SECP 1513 - Technology and Information Systems (Section 4)
Design Thinking

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Group: Swift tech

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<u>Introduction</u>

In an era where time is deemed more precious than gold, the task of caring for elderly family members has become challenging, particularly when one is away. Traditional solutions, such as hiring a personal nurse, can be expensive. Consequently, elderly care systems have been introduced, yet they are not without their flaws. This report aims to delve into the difficulties faced by caregivers in tending to their elderly family members. Furthermore, it seeks to explore how existing technologies and systems can be improved to address and alleviate these challenges. This process involved implementing the five stages of design thinking. Firstly, we identified the problem and then defined who is affected by it. After that, we sought various ideas on how to tackle the problems and created a prototype for the new system. The prototype was then tested by the affected group to assess its effectiveness in alleviating the problems presented at the beginning. With feedback from the clients, we refined the prototype, resulting in the final version.

Design Thinking Phases
Empathy
Potential clients

Recognizing the importance of identifying potential challenges faced by our clients or users is instrumental in enhancing the applicability of our prototype. By pinpointing these issues, we can refine our prototype to better cater to their needs. Given that a significant portion of our target audience consists of teenagers and adults cohabitating with elderly individuals, we have opted to conduct street interviews. The objective is to gather insights into the specific problems they encounter while caring for the elderly and solicit their opinions on our prototype idea. Our intention is to proactively address these challenges by developing corresponding solutions through our innovative app and device.

Problem and Solutions

Problem	Description	Solution
The privacy of user information	Users expressed worries about how their personal data would be handled and protected within the monitoring system. They are fearing any compromise that could lead to unauthorized access or misuse of their personal information.	Our app operates on privately-owned servers that undergo continuous monitoring for our users to use it in a peace of mind.
Device disconnection concerns	The devices may be removed by the elderly when they engage in activities such as bathing, doing dishes, or sleeping, or simply due to forgetfulness.	Our app will immediately come up with a pop-up notification that will appear on both the guardian's and the elderly person's phones. Subsequently, the guardian has the option to call the elderly person to inquire about the reason for the device removal.
Emergency response protocol	In today's fast-paced society, the demands of work consume individuals' time, leaving little room for constant monitoring of the elderly. Consequently, there is a heightened risk of situations such as falls, sudden breathing difficulties, drastic drops in heart rate, or critical incidents, as caregivers may not always be available to provide immediate assistance.	Our linked app device will promptly notify the nearest hospital and the guardian in case of an emergency, and simultaneously request the hospital to dispatch an ambulance.
The accuracy of information from	In the current environment, the prevalence of counterfeit technology	In collaboration with several hospitals and high-tech

detectors	and uncertified detectors has led to misunderstandings among consumers, resulting in unfortunate incidents stemming from the use of such deceptive technologies.	companies, our detectors undergo regular assessments to maintain consistent accuracy. This proactive approach addresses client concerns about the detectors keeping up with technological advancements and ensures their reliability in current trends.

Define

In this phase, we had identified our problems faced by our client. Here is the problem statement and analysis.

Client's identified problems	**Analysis**
1. The client needs an application system to organise health data from smart devices, including wearables, sensors, etc.	By making the system, we need to make sure the health data is always secure and the privacy of the client is protected. The data also needs to be well integrated from various devices such as laptops, wearables, phones, etc.
2. The client desires a monitoring system to replace caregivers for enhanced support and also reduce the cost of taking care of the elderly.	The application system should have a user-friendly interface to ease for elderly and clients to use.
3. An emergency button is requested for immediate medical assistance in unforeseen events such as faint and fall.	Location tracking can be implemented to locate where the elderly are to get the nearest medical assistance.

In summary, the client's need an application to improve the overall well-being and care of elderly individuals. It is important to approach these solutions with a deep understanding of the challenges faced by the elderly and to create a user-friendly, secure and effective system.

Ideate

In this phase, our group members were having a brainstorming activity. Every group member participated and provided valuable ideas. Initially, we prepared a lot of small papers to write down our ideas, giving every member 5 minutes to contemplate their ideas on elderly monitoring.

  Afterward, we shared our ideas together by presenting our papers on the table and we got 15 creative and interesting ideas in total. We then elaborated on our ideas, providing additional information and discussing to get a best idea of elderly monitoring.

  A lot of creative and good ideas provided by our group members, including a hologram chatting system for communication with the elderly, falling detection, health condition monitor, included the diet, blood sugar and pressure, location tracking and an application with currently available health monitoring tech.

  Following the discussion, we all agreed to combine and integrate an application capable of monitoring the safety and health condition of the elderly anywhere and anytime, utilising existing health monitoring tech.

  Lastly, we will focus on 3 parts after the ideate progress, which are the Spo2, oxygen saturation, fall detection and ECG.

Here are some pictures of the brainstorming process.

Prototype

In the design thinking process, the prototype phase is a pivotal step translating ideation into tangible solutions. Our undergraduate project, focused on enhancing the well-being of the elderly, employed cardboard to craft an innovative prototype.

Comprising eight pages, our prototype caters to the distinct needs of both the elderly and their guardians. Users begin by identifying themselves as guardian or elderly, initiating tailored experiences. For the elderly, an uneditable main page features medication reminders and an emergency call button for immediate medical assistance.

Conversely, the guardian's main page integrates emergency and elderly call buttons, CCTV, and a menu with health, account and security, reminder, and help and support categories. The reminder function allows guardians to customise prompts on the elderly user's pages, fostering personalization.

The health section utilises wearables like smart rings and watches to display detailed metrics such as oxygen saturation, blood pressure, heart rate, and temperature. In critical situations, indicators trigger messages to both guardians and the nearest hospital, ensuring swift medical support. This section also monitors exercise metrics, promoting active lifestyles.

The help and support category addresses common concerns through a list of FAQs, covering topics like information security and accuracy. This transparent approach builds trust in the system.

Our prototype not only exemplifies design thinking in action but also underscores our commitment to a user-centric solution prioritising the health and safety of the elderly. By combining cardboard prototyping with thoughtful design, we aim to create a practical and holistic solution for the elderly and their guardians, ensuring a seamless integration of technology into their daily lives.

Here is some of the pages of prototype
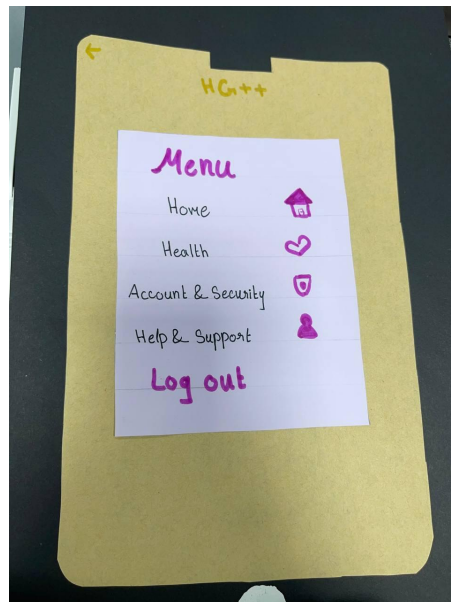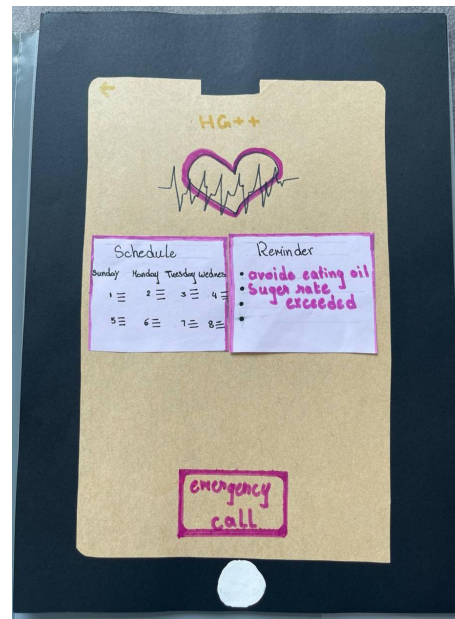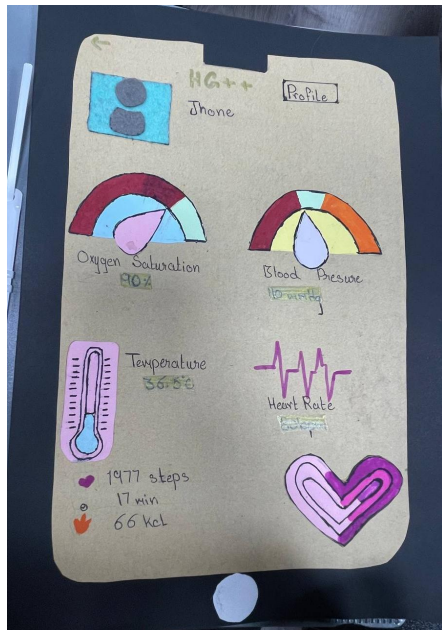
Test

During the initial phase of our project, we conducted a comprehensive evaluation with Dr Tan Ri Chuan during a team member interview. Through this process, we identified three critical components deemed essential for our system: fall detection, ECG monitoring, and oxygen saturation measurement. The medical expert highlighted the accessibility of smartwatches in the market that offer features such as fall detection and sleep monitoring, underscoring the significance of incorporating oxygen saturation and ECG monitoring. Following this assessment, we committed to refining our prototype to achieve optimal functionality.

Subsequently, during our second test session on Thursday, we presented our prototype to our lecturer. While the initial feedback suggested overall satisfaction with our prototype, the lecturer provided constructive suggestions aimed at improving the flow and reducing textual elements. These recommendations are expected to enhance the overall quality of our prototype, aligning it more closely with the standards expected at the university level.

Task Of Each Member

In our collaborative project, Ammar Abdulrahman Anaam Mudhsh, tasked with the introduction, plays a crucial role in setting the tone for the project and establishing a connection with the audience. Ghadeer Mahmoud Mohammed, responsible for detailing the client background, prototype development, and handling aspects of video editing and photography, brings a creative touch to our project. Chew Chuan Kai is tasked with researching and understanding the existing technologies, tools, methods, or systems used by the client. Chen Wei Jay Nickolas is focused on identifying the problems associated with the existing technologies and ideating solutions through brainstorming sessions. Tan Zhen Li is taking charge of generating ideas to overcome the identified problems. Tan Zheng Yu is playing a pivotal role in organising the entire report.

Reflections

Ammar Abdulrahman Anaam Mudhsh

I have always been fascinated by technology and AI, and the main reason I joined software engineering was because I can just write a bunch of code that creates a whole new world inside the device. These programs can be ERP systems, web browsers, games, and even new operating systems. My goal from this program is to have my own App development company.

This project has been a real eye opener on how to handle app development and the main steps we have to follow. It also improves my background and chances in employment by adding to my CV.

My plan going forward is to practice more when it comes to code and explore various methods in studying to increase my efficiency. I also plan on doing more projects both in and outside the university to increase my knowledge of the industry and improve my teamwork skills.

Ghadeer Mahmoud Mohammed

I aspire to be a professional programmer as it is the new direction of society which will be controlling all the world after a few years.

I learnt how to work in a group and share ideas. I think working on more projects practically can give me a wide experience to improve my performance.

I must improve my soft skills such as communication and working under stress. Visiting more industries as UTM DIGITAL will have a great impact in my future career as it will help me in a lot of things such as distributing networks in wide places

Chew Chuan Kai

My main objective is to grasp and apply the potential of technology in our changing world. Attaining an 'A' in this course is not just about the grade; it signifies mastery of the subject and validates my dedication. Equally significant is the aim to connect with like-minded peers who share similar ambitions.

Engaging in design thinking cultivates my teamwork skills through collaboration with diverse team members. This experience provides a holistic understanding of technological challenges, emphasising efficient communication within the team—essential preparation for the collaborative nature of the tech industry in the 'real world.

I plan to enhance my industry potential by actively researching current trends, staying updated on demands, and engaging in hands-on projects provided by lecturers. This approach ensures a smooth transition from academia to practical application, making me more valuable in the professional landscape.

Chen Wei Jay Nickolas

My goal is to gain team working and communication skills regarding the program as our project was done by every teammate's commitment, and we need to cooperate with our team members. For example, we need to do our task given with team members on time and to make sure the project can be well done.

This design thinking has really improved my communication skills by communicating with teammates when doing projects, and there are 2 foreign teammates in our team, and this is my first time collaborating with foreign students in doing projects.

I will stay current with new technologies and actively contribute to open-source projects. I will also try to engage in practical projects to apply theoretical knowledge and participate in coding communities.

Tan Zhen Li

Firstly, I think setting a goal or a dream for this course can provide me direction and motivation. I hope that I can get an A in this course. I aim to actively participate in collaborative projects, internships, and real-world applications to enhance my practical skills. By the end of my university journey, I envision myself not only graduating with distinction but also having a strong portfolio of projects that demonstrate my ability to solve complex problems and contribute meaningfully to the tech industry.

This design thinking project can significantly impact and enhance our journey in several ways, firstly it can improve our Problem Solving and Critical Thinking. Design thinking involves a holistic approach to problem-solving. Creating an Elderly Monitoring System will challenge us to think critically about user needs, potential issues and efficient solutions. Moreover, it can improve our application of technical skill. The project will allow us to apply and reinforce the technical skills you are learning in your program, such as programming, database management and system design.

I will Improve communication and collaboration skills. Being able to work effectively in a team, express ideas clearly, and understand the needs of stakeholders is crucial.

Tan Zheng Yu

My goal is to have a great understanding in various technologies and information systems. By studying this course, I can learn all the related knowledge by lectures and industry visits.

During this design thinking, we have learned about how a product is developed by design thinking phases. We have also learned about how to write a report, produce a high-quality video and also present our product. The thing I learned in design thinking had a great impact on my dream to become a successful developer.

In order to improve my potential in the industry, besides to strengthen my professional knowledge, I will also make an effort in improving my soft skills such as communication skills, leadership skills, computer literacy, etc. For example, I will involve myself in leadership roles such as president in club, or group leader in assignments to practise how to lead a team.