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Module 11- Daily Living and Smart technology

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Course Outline

- Learning Objectives / Outcomes
- Introduction
- Daily Living Technology for Independence
- Current and future AI technologies
- Learning activities/ Instructional strategies
- Assessment Methods
- Resources and additional materials

Learning Objectives / Outcomes

- Define and understand the predominance smart technology -Daily Living Technology
- Recognise the classification of ADLs and smart technology.
- How these emerging technologies help with living independently.
- Future and current AI technology
- Define each section of these technology and their usage.

Introduction

Smart, intelligent assistant agents can work towards enhancing the quality of life through technology. Their effectiveness lies in their ability to handle universal usability in several ways. Universal usability stresses three aspects of user diversity all of which are interconnected and interdependent.

Getting older is not what it used to be. Thanks to advances in medical technology and research, people are living longer, healthier lives. And thanks to advances in mobile technology for seniors, it is easier for many of them to live safely and

comfortably wherever they want to be, whether at home, with family or in a senior care facility.

These developments could not have come at a better time. With baby boomers now reaching senior citizen status en masse, the “silver tsunami” that experts have been predicting is upon us.

Not only do seniors have unique challenges that technology could help to solve — they also have significant buying power.

To better meet the needs of this key demographic, technology companies, senior care experts and even governments are putting their minds and money together to create innovative solutions.

Because the best technology for seniors is both cost-effective and easy to use, many of these solutions are built for or on consumer-grade smartphones, tablets, and wearables. For example, Samsung showcases several cutting-edge solutions built on mobile devices, such as senior-friendly tablet software and vision-enhancing VR (Virtual Reality) solutions.

Difficulties walking, seeing, and hearing can cause trouble on their own, but they can also create indirect issues. Personal care and cleanliness in the home can suffer, and this can in turn cause seniors to stay in more, socialize less, and possibly run into mood disorders like depression or seasonal affective disorder.

These times can be difficult for both seniors and their caregivers, including children, friends, and other relatives. But with the aid of several new types of technology, seniors can become more independent and better equipped to

handle challenges. For them and everyone in their inner circle, this is a boon to better functionality, a more stress-free lifestyle, and greater happiness.

Daily Living Technology for Independence

These systems can be developed using a variety of technologies, beginning with simple IoT (Internet of Things) devices, and progressing to more complex sensor networks that include weather sensors, intelligent devices, video cameras, etc. Data management involves several issues, such as communication protocols, security controls, and energy consumption since the varieties of technologies can affect the quantity and heterogeneity of data. The protection of privacy and sensitive data in a system may be subject to legal obligations if the data is collected, stored, and transmitted in ways that might provoke the violation of rights and freedoms of individuals.

Medication Management

Everyone knows that as we age, it becomes essential to take more medications. The good news is that with advancing health technology and innovation, these medications keep us alive, healthy, and well.

But handling new medications, how often to take them, and how much to take them, can be a hassle — not to mention handling prescription renewals, changes in dosages, and other challenges. Apps and online services, however, can help for these issues. Here are some examples:

- RxmindMe
- Personal Caregiver
- Care Zone
- Med minder
- Reminder Rosie

- Tab Safe
- Med Coach

GPS Technology

Often, seniors with Alzheimer's disease may leave their residence when no one else notices. Naturally, this can cause a huge scare, but GPS tracking devices such as Angel Sense can keep track of these individuals so that they can be located quickly and easily. Another option is GPS Smart Sole, which is a GPS device that can be hidden in a shoe insole.

Health Tracking Tools

Health tracking tools can assist seniors in taking care of both their physical and mental health. HealthVault is one option that has shown great promise among users.

This Microsoft service provides a super safe and secure place for you to store, manage, and gather important health information. Here, you can access medical records and track your health with smart watches, blood glucose monitors, activity trackers, blood pressure monitors, weight scales, and more. When necessary, you can share your data as well — for example, with loved ones or medical professionals.

Care Coordination Apps & Devices

When someone is having trouble managing a health issue or is in and out of the hospital, it can be difficult to juggle not only care, but information between friends and family members. An app like CaringBridge takes care of this.

While public social media accounts are not appropriate for sharing personal and medical details, a private service like CaringBridge offers a private and easy to use platform where health updates, messages and prayers, and caregiver information can be shared among loved ones.

Socialization

It is important for seniors to socialize, and according to WebMD, regular socializing may even help everyone stay sharper for longer. When face-to-face socialization is not an option, however, or for those seniors who live alone — apps such as Skype and social media sites like Facebook or Instagram are recommended. Other technological options specifically designed for seniors include Grand Care and Geri Joy.

Online Forums & Support Communities

Often, family members and friends would like to offer a helping hand to their senior loved ones. What keeps them from doing so sometimes, is not knowing the details of these loved ones' needs.

Lotsa Helping Hands makes things so much easier. With this service, friends and family members can form communities to schedule care, meals, and other support quickly and easily for senior loved ones. Everything is organized and easy to use, and your loved ones get the best free care and support possible.

Wireless Home Monitoring

Although it is certainly good for many seniors to remain independent, problems can abound in these situations — especially those that may be caused when an independent senior falls or is somehow incapacitated and cannot reach out for help.

The ideal solution is sensor-based monitoring. Grand Care offers a suite of technologies for seniors, including activity monitors that keep an eye on the daily activities of seniors living alone without sacrificing their privacy or independence. Another option is PERS (Personal Emergency Response System), which acts as an on-person monitor when seniors need assistance after a fall, for example.

Telokin Computer

Telokin, which is a super simple and easy-to-use computer — especially designed for senior use. Like any computer, it includes capabilities for video chat, looking at and sharing photos, games, web browsing, email, and much more, but without the learning curve of normal PCs. Each computer can also support multiple users, so these devices are great for senior centres and retirement communities as well. Whether you are looking for ways to help an elderly parent or someone with early-onset Alzheimer's, these areas of technological innovation are a step in the right direction. While some of the technologies may take some getting used to at the start, we recommend making a concerted effort to push through the smaller challenges — for the benefits, these technologies could help you make great strides at improving your quality of life or the quality of life of your loved one.

Vision Enhancements

Most seniors want to live as independently as possible for as long as possible, but vision impairments can make that difficult. New virtual reality (VR) technology can give back some of that independence by providing seniors a clearer view of the world around them. Two of these visual aids, IrisVision and Relumino, integrate vision-enhancement software into Samsung Gear VR headsets with Samsung Galaxy smartphones. The software can be customized for specific low-vision conditions, such as macular degeneration, cataracts, and severe myopia. Then, images from the smartphone camera are recreated to be viewed more easily based on the user's unique vision problems.

Hearing Enhancements

It is hard to connect with other people when you cannot hear them, so seniors often get left out of the conversation. Thankfully, hearing aids have come a long

way in recent years. They are more discreet and can better filter out background noise. New Phonak hearing aids are even Bluetooth-enabled and synchronise up with smart devices such as internet-connected TVs and smartphones. With the Phonak mobile app, users can turn their hearing aids into wireless speakers. So, whether they are talking to their grandchildren or their doctors, they will never miss an important word.

Caregiver Monitoring

Everyone slows down with age, mentally and physically. So how do adult children know when Mom is not getting around so well on her own? How can senior care facilities determine which residents are a greater fall risk or need closer observation? Those patterns are easier to spot with hard data, and digital sensors are key to gathering that data. For example, Reemo Health has turned Samsung Gear smartwatches into remote monitoring devices. Using the watch's sensors, Reemo tracks the wearer's quality of movement, heart rate, sleep patterns and other relevant health data. Caregivers see daily data, a 30-day baseline for the individual and a three-day trend from that baseline. This way, they can spot negative trends and intervene quickly. While Reemo tracks signs of physical decline, IoT-based Connected Home solutions can provide insights into cognitive decline. For instance, with the Samsung Smart Home app, users can monitor and control smart appliances. If Mom leaves the stove on or the refrigerator door open, her adult child gets an alert from the app. Sensors installed on doors and kitchen cabinets can also provide useful behavioural data. If Mom was opening her cabinets five times a day and now opens them 50 times a day, she might be experiencing memory loss. And if an assisted living community resident with dementia opens his door in the middle of the night, someone knows to go check on him.

Infotainment and Communication

Mobile technology provides many new ways to improve the lives of seniors, but that all hinges on seniors adopting the technology. Just like with any other demographic, it is easier to get people to adopt technology when it is fun to use. Mobile devices can offer seniors opportunities to learn, connect with family members and stream beloved television shows they have not seen in decades. But there is also a technology learning curve that can be intimidating.

That is why Breezie has created senior-friendly tablets. Using Samsung Knox, Breezie configures the settings and apps on Samsung Galaxy tablets to simplify the user experience. Breezie technicians and approved family members can access the device remotely to provide training and tech support. Breezie is also offering a new platform for senior care facilities. Built on Samsung Knox and Artik frameworks, the platform enables care providers to deliver personalized services, medical information, and disease management education to residents through a simple tablet interface.

These solutions are just the tip of the iceberg. As innovative companies and thinkers put their heads together to solve age-related challenges, much of the best technology for seniors is yet to come.

Smart Everyday Objects

With the recent emergence of Internet of Things (IoT) and miniaturized sensors and processors, everyday objects can be identifiable, and they possess the ability to communicate and interact in a way they can be smart. In this way, home appliances can communicate with each other or be controlled remotely, providing home residents with new facilities that are able to detect anomalies or assess health issues early, in order to apply prevention policies or trigger actions. Smart everyday objects are generally used together with wearable

sensors to acquire joint knowledge regarding individual activities and interactions with the objects in the environment.

Sensors in furniture, such as doors, beds, chairs, washstand, toilet, and cupboards,

allow for the non-obtrusive monitoring of daily living activities, providing presence statistics of users in different spaces of the environment. Furthermore, power meters can

be used to monitor appliance usage, such as TV set or lamps, whereas smart pill box

devices can be very useful for checking medication intake.

Assistive Robots

Assistive Robots are less common than wearable or environmental sensors, but they represent an emerging technology that can support and enhance human activities, especially in heavy tasks. Assistive Robots can be used for different purposes: to overcome elderly inabilities; to relieve nursing staff from time-consuming, non-empathic, and repetitive tasks in retirement house; to transport food or medicine carts; for grasping objects; for laundry collection; and, delivery services, mail delivery, warehouse logistics, trash logistics, and cleaning material logistics. With the spread of these innovative technologies, the service quality can increase and, at the same time, resident and staff satisfaction improve. In this context, it is also important to personalize the human-robot interaction by endowing the robot with human-like social skills (i.e., natural language processing, user emotion estimation, etc.).

Current and future AI technologies

Artificial intelligence (AI) is a rapidly developing field with the potential to revolutionize many aspects of our lives. In this article, we will explore some of the ways in which AI is expected to impact future technologies.

Augmented Reality (AR) and Virtual Reality (VR)

AI is expected to play a major role in the development of augmented reality (AR) and virtual reality (VR) technologies. AR overlays digital information onto the real world, while VR creates a completely immersive simulated environment. AI can be used to make AR and VR experiences more realistic and interactive. For example, AI can be used to track a user's movements and adjust the AR or VR environment accordingly. AI can also be used to generate realistic avatars and environments.

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Internet of Things (IoT)

The Internet of Things (IoT) refers to the network of physical devices, vehicles, home appliances, and other items embedded with electronics, software, sensors, actuators, and connectivity, which enables these objects to connect and exchange data. AI can be used to collect and analyse data from IoT devices to improve efficiency, automate tasks, and make better decisions. For example, AI can be used to optimize traffic flow by analysing data from traffic sensors. AI can also be used to predict equipment failures by analysing data from sensors in industrial machinery.

Artificial General Intelligence (AGI)

Artificial general intelligence (AGI) is a hypothetical type of AI that would have the ability to understand and reason at the same level as a human. AGI is still a long way off, but it has the potential to revolutionize many industries, including healthcare, finance, and transportation. For example, AGI could be used to develop new drugs and therapies, make more accurate financial predictions, and design autonomous vehicles.

AI-powered prosthetics and exoskeletons

AI-powered prosthetics and exoskeletons can help people with disabilities regain mobility and independence. For example, AI-powered prosthetics can learn to adapt to different walking patterns and environments, while exoskeletons can provide support for people with weakened muscles.

AI-powered communication aids

AI-powered communication aids can help people with speech impairments communicate more effectively. For example, AI-powered speech-to-text software can transcribe spoken language into text, while text-to-speech software can convert text into spoken language.

AI-powered cognitive assistants

AI-powered cognitive assistants can help people with cognitive disabilities manage their daily lives. For example, AI-powered cognitive assistants can remind people to take their medication, schedule appointments, and stay on top of their finances.

AI-powered environmental control systems

AI-powered environmental control systems can help people with disabilities control their environment, such as turning on lights, adjusting thermostats, and opening doors.

AI is still in its early stages of development, but it has the potential to make a significant impact on the lives of people with disabilities. As AI technology continues to develop, we can expect to see even more innovative and effective assistive technologies emerge.

Here are some additional examples of how AI is being used to develop assistive technologies:

- AI-powered hearing aids can filter out background noise and amplify sounds that are important to the user.
- AI-powered wearable devices can monitor a person's health and activity levels and provide alerts if there are any concerns.
- AI-powered software can be used to develop personalized learning programs for people with learning disabilities.
- AI-powered virtual reality (VR) can be used to create immersive experiences that can help people with autism spectrum disorder (ASD) develop social skills and communication skills.

AI has the potential to make a real difference in the lives of people with disabilities. By making assistive technologies more personalized, effective, and affordable, AI can help people with disabilities live more independent and fulfilling lives.

Learning activities/ Instructional strategies

- Target different senses within the session
- Share my own strengths and weaknesses.
- Implement reflection and goal setting exercises.
- Analyse and differentiated instruction strategy on a regular basis

Assessment Methods

- Pre & post
- Online polling
- Dynamic questions

Resources and additional materials

- 1- Albogamy, F., Alotaibi, T., Alhawdan, G. and Faisal, M. (n.d.). "SRAVIP: Smart Robot Assistant for Visually Impaired Persons," IJACSA) International Journal of Advanced Computer Science and Applications, Vol. 12 No. 7, p. 2021.
- 2- <https://hcis-journal.springeropen.com/articles/10.1186/s13673-017-0113-63>. <https://guides.library.illinois.edu/c.php?g=533633&p=3651132>
- 3- <https://www.oecd.org/sti/ieconomy/the-future-of-smart-in-our-daily-lives.pdf>

