Application and Measure Research of Intelligent Technology in the Pension Services

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Abstract. With the rapid growth of China's aging population, the traditional pension has been hard to bear, the pension has become a public problem. In such cases, the national proposed a model of intelligent pension service. This paper expounds the applications of intelligent technology on the emergency rescue, activities of daily living and physiological parameters monitoring, and then analyzed the main problems of intelligent pension service in China, and from the financing mechanism, resource integration, service standards, etc., to discuss the approaches and measures of intelligent pension service, so as to promote the development of pension services in China.

Introduction

According to the data published by Ministry of Civil Affairs, the aging population in China over 60 has reached 212 million. The proportion of the population aged over 60 is about 15.5% at the end of 2014. Research [1] (Zhu, 2014) predicts that the older populations gradually increase at an annual rate of 2.43% to 2053, reaching about 487 million. The rapid growth of aging population brought a challenge to pension and medical, the traditional family endowment and institution care are difficult to meet the various demands of the elderly. The pension has become an inevitable public problem. National Health and Family Planning Commission Survey reveals that 65-year-old elderly chronic disease prevalence of about 53%, the medical expenses three times as young people, accounting for 30%-35% of the total health expenses [2]. In addition, the hospitalization for elderly patients with chronic diseases is arousing public concern increasingly.

Smart home care is proposed under the above background, a new pension mode that use of the Internet of things and Intelligent Cloud Computing, to realize the seamless connection of all kinds of sensors and computer network, the elder and the government, the pension agency/community, medical institutions, such as closely linked, to provide a safe, healthy, comfortable and convenient service for elder.

The China National Committee on Aging established the national intelligent pension expert committee in 2013, to guide the development of intelligent pension service in China. Thus it can be seen that, smart home care cause high attention. “The several opinions on accelerating the development of pension services under the state council” proposed that, pension, medical, service to join each other three aspects, the construction of a unified pension service platform, perfecting the information database of old people. Not long ago, to promote internet plus initiative in field of pension by NDRC, Ministry of Civil Affairs and National Working committee office on aging in "about further notice for pension services development work”. To build open information platform, develop wearable devices suitable for the elderly, constantly find and meet the needs of the elderly, to strengthen the cohesion of supply and demand, expand the scope of services, personality and
efficient intelligent pension services. While developed countries deal with the aging experience shows that intelligent technology to maximize meet the various needs of the elderly for pension. In order to help our country adapt to an ageing society, correct analysis current situation of the development of intelligent technology at home and abroad, the development of pension services in China has important significance.

Intelligent Technology Application in Pension Services

Accelerating the global scientific and technological innovation process, the development and innovation of information technology and Internet of things, have significantly changed the human way of life. From scientific and technological level, there is a very worthy topic that how to use intelligent technology to develop technology products, accessible environment and services suitable for the aged, and make the aged with physical defect still enjoy a healthy, comfortable and safe later life. And research and applications of integration pension service and intelligent technology in the aspect of emergency rescue, activity of daily living, long term wellness monitoring have already concern.

In Personal Emergency Services

Personal emergency response system is a service model of the early smart home care, early 1970s used to provide emergency relief for high-risk elderly who live alone. Philips lifeline service is one of this [3], the system mainly include the emergency response centre, in-home Communicator and personal help button around the elder’s neck as a pendant or around the wrist. When the old man press the help button within range, the Communicator works like a speaker-phone and speed-dials the Lifeline Response Centre for direct communication with an associate ready to help. A caring Lifeline Response Associate will quickly access your personal profile, assess the situation, and identify your location through the in-home Communicator, contact the help you want – a neighbor, family member, or emergency services and will follow up to confirm that help arrives. In 2010, Lifeline launched “Philips lifeline with AutoAlert”, increased the fall detection function in the original help button which is designed to sense when the old man fall and contact Lifeline automatically if the elder don’t or can’t push the button. In addition, start the lifeline response APP, click on the one-touch call button, a direct line to a Lifeline Response Associate ready to help. More than six million order lifeline emergency services in North America.

In 2013, the U.S. carrier AT&T launched a special emergency alarm device- EverThere [4], worn by a lanyard, clip and strap. When the device detects a fall, and automatically alerts the emergency dispatch centre booked in advance, after, will guide the ambulance to the old man’s current location by GPS and rapid implementation of the rescue.

German R&D team developed a home security system safe@home [5] listed in 2014, mainly a CareBox equipped with optical and acoustic sensor, installed in the ceiling of the room to detect the location and action of the old man. When the old man fell down or other abnormal situations, the CareBox will not immediately give an alarm, but will wait for a certain time, monitoring the old man's behaviors, and judge whether the old really dangerous or need first aid. If need, CareBox activates the master alarm system through wireless, alarm system calls and waits for the response of the old, if not need first aid, the old man can cancel the error alarm, if not respond in time, and alarm system will send a distress message to the emergency centre and their families, for rescue time. Monitoring data and analysis of the system are conducted within the master alarm system, not upload the data to the Internet to protect the privacy of the old man.

Emergency aid system in Hong Kong is for the elderly in need of support services, which generally includes three parts: the remote control button carried on, family host and the 24 hours operation control centre. In case of emergency accident, the old man can press the button portable or help button on the host to call to control centre. After determining the identity of the old man, the control centre will take action and make the old man quickly get assistance. Comprehensive Social Security Assistance recipients and the old man over 65-year-old may apply to the social welfare department for economic aid to install the emergency aid system.
Fall alarm, filial first [6] developed by Xi'an Chinastar M&C Limited can be worn on the belt or chest. Which can do it all: send an alert when you press the button, sense when the old man fall and send an automatic alert and precise positioning, in addition, can also be a key call and remind the elderly to take medicine, etc.

In mainland China, more successful promotion of smart home care projects as peace bell and a key call. Civil affairs bureau across the country distribute the elderly cellphone-"one touch", Such as Beijing, Shanghai, Guangzhou, Wuhan, Hangzhou and Hefei. When meet the emergency or need service, the old can press the red button or green button to contact the service centre for help. Even if the old man can't words, customer service can take appropriate measures in time according to the situation, by the old man’s data and the position of the electronic map display. In addition also provide services as household cleaning, meals and chat with old man, etc.

In 2015, Hangzhou High Thick Intelligent Technology Co., LTD launched a series of products, smart locator, safety guard back key [7] and intelligent mobile phone, etc, hanging in the waist, once the old man falls, it will give an alarm and send text messages to their families, at the same time show the current the precise location of the old man, so as to buy the rescue time for the old man. The equipment adopts the base station, GPS, WIFI and Bluetooth, as long as the old man to wear, families can check the position by the mobile APP. Press the orange button to help when the old man meet the emergency, and at the same time when Safe Cloud intelligent unable to get GPS signals half an hour, the locator report will be release offline warning to the family phone APP, and provide the last position of the old man offline before.

In Monitoring Activities of Daily Living

The main purpose of monitor activities of daily living (ADL) for the elderly is to understand their long-term lifestyle at home environment. Many scholars try to establish the correlations among the daily home lifestyle, disease and physiological function degradation.

A study plan at the University of new south Wales in Australia consider [8] (Celler,1995), which is a transformation process that the old man from the health, independence to illness, weakness, but the subtle process is not easy to be noticed by families, doctors, and the old man himself. They attempted to prejudge the change of the old man’s functional health status by some simple test, such as the old man's mobility, sleep patterns, and even eating custom and practice, and other living habits, thus sent out appropriate and timely notice to reduce the prevalence and maintain their independence, good quality of life.

British Tunstall’s ADL monitoring system perceive the old man’s activities of daily living in a non-intrusive manner, sensors were placed on all kinds of household appliances and furniture, sensory data were sent to the server for storage and analysis by family gateway, so as to get the old man's behavior mode, which was recognized by the system if inconsistent with the median number of accumulated over a long period of time, then remind their families understand reason and take necessary preventive measures [9].

Shanghai Wei Sai Intelligent Technology Co., Ltd. launched remote homecare system , the core is all-in-one [10], with the life sensors and magnetic door sensors, to realize the functions, such as emergency alarm, affection hotline, activity detection, temperature detection, light detection, loving voice remind, social content detection, feeding condition detection, etc. Also the system can match more care devices, and cooperate with the Smartphone client to achieve fully telehomecare of the old man.

Intelligent mattress [11] monitors the old man's heart rate, respiration rate, sleep and other physical signs in real-time, and uploads the monitoring data to the cloud. Families see the old man's physical signs monitoring data at any time by phone APP. The sleep quality analysis report can effectively response the old man's sleep quality, evaluate the elderly health recently, easier to find the potential ill health problems early, provide convenience for old people living alone at home endowment.
In Long-Term Monitoring of Physiological Parameters

For old man with chronic disease, long-term monitoring of physiological parameters in the home environment is very important. Physiological parameters monitoring systems that occupy the home, The United States’ California’s Health Hero Network, Inc. can be said to be one of the most representative of the companies. Health Buddy System [12] includes a host family- Health Buddy® Appliance and a set of physiological parameters measurement devices, such as blood pressure monitor, glucose meter, scales and peak flow meter. Physiological parameters were measured by the elderly at home, stored in the Health Buddy® Appliance. The host upload data to the health Hero clinical information database regularly, background decision support system and content development tools for health information analysis and management. Old people, families and caregivers can know the elderly physiological state parameters through the Internet for mobile phones, computers and other equipment, in addition, the system also provides real-time analysis interface, the old man and the family can request the doctor for information consulting, management and analysis. Another feature of the Health Buddy System is content with care, the Health Buddy® Appliance has a corresponding health management model, not only for the elderly to physiological parameters monitoring, as well as health education for the elderly.

Recently, Philips launched a wearable medical device. The device with a sensor, can constantly monitor various physiological indexes of patients with chronic lung disease, so as to grasp the patient's physical condition. Sensors are placed in a cohesive structure similar to the band-aid, sustainable collect data of patients, such as heart rate, respiratory function and physiological activities, then these data will be sent to the user's mobile devices, also uploaded to the cloud of healthcare database.

The Medtronic launched "guardian real-time dynamic blood sugar monitoring system" [13], the system formed by subcutaneous glucose probe, sensor, external display. Probe placed under the old man’s abdominal skin (probe is extremely small, no pain), sensor sends data wirelessly to display every 5 minutes to 7 consecutive days. Monitoring accuracy gradually increase, is close to finger blood monitoring now.

BodyTel family diagnosis system [14] includes Glucose Tel, Pressure Tel, Weight Tel and Weight Tel Pro. All devices with bluetooth module, which can automatically send physical index measured wireless to the transfer station (the patient's mobile phone, etc.), transfer station will send the data to the online database, the entire automatic real-time transmission process, without the old man’s operation. When the data more than or less than a preset threshold, the doctor will receive a reminder (SMS, email, fax, etc.).

The Problems of Intelligent Pension Service in China

The said pension service products show that the technical level is no significant difference in the mainland and Taiwan, Hong Kong and abroad, which can completely satisfy the safety and health for the elderly, as well as daily life care, rehabilitation care different requirements, at the same time, these products also take into account the old man’s families and service personnel demand for pension services, such as, remote monitoring, risk prediction and so on. In promoting intelligence pension services product applications, however, the following problems in mainland China make the role of intelligent technology in pension services limited.

Products Promotion Efforts lack and Inadequate Inputs on Intelligent Pension Service

Throughout the domestic situation, on the landing of the intelligent pension service products application, the government promotion more are emergency rescue system at home (such as: a key call) and physiological parameters monitoring system for a long time (such as: family health package), the manners pushed intelligent endowment more are the old man to satisfy certain conditions, or a community pilot project and government to buy enterprise service, for example, Since 2010, Hangzhou government has provided dedicated smart phones and all services on the phone for over the age of 70 in the empty nest, solitary, lonely old people free by buying social
service way. If an emergency occurs, the old man just press the red “SOS” button on the mobile phone, the background will immediately inform the 120 emergency center, families and near medical personnel to do a joint relief operation. And press the green button, the old man can enjoy daily life for help. Too little government investment, can only solve the difficulties of life, safety and health for part of the strands and the very elderly, it is difficult to fully provide that occupy the home to all the elderly pension services.

Less intelligent endowment product service centers, many cities have not to promote, such as the smart phone called 365 care for the elderly, sold in markets throughout the country, but only have service centres in Zhongshan city, which brings inconvenience for the old people to use the product in the other area.

The Old Man Less Viscous On Smart Endowment Products

In addition to intelligent hematomanometer, intelligent thermometer and the other health products on the market at present, many intelligent wearable products have to address the problems caused by the old people’s physiological function recession, such as anti-lost device with function of positioning and intelligent products with alarm function and monitoring the elderly health, they are often small, beautiful and easy to wear, provide real-time positioning, blood pressure, blood sugar, heart rate and sleep monitoring functions, and the price is relatively low, although it is easy to attract old people and their families to purchase, but unable to form a valid user viscosity, the elderly often the idle at home after a period of time, no longer wear. Investigate the reason, on the design of conundrum of neglecting one or the other, making a lot of wearable products difficult to meet the requirement of the elderly. In addition, the lack of core applications and irreplaceabilities is always the “bottleneck” that intelligence endowment service products are difficult to break through, for the old man and the family members, smart care products are “look good, but not apply to use”.

Immature Operation Mode For Pension Service Platform

As national intelligent pension expert committee was established, some economically developed areas began to test the water “smart endowment”, followed by, all kinds of intelligent pension service platform. A case study in Zhuhai Xiangzhou district has two home care service platforms in the operation, “safe call” home care information service platform can provide emergency assistance services, and also provide daily services such as the elderly life care, health care and emotion; “One key call” home care information network platform provides services including emergency support services, personnel positioning, domestic help referral service, life service, information service, daily reminder service, professional social workers, volunteers and family members contact services and health management services. Two platforms are interlinked in certain functions, it is not necessary to repeat construction to waste the related resources. Many projects were built for simple mode of call center with no substantial content, just as vanity project caused by many operators lack of awareness about that demand for pension services, processes and standards.

Strategies and Suggestions

Mobilize All Forces to Promote Pension Service

In the short term, single relying on one party power of social, community or the family cannot afford the elderly pension burden, must establish the elderly welfare matched with social economic development, need to increase the investment to promote comprehensive multi-channel pension services to the ground. At present, the community aged care mode mainly adopt the way of government purchasing service, in order to guarantee the stability of the pension funding sources, it is suggested that the government put community home care funds into the government budget. In addition, the government can also provide more practical tax incentives, lower the threshold of the institutions to enjoy various preferential, such as the facilities for the aged construction of water and
electricity, etc, to provide preferential policies, the introduction of private capital to participate in
the construction of community cares for the aged.

**Integration of Old-Age Resources, Development of Nearby Delivery Service**
There are many different types of service platform on the market at present, but with the
corresponding integration rate for the old man entity service is low, delivery is not in time, many
product providers but lack of operational capabilities. Advice from the old man to the nearest
service, reconstruction of existing public facilities or community resources idle property to build
embedded, multifunctional and miniaturization of community cares for aged facilities and provide
comprehensive nearest convenient services for the old man, to satisfy the actual needs of old
people, make the existing domestic, service providers, medical institutions and other resources
involve in the pension services, to maximize the resource efficiency, so as to realize the elderly “the
distance of a bowl of soup” pension.

**Intelligent Pension Products Standard**
The premise of the intelligent pension products is simple, demand is the fundamental, only guided
by the demands of the elderly, with a perspective-taking mode, in the field of the whole pension
industry to maximize the product viscosity to the limit. On the old man intelligent product design,
human factors engineering calculations are particularly important, in order to avoid the designer too
much emphasis on their own points and ignore the needs of real users - the elderly, the designer
must understand the old man’s limits on perception, cognition and application of a force, to design
the intelligent product suitable for the old man, the elderly analog experience activities is the most
direct way to help the objective thinking.

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