

Photo Alive! Application and Method for Intergenerational Social Communication

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Abstract— Rapid increase of technology and escalation of Social Network Services (SNS) are widely being used for elderly life improvement and support interaction among family members. Advancement in technological tools and rapidly changing social communication mediums bring intergenerational gap. Due to an increase of digitalization, seniors are left behind in technological skills that caused loneliness and social isolation. Elderly need to introduce with new technological means, an opportunity has revealed for better social and technological integration. We propose a system that provides Intergeneration Social Communication (ISC) among elderly people and family members using family photos. Family Photos provide interaction with the viewer being a communication medium among members of different age groups create emotional attachment. On one hand, high tech savvy younger generation prefer smartly modified technology while on the other hand, older age people are far away from new interaction techniques and prefer simple technology. In this paper, we proposed a system “Photo Alive!” and camera based smartphone app concerning capture photos and send to TV based “Photo Alive!” as well as on SNS, named “Photo Alive!” This app facilitates to remove intergenerational gap among older and younger generation by providing an elderly friendly platform by using simple and smart interfaces and techniques like Remote control, touch pad and voice. Photo Alive! Service focus age group in social media through family photos with the objective of intergenerational social communication providing family photo view service, photo tagging service and photo-based interactive service to bring elderly people closer to family members, friends and loved ones for the cultivation of family togetherness of all generations. After development stage, our system will be evaluated by easily accessible techniques for elderly through the provision of uncomplicated and smart elderly friendly interfaces.

Keywords— Elderly people, Family photos, Intergenerational Social Communication, Photo Alive! , Social Network Service.

I. INTRODUCTION

Young adults and teens usually are early adopters of social media, while elderly people have been reluctant to use new technologies. Social media is getting popular and these days, different generations within a family might have divergent media preferences (For example, adolescents preferring Facebook, adults email, and older adults telephone and/or

letters) [1]. Communication mediums (For example, email, social SNS, SMS, weekly letters, and video conference) provide enhance tools and models for interaction between human and computer. These days social media is becoming actively part of our life for getting connected and stay in touch with family members and friends. But it need skills to operate the functionality of SNS having small icons and a large variety of operations that are inevitable for seniors. They need to stay in touch with family members in order to remove social isolation and loneliness since interaction media and medium used by young people are not owned by older adults; although elderly is technology hesitant while the younger generation is technology friendly. This trend leads towards technology gap between younger and elder as technology immigrant and technology native due to the inappropriate knowledge of using interactive and recent interfaces of SNS. Hence, the trend would be changed from elderly reluctant to elderly friendly interfaces. This situation is particularly relevant for elders, since social networks tend to decrease as we age, and it has been proved that this reduction impacts negatively on the physical and cognitive health of older adults [2]. Photos are the main source of interaction as well as memory enhancement among friends and family members, we can share and keep memories in form of collection of photos liveliness.

The authors in [3] distinguished between three different generations based on their reaching the smart system due to cultural, physical and mental issues. The age group familiar in using various digital devices and contents referred to as smart silver generation called 2nd baby boomer generation, those who has been using analog devices and analog content primarily belong to 50s age group refer to the new silver generation called first baby boomer generation, and finally generation born between 1977 and 1997 defined as digital native generation. These preferences of adaptation digital technology cause ISC.

Therefore, our system “Photo Alive!” boost individual’s memory. Forever photos are the best source of revitalizing old memories and healthy source of communication. In our system, digital photos contributed as an element for communication emphasized on family photos that grant a live environment associated with social network services. Our

system “Photo Alive!” can be elaborated as an interactive social content technology which is Audible, Readable, and Connectable in terms of proposed services of Photo view in which various photos can be visualized on various patterns, Photo tagging service in which audio messages are added and listened. In addition, family member’s information can be tagged to promote spirit in photos which provided a sense of talking. Furthermore, “Photo Alive!” contained Photo interactive service by rejuvenate Email, SNS and communication like sending email, making video call, SNS posting and comments of family members in order to memory enhancement proceeded to bridge intergenerational social communication between elderly and their family members by elderly friendly smart interfaces with Remote-con, touchpad and voice which obstacle social dissociation by filling colours of liveliness in Photos.

II. RELATED WORK AND PREVIOUS APPROACHES

In this section, we explain about existing techniques, Cornejo et al. [4] focused on ambient awareness within intergenerational families perceived the older people relationships that younger relatives have technological and geographical barrier build social connectedness by sharing photographs, activities or comments through social network services with emotional content. Authors analyzed older adults have relative’s shared information in social systems, while others rely on face-to-face interaction and telephonic communication to keep in touch with relatives and know about their activities.

Another effort of increasing amount of social interaction among older adults and their close relatives proposed in [5]. Authors developed computer-based application named Social Connector using touch screen and voice commands that play two roles: (1) reduce gap among generations as digital native, digital immigrants and digital illiterates which use cloud services in context of social interaction (2) act as mood sensor by embedded in computers to give alertness and support those in need. The system facilitates seniors who are first-time computer users by means of a seamless interface.

Regarding photo oriented communication medium, authors proposed a system for the closeness of family [6] that provide web-based service to the closeness of family members and elderly people where family members could upload a photo using a laptop or smart devices. On that Photos faces are detected. On behalf of that detected faces, voice messages are added using electronic gadgets TV and Remote control for elderly. The photo is uploaded to the system and faces are detected by detecting the position of faces with the help of annotation method that selected face area and tag voice.

Recent studies such as [7], aim to verify whether Multimodal Human-Computer Interaction (MHCI) systems designed with Universal Accessibility principles, taking into account elderly specific requirements, facilitate the adoption and access to popular Social Media Services (SMSs) and Audio-visual Communication Services, thus potentially contributing to the elderly social and technological integration focus on broken barriers and improve quality life of elderly by designing

solutions for elderly. The results of the study, basically a set of new MHCI requirements, were described to inform development of a multimodal prototype previously proposed for mobility-impaired individuals; now targeting the elderly allows connecting users with their social networks through a text, audio and video communication service and integrates with SMSs, using natural interaction modalities, like speech, touch and gesture. By looking the limitation of existing techniques, we proposed “Photo Alive!” that provide smart interaction among people.

A method for interactions through paper photos are introduced in [8], [9]. They used paper photos with Livescribed pen to embed audio within a certain area in a photo. However, their system fails to indicate who embedded the audio. Photo alive! Emphasis on who want to get a connection to whom, it means services provided according to each channel that focused on who is interacting and tagging to whom. Whereas, authors in [10] integrated classic media based on pen and paper with online social networks used Tlatosketch, a paper –based communication tool merged with a digital frame manage photos from Facebook and send written notes on Facebook. Therefore our system provided not only elderly interfaces like voice, touchpad, and Voice but also SNS integration by managing photos and comments from Facebook with an indication of who is commented on photos with the novelty of voice posting of elderly on SNS and also provided photo tagging service with the integration of various SNS services. On contrary, in our system user interface, photo tagging, and photo interaction is an interesting platform for intergenerational social communication.

III. PROPOSED METHOD

Elderly people are often found to be more comfortable with radio, television, and telephone. Therefore, we expect their priorities would comprise such devices and choose Normal TV with HDMI port along with various communication techniques and interaction modalities. In our work, we have used Stick PC, which is a device that turns HDMI television or monitor into a home entertainment computer and using interaction modalities like a remote-con, touch pad, a voice in TV, which is shown in Figure 1. For preferably using TV will be easy and relaxable for elderly. On the other hand, young generation can use computers, laptops, tablets and smartphones to access our system. Our system is web-based and it is responsive web designed (RWD) so family members can access Photo Alive! In any of their choose device and media as the complete description is shown in Figure 1.

A. Implementation and design

For implementation, we developed web-based and smartphone app for interactive social content technology focusing older age people. The applicability of our system “Photo Alive!” and designed app is well suited and easy considering needs of elderly to facilitate valuable interaction techniques. The Elderly People can use “Photo Alive!” with the required

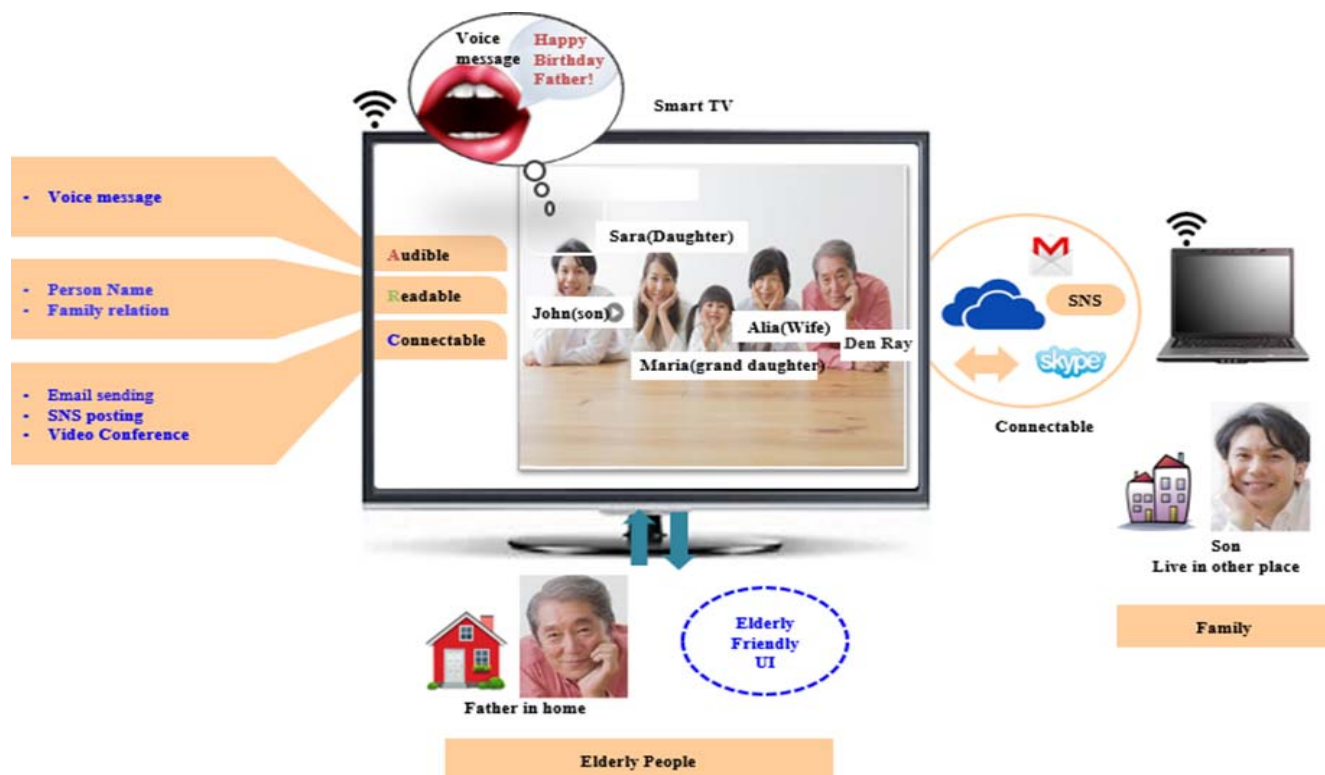


Figure 1. Photo Alive! Audible, Readable, Connectable

electronic gadgets in a very convenient way, as well as system, improves technological and interaction skills in elderly so aged people cannot feel difficulty in using devices and methods which proposed in our system in terms of communication modules for interaction with different modalities. Figure 2, shows our system consist of elderly friendly interfaces and social inter-generational communication techniques in which on one hand remote con, touchpad, and voice command providing various communication mediums for elderly to involvement in responsive system. On the other hand, Elderly can interact with family members by SNS offered in our system by hand written email sending, video calling, text and voice posting to SNS proved virtual family togetherness in a most supportive service which promotes intergenerational social communication.

B. Intergenerational social communication

1) *Photo View Service*: Photos remind us of our memories that create a series of emotion in the viewer. In Photo View service examined in Photo view channel where elderly can get experience various photos by forward and backward of Photos using elderly friendly interfaces and also see a photo gallery, elderly people can choose any photo from photo gallery, after selection, it will be selected for photo view service. Photo view service is referred to as photo channel.

Our system “Photo Alive!” promoted social communication among elderly people and family members by offering following services easily understandable by elderly. In order to gain more benefits from our system and to provide services more understandable and recognize able, we offered Interactive TV and multi-modal communication techniques integrated in order to allow connections to relatives and the younger generation. Elderly feels comfortable with gadgets and techniques that they used earlier ages like TV and Remote Con, Letter writing to convey messages, telephonic calls for conversation etc. Moreover preferred channel services in accordance to TV for entertained and keep them busy. We developed different services and categorized them according to adhere functionalities of Audible, Readable, Connectable. The whole concept of services and their categorized channel concept is shown in Figure 3, which elaborate various services distributed among TV channels like services and channels for easy optimize and understandable by our targeting age group.

2) *Photo Tagging Service*: Photos provide a source of communication as far as, our loved ones are much far away but we can see their appearance in terms of photos. Elderly wants to converse them so Photo Alive! Brings communication tool among elderly and loved ones. We integrate various photos and audio message to improve communication. Photos can be selected very easy from photo gallery which we create in Photo View service. After selection

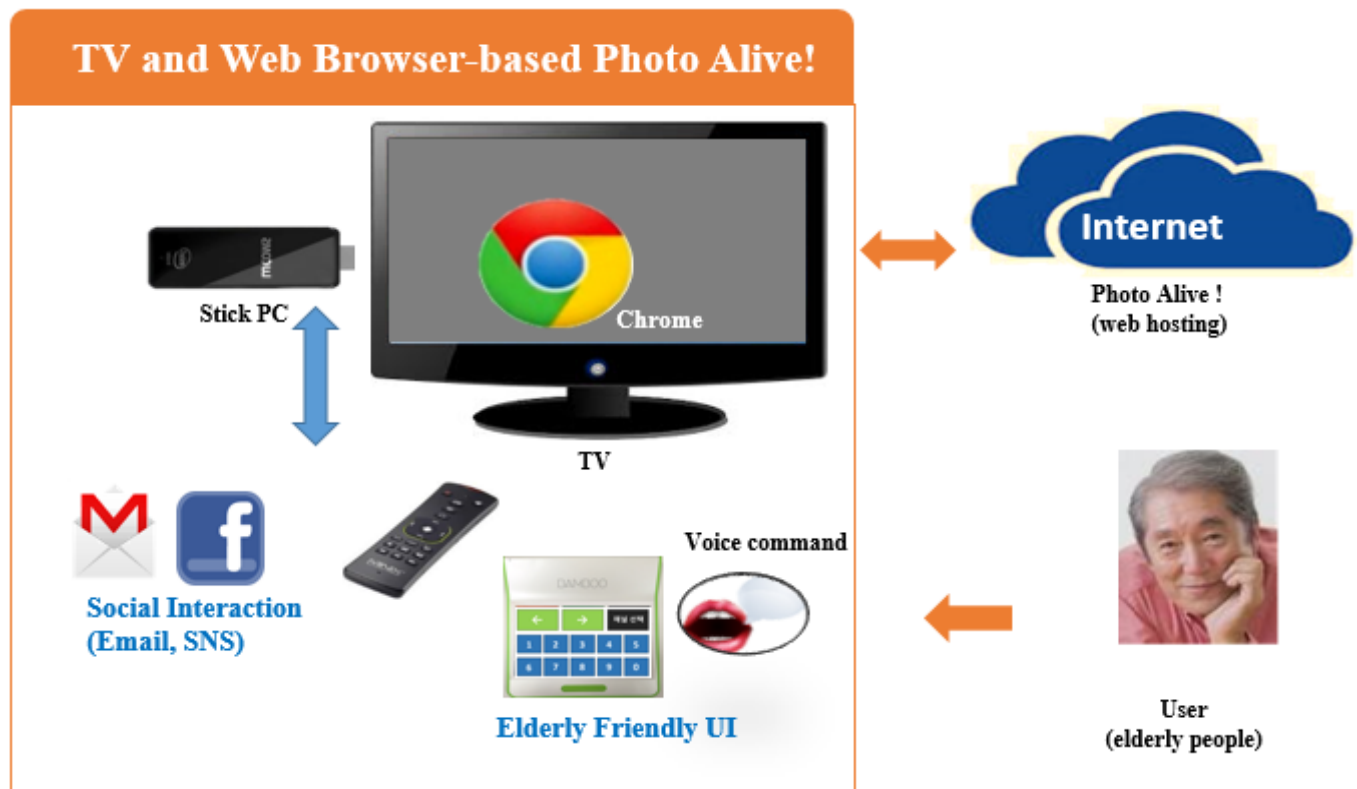


Figure2. Interface and Interaction techniques

of these photos, height and width are detected with a number of faces found in given photo. By detecting a number of faces, our system detects the position of the faces. We use KAIROS API for face detection. Face detection involves finding faces in a photo, by scanning over the photo looking for patterns that match a typical face. To help with this there is an optional parameter that you could have sent through with the photo called minHeadScale. This basically tells Kairos what the smallest face that they should be looking for in a photo is. If this parameter is not specified, it is set to .125 (1:8 scales) according to the photo width of 320 pixels, so there are two factors which effect on enrolling image. Absolute face size in pixels and face size relative to the total size of the image. therefore, the faces are detected according to Photo width and face size in a photo [11]. We used web audio API for record voice message in a secure hypertext transfer protocol because web audio API contain user media function. For example chrome browser allows user media function on secure hypertext transfer protocol over face detected in Photos according to color, symbols and numbers guide for elderly to tag voice message for a particular person. This will be done in Voice message record channel. Similarly, Elderly can listen to a voice messages through Listen Voice message channel so elderly just have to use easily operable remote-con keys to hear the voice messages.

Many voice tagging apps and devices are available, but no one has yet tagged particular according to face in Photos. Our system contains novel characteristic to tag voice in individual faces. For targeting problem of memory loss in elderly, our system features to tag specific faces to help them who they are and which relation they have with them. In this context, we developed Photo Alive as Audible. Furthermore, Photos are best way to remind memories but most probably due to aging and memory loss elderly forget names and relationship present in photos they become curious about their relationships. So, on behalf of Photos family members can tag names and relationships according to the number of faces as which person present in Photos on which Face number. In that case, elderly can know who are present in these Photos and what relation they have with family members. Photo Alive is become Readable by showing names and relations of most memorable persons by elderly.

3) *Photo based Interactive Service*: Photo Interactive service contained mail, SNS and communication services, related with Photo Alive Connectable. Mail Channel elderly can contact with the younger by sending a hand written email deployed with equil smart pen2 that convert handwriting to text by equil receiver and equil smart pen2 connects to the device via Bluetooth, although in "Photo Alive!" Elderly can send an email by selecting faces regarding many Photos. For easy interfacing of elderly, we provide remote con

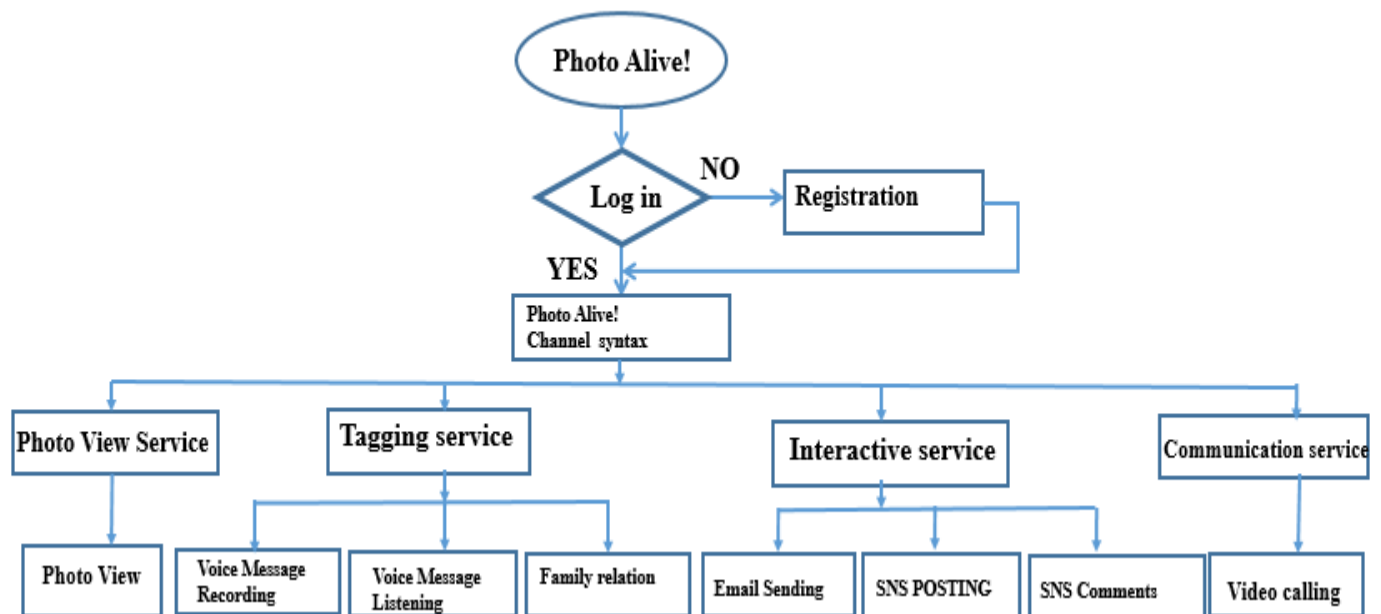


Figure 3. Photo Alive! Services

functionality for pressing a button to open the handwritten email and also voice mail for elderly using web speech API. The mail will be sent to family members by choosing selected recipient on the basis to face detected number and mail is to be sent by the unique feature of select face number that shows relation name with elderly also.

SNS Comments Channel shows the strong relation among family members to avoid apprehension and improve readability for elderly people by providing availability information of family members and younger generation on photos which are uploaded photos on Facebook. We connect Facebook and Photo Alive! Using Facebook APIs. Our system deals with photos so we can get photos from the Facebook show in Photo Alive! On behalf of these photos, there are lots of comments or expressions that younger generation and others who can use the internet easily and can be entertained. But elderly have communication barrier, for this purpose, we show comments and expressions of various Photos in Photo Alive for emotional content renovation by sharing and expressing remarks over photos for elderly.

SNS Posting Channel acknowledged elderly about posting on SNS with most favorable and usable interaction for elderly said Pen and Paper using Equil smart pen 2, writing criteria uses normal paper. For the convenience of elderly did not need to use modern gadgets use remote con key "0" similarly For Voice interface uses the mic for voice input in a specific area where it converts voice to text. So for on and off of mic manipulate remote con "1" key. Simultaneously voice posting deploy STT manipulate speech to text web API for conversion speech in text for posting to Facebook for convenience proposed remote con "2" key for posting. Call Channel reveals the elderly can call to their beloved ones on the

representation of photos and face detection with color, numbers, and symbols so the responsive technique for making a video call extended the happiness which fades out due to aging perspectives. We deployed video call from our system "Photo Alive!" considering needs of elderly towards the younger generation and family members which are far away and stuck in their schedules by using SKYPE URI API which can connect the call to far away stayed relations in a highly recommended service for elderly.

C. Smart App based ISC

According to research [12] from 2006 to 2015, that describes percentage of all American adults and internet-using adults who use at least one social networking site which are friendlier for younger adults although in everyday life successive intrusion of information technology and more excessively demand of social services feels elderly paralyzes to connected with worldly environment easily. Julian strengthens at s[16] Establish smartphone interface design requirements for people from ages 60 and up. Extract research question from previous works evaluate on basis of these 3 procedures of smartphone 1) Call specific contact to favorite contacts. 2) Call a specific contact from the contact list. 3) To send a specific text message back to a contact. Author focused on call and text message service whereas our proposed Smart Phone app has a unique feature to deal with the camera, social network services, and text based posting. Therefore the purpose of App to connect elderly socially and physically to remove social barriers. Our "Photo Alive!" App that full fills the interaction, communication and connection requirements with social media services by including Facebook which is very popular among youngers by posting status, comments, tags and sharing Photos. We improved emotional

enhancement of elderly by using the camera. The App has the advantage that elderly can select photos either from the camera or outside gallery and send to SNS with text based posting in order to social connection, similarly send to email by selecting family member names and also by writing their email addresses in touch with their loved ones. Elderly can also send their selected photos to TV based Photo Alive! Service by just touch on the text-based button of send to send to Photo Alive.

IV. FEATURES

A. Easy User interface and Social Services

Easy User interface: The immediate increasing of computing has made effective human-computer interaction contributed the emergence of new communication and social network services. A variety of interaction mediums for interact with recent technology with social media services for sharing photos, videos, status updates, meet with new people and communication with friends, family members still present several technical limitations for elderly believed as unnatural and difficult to get used for elderly. Elderly often face isolation and loneliness because of limited mobility and lack of nearby relatives. Information and Communication Technologies (ICTs) offer an excellent opportunity that helps to overcome these issues for older age peoples. Therefore, solutions are required that enable elderly to take advantage of the modern communication services. For purpose of elderly to use contents in a more natural and simpler way. Kurniawan and zaphiris in [14] proposed guidelines of web pages for elderly includes goal to specify graphics, navigation, browser features, layout, use of color and background, text design. Therefore, we made an interactive Graphical user interface for elderly with text and icons to interact with channels. We deployed different kinds of communication mediums in our system "Photo Alive!" having simple numbers and highlighting colours and icons scenario which discussed in [15] for this purpose, we used bamboo touch pad and remote con for easiness of elderly after installing Wacom software that assign specific screen area to meet the coordinates with TV screen and bamboo pad by taking X and Y coordinates of the area where user have to touch the buttons on accordance with the "Photo Alive!" system buttons. We have 8 channels and home button to redirect from all channels to main channel syntax page as shown in Figure 4. This application is easy to use and attractive for elders. Moreover, it provides facility to forward and backward photographs in channel services.

Remote control: We have provided more elderly-friendly experience and natural interface for elderly. As, the design process and implementation of a user interface and device for the elderly for a social networking application called home terminal [13] provides elderly users the ability to stay connected with their personal safety-net by a Home Terminal device, which is a touch screen computer with a user interface. Our purpose of using Remote-con with TV because elderly people are found to be familiar with radio, television, and telephone. We introduce remote con functionality for channels like in TV.

Voice: For voice interface, we used Web Speech to text API that converted voice into text. On "Photo Alive!" main system there are several channels so system allow access to elderly on these channels using Voice interface with short keywords considering elderly impairment problems like for Photo channel, They just need to say Photo and they entertained from Photo Channel similarly for Relation channel they just need to say Relation and elderly can experience their beloved relations.

1)Photo Alive Services: Photo Alive! Services provide a simplified form that divided roles of elderly and family members. Photo Alive! can be used by both according to the functionalities, for example, photo viewing, listen voice message, tagged family information, send hand written and voice email, SNS voice and text posting, SNS comments and video calling. Moreover, Photo Alive! include functions such as collection of family photos, tagging voice message, upload family photos to SNS, comments over family photos. In our web-based service we prefer symbols, colors and numbers while for interaction technique we proposed pen and paper, voice, touchpad interfaces.

V. EVALUATION PLAN

In this section, we discuss the evaluation of our proposed application and methods of Photo Alive! for end users. Our targeted group is elderly, age group from 60 years to 80 years old. We proposed assessment methods in terms of difficulty and satisfaction by introducing scales of difficult and easiness whether the user can understand the tasks and proposed services and how much they are satisfied from the overall user interface as described in Table 1. According to their

	Evaluation items	Explanation
TV based Service	Usability	- Difficulty level: user understand ability (1-5). - Satisfaction - Satisfaction with overall UI.
	Observation	- Whether or not-Achieve goal intended by the user. - Find problems.
Smart phone based service	Usability	- Difficulty level: user understand ability (1-5). - Satisfaction - Satisfaction with overall UI.
	Observation	- Whether or not -Achieve goal intended by user - Find problems.

TABLE 1. Evaluation Plan

Usability, observation will take place for better improvement and will notice what problems face by elderly. Teixeira in [7]

described questionnaire results about requirements study participants generic ICT usage. In our system, we will conduct query evaluation by including different parameters of each service and user interface as attractiveness, visually, usability, and feelings with setting scales from 1 to 5 where 1 describe how easy task and service is this, where 5 showing how difficult is this for completion of the task.

Finally, we analyse that our proposed services contain unique feature of proposed services which is based liveliness in digital family photos so elderly people can converse, sense, read with the help of these Photos, in comparison of other services and systems Photo Alive offers Framework for Intergenerational Social Communication (ISC) to break social isolation of Parent (Elderly) and Family Member (Middle & Young Generation) by using Photos (Family Photos) provided Elderly Friendly Platform on the basis of Photo Tagging Service, Photo based Interactive Service.

VI. CONCLUSION AND FUTURE WORK

Intergenerational social communication improved through "Photo Alive!" using different methods, techniques adopted to provide Elderly friendly environment and interface that are attracted older adults by glamorous channels concept. It provides various digital photos with a voice message, email, readable family relations, experiencing comments, Voice posting, video call to reduce loneliness and social isolation. Elderly can interact with the system with various interaction techniques using Touchpad, voice, remote con that enables elderly to interact in a more natural and simple way. In future we will evaluate our system and smartphone app according to the requirements of elderly and will improve by involving other SNS services and smart techniques for elderly.

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