

Smart home gives independence back to the disabled

According to the WHO, more than one billion people in the world live with some form of disability (WHO, 2011). In South Korea alone there are over 2 million (2,683,400) persons with disabilities. People with physical disability represent approximately 50% of the entire population with disability (Kim et al., 2014). Over a quarter of disabled people say that they do not frequently have choice and control over their daily lives (Office for Disability Issues, 2012). In order to solve the problem of daily life for the disabled, smart home can maintain and empower their lives and provide them with independence and freedom from many things. It makes a really big difference for them to be able to live independently and not needing assistance at home when they are able to do those things on their own.

There are many problems that the able-bodied people have never considered. The first is position of the ordinary switch is designed according to the height of a normal person. It is a daily problem that people with disabilities are often troubled. People who are bound to a wheelchair or with limited movement have no ability to control their lives even a light. Second, the disabled will face the peril of every moment especially they cannot get instant help when they fell down. It seems like a trivial problem, but very dangerous for people with limited mobility. Over 50% of injuries were caused by falls among adults with developmental disabilities (Hsieh, Heller, Miller, 2001). Third, although there are many accessibility products, the cost of these product which designed especially for the disabled is very expensive. The disabled cannot afford to pay them. On average people who develop a disability over their life span will see a 79% decline in earnings ten years later (Meyer, Mok, 2013).

These problems can be solved by smart home. Above all, through the IOT and voice recognition technology, the disabled can control all aspects of their house easily by using smartphone or voice now (Brownlee, 2016). With smart home products like MicroBot Push, it is like a robotic finger that can be connected via bluetooth or automation service. The disabled can easily turn a manual switch into automatically turn on and off the connected lights. Setting it up is easy and makes so many things practical. The disabled can be able to control the lights from the bed, or anywhere. It is easy for the disabled to give a better deal and sense of control over their traditional light switches (Yirka, 2015). Not only that, the disabled can control their home by using voice. Many smart speaker like Amazon Echo or Google home provides not only informational services but also voice control over systems in

the house when it connected to other smart home devices. It is really helpful for people with limited movement to have the ability to control their lives start with control the household devices of their surroundings. Furthermore, the smart home security camera or smart wearable device has integrated fall down detection function. These products can detect if the person falls down. The smart home security camera through human pose estimation to detect (Juang, Wu, 2015), and smart wearable device through sensors like accelerometer to detect the falling. Certainly the smart home security camera can provide daily monitoring to give their loved ones peace of mind in case that the disabled get into trouble at home. Last but not least, the cost of smart home product is much cheaper than which designed especially for the disabled. Some people with disability may even be able to get smart home technology funded through the National Disability Insurance Scheme to make their homes more accessible in Australia (Callaway, Tregloan, 2015). In addition, smart home product is more available than ever before. In general, setting up an entire home to be completely automated for the disabled will cost a pretty penny. However, smart home allows the disabled to start by choosing the area of most concern and tackling that issue and then add upon it (Loucks, 2016). If mobility is the biggest obstacle in life of a person with disabilities, installing smart lighting so lights can be turned on and off remotely is a great place to start. To using a smartphone to set up voice-activated requests and tasks using voice assistant either Android's Ok Google or iPhone's Siri is a great solution for the mobility-handicapped persons. Smart home with assistive technologies are coming to market, such as wearables, improved text-to-speech programs, improved magnification software and assistive apps. These products or technology emerging in the mainstream that does not exclude those with a disability, such as products of Apple, are already coming to market with accessibility features built in from the start (Aquino, 2016). These products and services weren't created specifically for people with disabilities, but this demographic stands to benefit most from their development.

In conclusion, smart home with assistive technology allows for the disabled to maintain control over their environment and daily activities and offer a more positive quality of life by allowing them to maintain their dignity. These smart home and assistive technology possibilities empower the lives of the disabled. With all of the physical and emotional stress they have had to endure, the smart home gives independence back to them and helps give them strength and hope for the future.

References

- World Health Organization (2011, Jan). World report on disability. Retrieved from
https://www.who.int/disabilities/world_report/2011/en/
- Kim, W.H. Park, Y.G. Shin, H.I. Im, S.H. (2014, Jan). The world report on disability and recent developments in South Korea. *American Journal of Physical Medicine & Rehabilitation*, pp.S58–S62.
- Office for Disability Issues (2012, July 12). Disability Equality Indicators. *ONS Opinions Survey*. Retrieved from
<http://webarchive.nationalarchives.gov.uk/20131101163230/http://odi.dwp.gov.uk/disability-statistics-and-research/disability-equality-indicators.php>
- Hsieh, K. Heller, T. Miller, A.B. (2001, Feb). Risk factors for injuries and falls among adults with developmental disabilities. *Journal of Intellectual Disability Research*, pp.S76-S82
- Meyer, B.D. Mok, W.K.C. (2013, March). Disability, Earnings, Income and Consumption. *National Bureau of Economic Research*. Retrieved from
<https://www.nber.org/papers/w18869>
- Brownlee, J. (2016, May 20). How Smart Home Products Empower Users With Disabilities. Retrieved from
<https://www.fastcompany.com/3060028/googles-latest-accessibility-feature-is-so-good-everyone-will-use-it>
- Yirka, B. (2015, November 6). Microbot Push allows for remotely pushing buttons or flipping switches. Retrieved from
<https://techxplore.com/news/2015-11-microbot-remotely-buttons-flipping.html>
- Juang, L.H. Wu, M.N. (2015, Aug 15). Fall Down Detection Under Smart Home System. *Journal of Medical Systems*. Retrieved from
<https://link.springer.com/article/10.1007%2Fs10916-015-0286-3>
- Callaway, L. Tregloan, K. (2015, September 29). Bringing the NDIS home: smarter housing design for people with disability. Retrieved from
<https://theconversation.com/bringing-the-ndis-home-smarter-housing-design-for-people-with-disability-47690>
- Loucks, K. (2016, March 28). How smart homes can empower disabled homeowners. Retrieved from
<http://www.modernsmarthome.com/how-smart-homes-can-empower-disabled-homeowners/>
- Aquino, S. (2016, May 19). Retrieved from
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-in-awareness-and-innovation/](https://techcrunch.com/2016/05/19/when-it-comes-to-accessibility-apple-continues-to-lead-in-awareness-and-innovation/)