/gauge its positive and negative points. Information can play a measure role in making an organization aware of its internal and external environment and to obtain a competitive advantage. If decisions are made without using the appropriate information than there is a chance that decision may be wrong. Organization must maintain its appropriate information so that it can be available at the time of decision making. Furthermore organization must keep a record of its decision making so that in future they will be available for reference. This practice will help to improve future decision making [19][20].

Information is a mandatory and recognized tool for knowledge creation, as described above; it can be used as a helping tool for elderly care. The available information of elderly contributed through social media can be served for knowledge creation.

2.5. Innovation through Knowledge Management

In the modern age knowledge is the most factors which can bring success to any organization. Most of the today's organizations are able to rival other organizations in the basis of their knowledge. If an organization uses its knowledge in creating new

product/services than its products becomes more complex and different to others. To gain competitive advantage the organization must manage its knowledge assets. In today's world the person who has more knowledge is considered as the most powerful as well as organization that possess more knowledge is considered as more powerful [21]. In the same manner that has more data frequently succeeds. The more informed manager can make better decision, more informed decision, at the forefront of the competition [22]. This is only possible when managers and executives manage their information smartly expertly and skillfully. In today's world companies having more knowledge and applying their knowledge in creating more accurate processes are considered as more successful [21]. The work presented in [23] shows that there is a positive relationship between knowledge management and organization performance.

If an organization can come up with the idea that can bring a positive change for the assistance and help of its customers the innovation comes to the organization. An organization can only initiate innovation process if it knows about its customer's wishes and demands and by properly managing its resources it can come up with a better product/service which can benefit its customers as well as benefit to the organizing itself hence new product/ services are created. An enterprise must create and obtain new information about its customers, technology and its surroundings if it wants to be the ultimate choice of different classes of people. Due to its dynamic nature the new information about market becomes archaic and organization has to come up with some new ideas and make change in something which is established in the organization [19]. If an organization is able to recognize market trend ahead of its competitors it can produce product/services earlier than its competitors and can get competitive advantage [24].

Before knowledge management data was being drain out and no useful benefits were taken but after the development of knowledge management techniques the data is being organized and converted into knowledge and efficiency and effectiveness of the system is being improved.

2.6. Assistive Technology for Elderly

Assistive technology refers to a wide range of hardware and software devices or services built to provide help/assistance elderly to live independently,

within their environment (home/office/workplace without the help of some caregiver. Assistive technology devices help elderly to enjoy their daily routine tasks independently as well as to put their role in the self-betterment. Assistive technology devices range from low cost, low tech devices, such as gripping tools, to extremely complex and expensive high tech devices such as haptic gloves [25]. Assistive technology not only helps in cognitive, physical, or communication disabilities but also can improve the functional capabilities of individuals. The study shown in [26] describe that the ratio of old people is growing in western countries. As the population of older people is increasing the need for providing assistance and care for them is also increasing. Older people need relentless of some person (caregiver) due to different issues. As their age increase their physical senses and physical abilities also deteriorate. They cannot fight with their problems effectively as compared to young/middle aged persons and in most of the cases they had to live alone in their environment. Due to these circumstances the need of home care for elderly is increasing.

The study, prepared by Chand *et al.* [27], claims that in 2050 the world populations of elderly will up to 2 billion. Context aware devices are being used to provide assistance to elderly in their home environment. For this purpose PoC (point of control) devices are being used to obtain physiological information, environmental sensor can be used to monitor the movement of elderly and then the collected data is send using wireless communication. Hence the real time, context aware monitoring is being made possible which can help caregiver/ relative in order to remain in touch with their loved ones.

In 2012 the percentage of world population who are more than 65 years was 6.9% and this is estimated to increase around 20% by 2050. Due to these this is clear that in near future the need to provide care for elderly will be increased. Assistive technology can be a helpful tool in order to provide care to them. Assistive technology can help in the following manners:

- 1) Most elderly persons want to live in their home environment alone as they prefer an independent life. Assistive technology devices can help them to spend an assisted life.
- 2) This is also needed that care should be provided to them in home environment as most of them cannot bear the burden of travelling long

distances for their routine checkup. In some cases the healthcare professional need regular checkup for better treatment of disease. By the use of assistive technology this regular checkup task can be performed in their home environment and in some cases without direct intervention of patient.

According to a study the older people who are socially active can live a longer life as compared to the older that are not socially active.

Assistive technology devices are helping elderly for their better living. Falls are the most common cause of elderly deaths. A posture recognition based fall detection system is proposed in [28]. As continuous monitoring of elderly requires the physical presence of some caregiver but due to availability of modern technology devices, such as bio sensors and camera, this is possible to observe body parameters remotely without the presence of some caregiver. A single camera is used to detect the posture of an elderly in its home environment. Computer vision techniques are used to recognize a fall.

This is observed through experience that most elderly find it boring when doing physical therapy exercise. VR (virtual reality) is used to please and provide a better experience to retirement home elderly. Bruun *et al.* in [29] propose a preliminary study for retirement home physical therapy. In this study natural scenes are created through VR which provide a great scene to elderly making them happy while exercising. Multisensory therapeutic devices are developed to generate alert for remote medical officer or caregiver in case of any abnormal condition is observed. The smart home WiMax based network for the communication has been used.

2.7. Elderly and Social Media

A very sad truth about the elderly life is that the most of elderly lose socialization. There are logical reasons for this dilemma. The most important reason is that as age goes above 60 elderly lose their physical strength which limits them to remain in one place. Their physical strength is a hurdle for maintaining their usual social interaction. They cannot go to visit their friends and relatives. Sometimes elderly have to spend time only with spouse to give him/her company which limits elderly to go around and last but not the least this is also observed that close friend pass away when somebody reaches to old age. These facts create

social isolation and elderly goes in total isolation from the surrounding world. In this situation social media can provide support/assistance/help in order to manage their socialization and make them able to continue their socialization.

A lot of elderly are using social media sites and the percentage of elderly using social media sites has been increased during the last few recent years. Dates from April 2009 to May 2011 observed 150% increases in the use of social media sites, and this was 137% increase from 2009. According to the study by Zickuhr *et al.* in [30] one in three on line elders are using social media sites. The most common sites among elderly are Facebook and linked in. Although the ratio is less as compared to the young generation but his is clear that old adults are using social networking sites for their entertainment, making new friends, sharing information, knowledge, and photographs, and to connect with each other. The using pattern and motivation of using social media sites is different as compared to young person as most of the elderly use these sites to connect with friends but young person use to remain in touch with family. Social networking sites not only used for creating new contacts, sharing, and to overcome with social isolation but a great motivation for using social networking site is for health benefits.

Using social networking sites elderly can avail the benefits like explore their passion, keep in touch with friends and family, connect with interesting people, get help on health issues, wellness and healthy living, Create cards, calendars, photographs, Audio or video calls, recreational activities and share information and stories.

The available social media web sites are offering help elderly to maintain their wellbeing as well as entertainment facilities but this work aims to create the service which can provide extra advantage from the fact that elderly are using social networking sites. Currently available social media sites facilitate elderly in different manner and elderly, on daily bases, share a lot of stuff with each other. Their usage pattern of the sites can contribute towards a lot of knowledge management task. If this usage pattern can be used to predict the future needs and to inform caregiver and medical professional about the likes and dislikes, and access pattern of some specific entity then it could provide a great benefit to caregiver as well as medical professionals. If this could be predicted that in which time elderly like which type of activity, in which time

elderly like to visit specifies information then it could provide benefits to elderly. If a database of elderly activities is created then using data mining techniques their future activities can be predicted. This prediction will help caregivers as well as medical professional in the process of fixing the needs and demands of other elderly also in community.

Haris and Majid in [31] describe a study which discusses the application of social media in elderly life in very detail. This study focuses the use of Facebook in elderly social personal learning, quality of life, stability and curiosity. Result presented in the study reveals that Facebook is backing elderly the necessary components of elderly life. The necessary seven components ranging from religion to leisure activities.

Although elderly activities are supported through social media and caregivers are being supported as discussed in the above discussion but no work has been done to support elderly from their own contributed data. This work aims to support elderly from their data which is contributed by them during interaction on social media sites. In this situation where massive amount of data is available the knowledge management model best fit. Knowledge management techniques can be used to exploit this data. The data of elderly converted into knowledge through data mining techniques and the provided to different view and these views can use this knowledge to better cure for elderly hence the gap between knowledge management and elderly can be filled. This work first describes the abstract model of knowledge management for elderly and then detailed description and proof of the concept will be presented.

2.8. Social Media Data Mining

There is an ample amount of work done to mine useful data from social media. This data provide help to healthcare professionals, caregivers, and different business applications. A huge amount of data is being shared by different communities throughout the world. To extract knowledge from this amount of data is a challenging task.

Data mining techniques can handle the three challenging issues, namely, size, noise and dynamism. The huge amount of data presented in social media sites require that it should be analyzed within a rational amount of time. The data mining tools are designed to be work with huge amount of data so social media can serve as an appropriate input type of this data. Data

mining tools can be supervised, unsupervised, and semi supervised. Graph theory is serving as a basic tool for social network analysis as it is designed for large scale data sets [32].

Pippal *et al.* in [1] presented that social media data can be converted into meaningful numbers. They proposed to perform exploratory factor analysis to convert the data into a few manageable factors. By using principal component extraction method the data has been stratified. Maximum entropy, Naïve Bayes, logical regression, Support Vector Machine and Boosting, are the universally used algorithms in data mining. Binary clusters as well as multi-level clusters are being used. A multi-label classifier has been built in order to classify tweets. This classification was based on inductive content analysis stage.

Text mining can be done in two ways, namely, document level and sentence level data mining. Liang and Dai in [33] proposed a system for opinion mining using machine learning techniques and domain specific data. The proposed system architecture can learn the process of extracting opinion from messages. These messages can determine the sentiment direction such as positive or negative sentiment.

Social media data can also be used as a tool to predict disease. Huang *et al.* in [34] proposed a system which can be used to predict disease in health information system. If data is appropriately collected from patients then prediction of the disease is possible. In this work the information already available in the form of medical record is used. A large number of medical records have been used to evaluate the work.

Both personal data as well as consumer data is being shared through social media. This colossal amount of data can be linked towards the improvement of products and services by the organization. Hence data is used to provide financial benefits. Operation management research in order to make decision and guide towards the improvement of design and product is benefited through data mining. Chan *et al.* in [35] proposed a structural approach to analyze social media data. The research group performs stratification cluster analysis to find the interrelationship of the acquired data. Due to the fact that social media social media data is not collected with a research purpose and is unstructured data, this is needed that this data must be converted into structural format so that data mining techniques can be applied. The proposed statistical approach can be applied to social media data

calculation to convert it into structural format. Calculation is done using Pearson correlation coefficient.

Akay *et al.* in [36] used the posts of a particular forum of social media and transform them into vectors. These vectors were used to mine the opinion of patient who used a particular drug. The drug effectiveness and side effects are measured through the comment made in social media.

Human social behavior is mined through the data collected by mobile phones of the user [37]. They proposed a framework SocaiDim which extracts social dimensions based on network structure. Network structure helps in determining the interaction pattern of actors. Relevant social dimensions are extracted through discriminative classifier. The frame work result were compared with different classifies such as BayesNet, Naïve Bayes, Lazy.IBk, Trees.J48, and REPTree.

3. PROPOSED MODEL

We first describe the abstract model, Figure 1, of the proposed work.

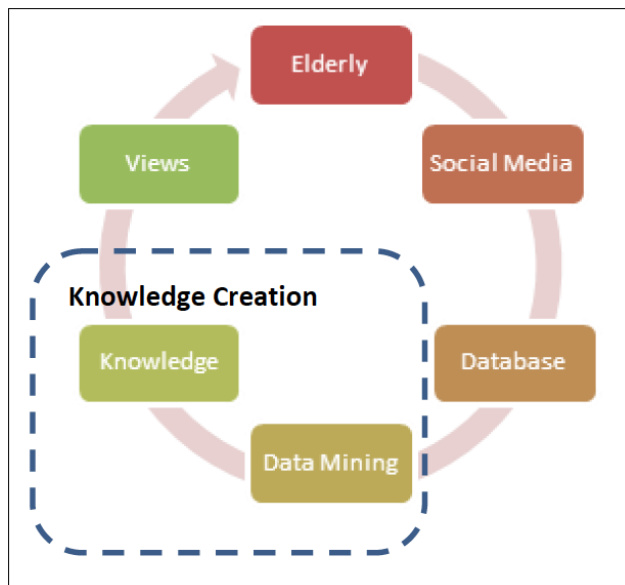


Figure 1: Abstract Model of the Proposed Wok.

The abstract model is a cyclic process in which elderly data is returned back to elderly after travelling from the cycle of tacit knowledge to explicit knowledge. This knowledge is returned back to elderly from different views such as caregiver. Different views share their knowledge in order to help elderly in different viewpoints. Knowledge creation process starts and

ends where data mining works on collected information to produce knowledge. This cycle remains in existence and elderly constantly get supported.

Comprehensive description of the proposed work is depicted in Figure 2. The main actors of the proposed model are elderly, social media, database, data mining techniques and views. Design consideration of the proposed models is given below.

3.1. Groups

When elderly use social media site, they become the part of different communities forming different groups. Groups contain the people of same mutual interest, discussing and sharing their thoughts. Groups may be of different personal interest. For example if a person is diabetic then he will prefer to join a group of diabetic person and will try to find out other diabetic person so he can get useful tips on improving his health. Some groups are made on occasion base for example in Haj season elderly may be interested to join the group of person who are going to perform Haj that particular year so he can share information about his travelling expense and about his luggage and things he might require performing Haj activities. Groups may be formed on famous sports events, for example, football word cup can bring peoples of different parts of the world closer to each other. On this way a lot of information is shared through the social media sites.

3.2. Technology

Mobile technology (Tablets, laptop and netbook computers, mobile phones and smart phones) as well as desktop computers can be used to join groups of same interest on social media sites. Mobile technology is very helpful in this case due to its portability and easy to use interface. Elderly find it easy to use and also they can use mobile technology whenever they want, wherever they want, at any place of their home environment, etc. When data is shared through different groups then this could be mined in order to get useful information and this information can be converted inti knowledge. Modern technology tools such as Wi-Fi, 3G and 4G are helping to communicate quickly and information can be spread very quickly. Database tool can be used to collect, manage and disseminate information quickly. Data mining techniques are growing constantly which can help to find knowledge from data. Modern user interfaces, such as voice interface, are helping elderly to continue their activities in a happy and enjoyable way.



Figure 2: System Model of the Proposed Work.

3.3. Database

When elderly communicate with each other they share a lot of thoughts. Their usage pattern of different social media sites can predict a lot of things; unfortunately this useful information gets lost. The use of this information to different entities in a very efficient way is the aim of this work. This work targets to obtain data from the activities of elderly from their activities spent on social media sites and to maintain a database of this data. Then database will serve for different views in different perspectives. Data mining tools can be used to turn chatter and network into behavior pattern of elderly.

3.4. Views

Different views can use the database according to their interest and need. For example caregiver can use the information about like and dislikes, which type of food their loved one order on regular basis, and what type of activities do elderly perform online. The database can be used to predict about the health status and about particular diseases. According to a study 60% of doctors say social media improves the quality of care delivered to patients [38]. Financial companies such as banks can use this data to predict what payment option suits to elderly and in which circumstances elderly like or dislike which product. Different organizations collecting data for healthcare can use this database to obtain the bits of their interest.

For example playing an emotional/destruction game again and again by a particular elderly can cause harmful effect on the mental status as well as physical health so healthcare professional can suggest to avoid playing this specific game. The novelty of this work is that the different views can share their information to provide better services to elderly. For example psychiatric association can share their data with the diabetic association so that diabetic association can figure out the effect of psychiatric behavior of elderly if some particular type of treatment is provided or to be provided in future. Healthcare professional can get advantage of the data obtained by hospitals and hence quality of life can be improved and a better treatment plan can be built for elderly. In this way different views can share information and can effectively manage their methodologies to delight elderly.

4. CONCEPTUAL DESCRIPTION

The aim of this model (Figure 3) is to provide assistance to different views such as caregiver and healthcare professionals so that they can create their own sight of information and build up their knowledge. This information will provide through a database. The database will be maintained and populated by acquiring data from elderly activities during the use of social media websites. Database will be built by taking the traces of elderly activities. For example the shopping choice of particular item for elderly can serve caregiver to arrange items for elderly. Different

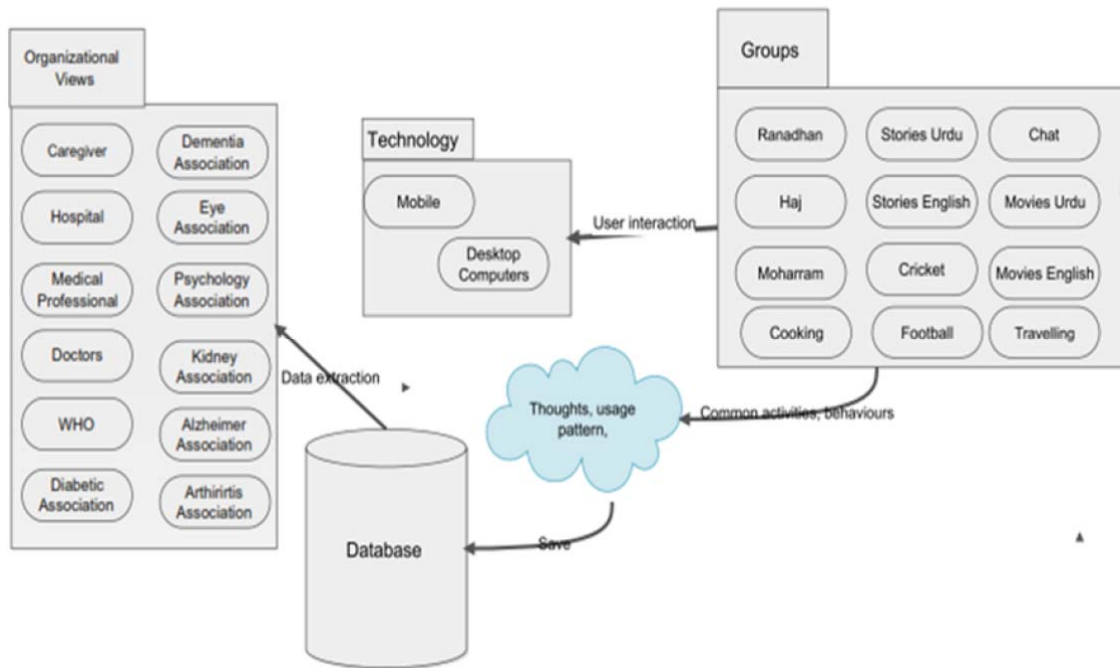


Figure 3: Conceptual Model of the Proposed Work.

healthcare associations can get benefit from this database, for example, the association interested in dementia patient activities can use this data to better diagnosis of future health issues. The database can be used by doctors to have a quick look on behavior pattern of elderly which can save time of doctor as well as to guide them on some issues which can bring a better health to elderly. Caregivers, doctors and healthcare professionals, etc. can interchange their knowledge which can bring benefits to elderly. In some cases elderly like some special type of activities on some particular events, this behavior of elderly once observed can be used to plan the same activities in upcoming events. Mobile technology will be used by elderly in this model as the use of mobile is seen very attractive for all age and all types of people. Elderly spent most of their times doing nothing in their home environment. One of the most popular activities observed in elderly is watching TV but due to the availability of mobile technology in an affordable cost elderly have become more interested in spending their time on social media sites which not only keeps them in touch with their family members but also provide them opportunity to create friends all around the world having same interest. It also enabled them to share their information and thoughts on the topic of their interest. Once the data and information about the behavior pattern of elderly is saved in a database then it can be used by different views in different context after analysis step and knowledge discovery on database. In the proposed model different views will

use data mining tools in order to capture the knowledge of the particular interest form the database.

5. VALIDATION

In order to validate the design and evaluation of the proposed model the method of expert opinion has been adopted. For the evaluation process the research group called 14 experts who are specialist in their fields. All of them were belong to the field of computer science and were fully aware of latest technologies. The participants were regular user of internet and social media and have ample knowledge about the effectiveness of social media. Half of the experts were from the field of artificial intelligence and had skills in the fields of data mining and knowledge management. The remaining half was from the field of networking, database management systems and mobile technology. The research group had a two hour session with them in which the proposed model was discussed and advantages were explained. Afterwards a carefully designed questionnaire was given to experts and their opinion was recorded. All of them were fully agreed that this model is useful and can act for the betterment of elderly. The experts were completely agreed with the primary consideration of the model that elderly population is facing physical as well as mental health issues and in order to take them out of from their social loneliness and isolation social media is providing them assistance. The experts had the identical opinion about the design fact that the data contributed by

elderly can be converted into knowledge using data mining tool. Data mining experts also pointed out the strength of the latest available tools and agreed that data mining tools can handle a large amount of data which is contributed on daily basis. The experts from database management tools were equally acquainted with the proposed idea of the research group. In the opinion of experts temporal databases can provide a systematic and uniform way of dealing with historical data and can make a true review record and exploit the corporate benefit. In the opinion of experts the knowledge provided to different views will help them in decision making process and knowledge management approaches can be used to deliver relevant information at the time of need. In the view of experts the most critical part of the proposed model is the collaboration of different views in terms of data exchange as the issues like security and privacy will hinder the overall process consideration. The organization should bind them not to use the data unethically as the elderly may have some concern in it.

6. USABILITY FACTOR

The proposed system will take feedbacks directly from the elderly so that their problems while using the system can be solved. The system will introduce the interface which will fit to the specific needs of the elderly. The project team will directly interact with the target group and will discuss the different options so that targets user will feel comfortable using system. The project team will highlight the issues and impending problems when elderly use the system. This will increase the prospect of the system use and elderly will try to use it repeatedly so more data will be contributed by them. It will also diminish the hazard of product failure and elderly will be better able to perform their objectives. Elderly will feel satisfy, enjoy interacting, cultivate confidence and will not feel frustrated with the system.

Usability factor will help to identify the problems and difficulties faced by elderly while using the system. One of the target functionality of the proposed system is that the improvement and the enhancement system will be done through constantly saving the foot prints of elderly activities and how elderly is communicating with the system. For example if an elderly commit the same mistake again and again then system will be made aware of it and appropriate marking will be done in the future improvement of the system and the same data may be served as a new research outcome. Elderly may avoid using a particular feature for a particular

location of the system will reflect the fact that user is not friendly / comfortable to this feature and use the same feature from some other location. The data which is saved from these types of activities if combined with other parameters of user data, for example age, can help to predict different results. In this scenario temporal database can help to learn about user activity behavior and pattern. If elderly is approaching hospitals or taking advice from healthcare services through social media and this information is placed on different servers on the cloud then different aspects of their usage pattern can be calculated and usability factor can be extracted and used in the wellbeing of elderly.

Hence the management of the knowledge of user mistake will be done. In this way usability factor will act as an input to knowledge management and will help to improve and better system will be provided.

7. CONCLUSION

As the population of elderly is intensifying throughout the world the need to provide them care in their home environment is also gaining importance. Due to the fast way of living style of the modern world the care which should be provided to them at their home environment is being not provided to them in standard manner. Besides the health issue psychological issues are emerged as the most observed problems faced by elderly. Both create difficulties in their lives. Caregivers try their best to provide them care but due to their busy lives and unavoidable schedules the care and attention needed by elderly population is suffering. Healthcare professionals strive to better services to elderly so that they can spend their life in stress-free way. The different organization, which collect health data, endeavor to collect meaningful information which in turn can serve for the betterment to elderly. The work presented in this research target s to use knowledge extracted from elderly activities in order to support them and for their wellbeing. Mobile technology and desktop computers are providing the useful data of elderly activities. The main actors of the proposed work are social media and data mining technology. Social media has the potential to provide the mode of communication, entertainment, and stay in touch with friends and family. Due to the advancement of internet, data mining techniques and exponential growth of social media platform the activities and behavior pattern of elderly can be converted into advantageous knowledge. Different views such as caregivers, healthcare professional, hospital, and healthcare

organizations can get benefits from the work as they can correlate of data of their interest to take new decision. Caregivers can use the information to provide better care to their loved ones. Elderly groups communicate different type of information with each other; this exchange of information is exploited by the proposed work. Hence data of elderly will be fed back to them for their best care.

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