Cover Page

Course: COMP2213

Interaction Design

Group 5

Hand-In #2: Coded Interview Transcripts and Affinity Diagram

Title: Smart House System

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1.0 Code Book

The codebook below will have the implementation, suggestions, and concerns of the participants to help aid the development of the smart home system to cater to the target audience. The interviews helped fill gaps in the literature review, having focused on the technical aspect rather than user wants and needs. The codebook is separated into specific section by bolded code, having all related discussions within.

1.1 Aged Care (Elderly and Youth)

Code	Description	Example
Implementation of aged care system (AGEDCARE)	Suggestions of some features that could be implemented in a smart home system that is targeted for elderly users or children.	
Medication reminder for elderly or children (MEDICATION)	A reminder function is included in the smart home system to ensure that the elderly is following the medication plan. There will be reminders according to the scheduled time for the elders to consume their medicine. This function could also be used for other activities, such as medical check-up or blood pressure test. If parents are away working, the system could remind the child to take medicine on time also.	"..customize the medicine reminder function with an alarm which ring the buzzer." (T1, pg33) "..reminders to either go for hospital check-up, or to take their medication on time." (T3, pg44) "..medication management that will remind my grandparents to take their medicine on time." (T4, pg50) "..customizing reminders based on medication schedules or personal routines." (T6, pg63)

What does it mean by "T3"? Transcript 1? You should define this indicator so that the reader will not confused.

Emergency call for elderly or children (EMERGENCY)	Emergency call services are embedded into the smart home system, either through buttons or voice-based system. This service allows the users to call the hospital or clinic nearby for emergency services, such as when the elders tripped or if the children hurt themselves when they are alone at home.	"..have emergency call services for the injured case." (T1, pg33) "..emergency calls that are voice-activated." (T4, pg52)
Utilised CCTV to monitor elderly or children (VIDEOSYSTEM)	Video-based system such as CCTV (Closed Circuit Television), cameras and sensors could be installed such that the owner could monitor the house's condition and the elder's situation. The owner could then react in time if any accidents or emergencies happens.	"..include a video-based system such as CCTV." (T1, pg33) "..something like security cameras that I can view at any time." (T3, pg43-44) 37/47 participants think that remote monitoring devices play a role in enhancing the safety of senior citizens and children. (Survey)
Notification system for elderly or children (NOTIFICATION)	This notification system works together with the motion detect sensor. When the sensor detects any unusual activities of the elders, it will send a notification to the guardians, neighbours or anybody concerned.	"..elderly is in danger, or in urgent need of medical care, it will send a notification." (T3, pg44) "..notification system whether the elderly has gone out of the house or not." (T3, pg44-45)

		"..prefer it to be an alarm on a device that I carry." (T7, pg71)
Sensor devices for elderly or children (SENSORS)	Sensors that are integrated in devices such as smartwatch and smartphones could help to track the elder's health status. The data collected could then be used for further analysis to ensure their safety by making sure their statistics are normal and notifications will be sent out if anything unusual is detected.	"..sensor devices should be worn by the elderly user." (T1, pg33) "..integrating health monitoring features provides a holistic approach." (T6, pg64) "..most important one would be something to monitor their health." (T7, pg70)
Good user interface for elderly (UI)	As elders are not very familiar with technology products, an intuitive user interface that is clear and could help them in understanding how to use our system is crucial. The graphics should be easy to understand and bigger font could be applied as there might be elders that face health problems	"a good user interface should be provided" (T1, pg33) "creating an intuitive interface is crucial" (T6, pg63-64) "elderly individuals may not be tech-savvy, so an intuitive interface is essential" (T8, pg76) 25/47 participants rated the importance of consideration of font size, contrast and readability in the design process for elderly users and children as 5 out of 5 (Survey)

Voice-based system for elderly (VOICE)	Voice-based system could be implemented as there are some elders that have difficulty moving and quite a number of elders are unfamiliar with technology products. This system allows the elders to control the systems by voice commands and the medication reminders could also be announced through speakers.	"should have a sound-based system to have voice control" (T2, pg38) "incorporating a speaker that would announce a reminder" (T4, pg51) "audible alerts ensure those with visual impairments can receive important information" (T6, pg65) 26/47 participants think that voice-activated technology are capable of aiding senior citizens and children with daily tasks and communications (Survey)
Motion detector for elderly (INNER-MOTION)	Motion detector systems would be installed to detect the elder's motions. Unusual activities such as elders that has Alzheimer's disease trying to leave the house and elders tripping would be detected and notifications would be sent to the people caring for them.	"..detect certain unusual behaviours of the elderly" (T3, pg44) "..fall detection sensors could be installed" (T4, pg52) 24/47 participants rated the usefulness of fall detection systems as 4 out of 5 (Survey)
Auto-lock for elderly or	The auto-lock feature allows the guardians to lock the door remotely to prevent elders or	"..perhaps they would also be able to lock the doors" (T3, pg44-45)

children (AUTOLOCK)	children that are staying alone from leaving the house. It can either be controlled through a smartphone application or by the smart home system itself when it detects unusual activities.	
Remote switch for elderly (REMOTESWITCH)	The elders could control the appliances such as lights, fans, air conditioners in the house remotely as some of them might face health issues and have difficulty walking.	"remote on and off buttons that we can have using your phone to turn on" (T5, pg56)
Children-Friendly Mode (CHILDRENMODE)	Children-friendly mode is incorporated in the smart home system to ensure that the accessibility of children is limited. For example, their parents could restrict the time limit of their children watching YouTube or playing games to avoid addiction at a young age.	".. ensure their safety and this mode might help in enhancing their ability to interact with the smart home system as the user interface would be simpler to understand.." (T4, pg54) "Implementing a mode that restricts certain functions or enhances security protocols when children are alone helps prevent unauthorized access and ensures the safety of both the children and the home. " (T6, pg68) "restrict access to certain features and provide additional safety measures, ensuring that children

		cannot inadvertently compromise the security of the home." (T8, pg79)
Challenges for aged care system (CHALLENGES_AGEDCARE)	Some challenges that could be addressed through a smart home system that is targeted for elderly users or children	
Elderly or children safety concerns (SAFETY)	Elderly or children that are left alone at home would face some emergency situations such as tripping, hurting themselves or leaving the home alone. Smart home systems could help to address this challenge by utilizing sensors and notification systems	"I am worried about their situation at home" (T1, pg32) "most likely use it for grandparents, because they always face emergency situations" (T3, pg43) "I believe one of the challenges is accidents" (T3, pg44) 23/47 participants think that the care system in smart houses could manage the safety of senior citizens and children (Survey)
Unfamiliarity with technology devices for elderly (UNFAMILIARITY)	Most elders have little exposure to technology products and they are not good at using them. The smart home system could utilize approaches that are more user-friendly such as designing a better	"if no one teach the elderly users to use then it may be a challenge as they cannot interact with that system" (T1, pg33) "simplicity and ease of use should be prioritized when designing a

	user interface for elders and implementing voice-based system	notification system for elders" (T4, pg51) "many older individuals may not be familiar with advanced technology" (T6, pg63-64) "elderly individuals may not be tech-savvy (T8, pg76)

1.2 Automated Pet Systems

Code	Description	Examples
Implementation of Automated Pet Systems (AUTOPETS)	Discussion about the various possible implementations of automated pet systems in a smart home system.	
Creating Automated Pet Feeding System (AUTOFEEDER)	An automated feeding system should be implemented to feed one or more pet(s). The feeding system should cater to the different types of available common pets, such as dogs, cats, and such. The feeding system should operate on a timer such that food is always available when required, which can be set and controlled by the user.	"Potential like the pet feeding system because nowadays a lot of people feeding pets and then they not just one pets" (T2, pg41) "So, whenever they are food is, whenever it's time for you to eat or drink, that their bowl is always replenished." (T5, pg58)

Creating Automated Pet Water System (AUTOWATER)	Alongside the automated feeding system, an automatic water bowl should be implemented for the pets at home. The automatic water bowl should also always have a minimum amount of water to ensure that the pet can hydrate whenever necessary, even when the owner is not around. The water will be checked and refilled at fixed intervals.	"As for water, I would prefer that the water dispenser could provide water all the time so that my dog would stay hydrated." (T4, pg52) "drink, that their bowl is always replenished." (T5, pg58)
Customisations of food providing for each pet (CUSTOMFOOD)	The automated feeder and water should implement settings allowing for different portions depending on specific pet being fed. This would allow for more customisation by the user to fit the exact needs of each pet. The system should also allow to be toggled on and off, depending on the requirements of the user.	"could be food dispensers that would dispense food based on the schedule and portion set by the owner" (T4, pg52) "System responds correctly as the food and the portion is slightly different for both of them"(T4, pg53)
Creating Monitoring System for Pets (MONITORPET)	A monitoring system will be implemented with the assistance of AI tools to identify the pet and their position in the home. If the pet is not in the safe areas, such as exiting the house or entering the kitchen, a warning is sent to the	"Detects whether the pet has gone out of boundary from the home and would immediately alert" (T3, pg46) "I would afraid that the pet will enter some dangerous zone such

	owner, and authorities if necessary. This will utilize image recognition technology to implement effectively.	as the drawer which store the sharp object." (T1, pg35) 33/47 individuals would like to be informed if pet leaves home vicinity. (Survey)
Creating automated bathing for pets (BATHEPET)	An automated bathing/cleaning system for pets could be implemented such that the system cleans the pet in a way which does not harm the pet, whilst also allowing for an effective cleaning. A possible implementation would be a steam bath where the pet enters a chamber and is rinsed with steam and soap in a safe manner. A dryer would also be implemented to ensure the pet does not fall ill after being washed.	"Automated cleaning system is provided as it is difficult to help some pet to shower" (T1, pg35) "grooming and cleaning, and taking a bath because it is a dangerous(challenging) action to the pet owner"(T2, pg39)
Creating automated pet toys (TOYPET)	An automated pet entertainment system could be implemented. Few suggested entertainments include automatic throwing machine for dogs, or automated mice for cats. This will allow users to have hands-free entertainment for pets whilst working or abroad to ensure healthy and active pets.	"maybe like an android that acts a mouse or something like that, that can run around so that the cat can be active"(T5, pg58)

Creating system to monitor pets' health status and wellbeing (PETHEALTH)	Through the usage of AI monitoring and understanding, a user's pets' health can be monitored to ensure the pet is in good health, else warn the owner of possible illnesses. This would significantly increase the quality of care given to pets and help the owner with understanding of how to care for the pet. This could be done by attaching a simple device to the pets' collar, which tracks its health.	"health monitoring device to check if my pet is in a good health condition."(T7,pg72) "pet health monitoring system that tracks vitals, activity levels, and potential health issues"(T8, pg78)
Challenges Of Automated Pet Systems (CHALAUTOPETS)	There were few possible challenges which were discussed to the implementation of automated pet systems. These challenges may have existing solutions discussed in literature review or bring new ideas for implementation.	
Automated system not fully reliable to take care of pets (MALFUNCTION)	A system malfunction could occur leading to food not being provided to the pets causing pets to not be fed. Other malfunctions could include other devices hurting pets or monitoring devices not working as	"Because pets do not understand their environment, especially, robot vacuum cleaners" (T5, pg59) "the malfunction, if my pet suddenly had an injury or a heart attack, I guess. And the smart

	intended. This issue could be resolved by performing a routine check and informing owner of errors.	house malfunction and I wasn't notified" (T7, pg73) "systems could always fail, no matter how fail-proof they are, and if we rely too much on this kind of automated system" (T3, pg46)
Pet endangered by objects in the smart home (PETHARM)	There is a concern that the toys, other smart devices, and areas of the house can pose danger to the pet when operating. The main concern is playing and entering a hazard zone. The solution to this is the pet monitoring system, along with systems to ensure devices such as the robot vacuum cleaners only operate when a pet is not detected in the vicinity.	"start throwing things in the hazard zone. So that can cause harm to the pet as well" (T5, pg59)

1.3 Security System

Code	Descriptions	Example
Implementation of Security System (SECURITYSYSTEM)	Suggestions of some features that could be implemented in a smart home system that enhance the security of system	
Implementation of CCTV for safety and care (VIDEO)	CCTV (Closed Circuit Television) would be included in the smart home system such that the users could monitor the situation of their house from a certain distance. The user will be aware of any danger or emergencies that happened in the house and would be able to respond to the matter as soon as possible.	"..include a video-based system such as CCTV to monitor elder's motion which can help the children to recognize the elder activities at house." (T1, pg33) ".. like security cameras that I can view at any time through digital device like a phone.." (T3, pg44) "real-time monitoring and alerts for unusual activities ensure prompt response to potential security threats." (T8, pg79)
Warning Notification (WARNINGNOTI)	The notification system of the smart home system includes warning notifications, which will alert the users about the danger or emergencies in their house so that they could attend to it immediately. For example, a	"Give the warning notifications when someone is trying to enter your home but keep give wrong authentication message to the strangers." (T1, pg36) "..hope that the system can detect the motion that people get

	stranger lingering at the doorstep or the elders in the house tripping.	in my house and then send notifications to my handphone..” (T2, pg40) “..can help adults that are away and if anything happens, the smart home can also notify the adults and they can rush back to their house immediately.” (T3, pg43)
Voice Control (VOICECONTROL)	Users could control the smart home system through voice control, such as voice assistants like Alexa, Siri, Google Assistant. Users could give instructions by voice commands and the system would also provide feedback through voice, which is convenient for elderly people that has health issues or people that prefer voice-based systems.	“..through the voice control which may be easy to explain what we want to do or ask the smart system such as “Hey, Siri”.” (T1, pg36) “..should have a sound-based system to have voice control because old people now know Mandarin and dialect more, so the voice control of the smart home system should include the voice control through dialect.” (T2, pg38) “.. because it can speak out and remind people like using voice, not a sentence on the screen.” (T2, pg38)

Set Up Primary User (PRIMARYUSER)	The smart home system includes a feature which is the primary user. Primary user has the full authority to obtain, use or operate the smart home system as they are usually the owner of the house. They could also grant access for guests and customize the features according to their preferences, such as the type of data that is allowed to collect.	"..give the right to the primary user to add, remove, and update their control to some smart lock at home." (T1, pg36) "..customize what kind of data the smart home can collect from me and my family, and who is allowed to view this kind of data."(T3, pg43) "User authentication is important to make sure that only authorized users have access and can control the system." (T4, pg54)
Analyse Daily Activity (ANALYSE)	The daily activity of the user is tracked using sensors and is analysed by the smart home system for better performance. For example, the system could help the user in some daily routines, such as preparing breakfast, getting ready for work and doing the house chores based on the time analysed.	"If I can share the data to the system, maybe it can help to enhance and control the time limit like it can help to prepare my breakfast before I go working before ten minutes I go out from my home." (T2, pg40) "..control the vacuum machine everyday from 10am to 12pm because the system will know that this time won't have people in my home, it can directly control the vacuum machine working." (T2, pg40)

		"..a lot of data would need to be collected for the sake of efficiency as the more data the system has on a certain household, the better that smart home can predict the behaviours of the household." (T3, pg47) "..., because if it doesn't record my daily activities, then the smart home wouldn't know my preferences, it wouldn't know how to be "smart", it wouldn't know what my daily routine is.." (T3, pg47) "..keeping track of our fridge food.." (T5, pg61)
Outer Motion Detector System (OUTER-MOTION)	Motion detector system would be installed in the smart home system to detect the nearby motion. This helps to ensure the user's safety by alerting the user beforehand if any danger is detected, such as a stranger at the doorstep.	"The motion detector system should be included because when stranger is approaching my house and try to get into to my house." (T2, pg40) "..anyone breaking into the house. I want my smart home to be able to detect..(T5, pg60-61) 43/47 individuals would like to use smart home system to detect

		the strangers/ suspicious activity surrounding home. (Survey)
Remote Monitoring (REMOTE)	Users would be able to monitor the condition of their houses through CCTV (Closed Circuit Television), surveillance cameras and sensors on their smartphone. If any unusual activity is detected, alerts will be sent to the users so that they would be prepared.	"Remote monitoring should also be included so that the users are able to monitor their home and receive alerts for unusual activities." (T4, pg54)
Customize security Features (CUSTOMIZESECURITY)	Users are allowed to customize the security features according to their preferences, such as the primary user and guest access, types of data collected and who has access to view these data.	"I think the first thing I would like to customize is security features" (T3, pg43) "..customize security and privacy settings" (T4, pg51) 35/47 individuals agree that the smart home system interfaces can accommodate their needs. (Survey) 41/47 individuals agree that the consideration of security settings

		plays an important role in the design process. (Survey)
Cybersecurity features: Firewall and Encryption (CYBERSECURITY)	Two main cyber features stood out as a necessity for implementation during the creation of a smart home; firewall and encryption methods A firewall is included in the system to prevent attacks from hackers to obtain the user's personal data. The firewall could also avoid any unauthorized users from accessing sensitive information. Encryption methods could be implemented to ensure the security of the user's personal data, such as end-to-end encryption and multi-factor authentication. Thus, even if the data is intercepted by hackers, the data would remain unreadable.	"..one thing would be having a firewall.." (T3, pg48-49) "..recommend encrypting the data using end-to-end encryption to prevent eavesdropping and ensure that the data is unreadable even if it is intercepted." (T4, pg54) "..like my house being defended by a firewall. That people cannot just come in by the Wi-Fi or hack my Wi-Fi switch and come inside."(T5, pg60-61) ".. include multi-factor authentication, encrypted communication channels, and regular software updates to address vulnerabilities. Additionally, real-time monitoring and alerts for unusual activities ensure prompt response to potential security threats." (T6, pg68) "..allow limited recording of activities for security purposes,

		provided the data is encrypted, and user privacy is prioritized." (T8, pg79) "A robust security feature should include encryption protocols, regular software updates, and two-factor authentication" (T8, pg79) "Multi-layered authentication and encryption at both hardware and software levels contribute to a robust security framework" (T8, pg80)
Biometrics (BIOMETIRCS)	Users could use their own unique identifiers of their biology and behaviours as standalone authentication biometrics are always with individuals and cannot be lost or forgotten.	
Implementation Eye Recognition (EYERECOG)	Users could choose the eye recognition method to authenticate their identity. The user would be required to register their iris into the database and access is only granted if the iris is recognized. Multi-users are supported so there could be	"..prefer eye recognition because it is convenient and fingerprint maybe affected when I touched the verification path, they may have some dusts which may affect the working." (T2, pg40) "And I chose a combination of fingerprint and retina scan. Well,

	various users that have their irises registered and the system would provide personalized access based on their information.	it's more of extra security. We don't want to rely on you." (T7, pg73)
Implementation of Fingerprint Recognition (FINGERPRINT)	Users could choose the fingerprint recognition method to authenticate their identity. The user would be required to register at least two fingerprints in the database. Multi-users are supported so there could be various users that have their fingerprints registered and the system would provide personalized access for these users based on their information.	"..think it's because we're more used to fingerprints through our smart phones, and password is also very commonly used in smart phones, which is why I'm more inclined to do that.." (T3, pg47) "..would prefer face recognition and fingerprint recognition as they are more convenient and unique." (T4, pg53) "..I think that these two are more user-friendly as it is easy to use and we always have our face and fingerprints along with us, which would be helpful for people that are forgetful." (T4, pg53) "I prefer are usually fingerprint picture recognition"(T5, pg59-60) "And I chose a combination of fingerprint and retina scan. Well, it's more of extra security. We don't want to rely on you." (T7, pg73)

Implementation of Facial Recognition (FACERECOG)	Users could choose the face recognition method to verify their identity. The user would be required to register their face into the database through cameras. Multi-users are supported so various users could register their faces into the database and the system would provide personalized access based on the registered data.	".. prefer face recognition as it is more convenient to authenticate our identity" (T1, pg35) "..would prefer face recognition and fingerprint recognition as they are more convenient and unique." (T4, pg53) "..Face recognition is non-intrusive and provides a seamless entry process"(T6, pg67) "Face recognition is preferable for its convenience and non-intrusiveness." (T8, pg79)
Challenges for Security System (CHALLENGESECURITY)	Challenges of some features that are faced by the security system of a smart home system in order to improve our safety in physical home and virtual network.	
Child safety and security when left alone (CHILDSAFETY)	Challenges are faced by the security system to provide a child production mode when children are left alone in the smart home. Children may open the door to strangers, to which needs to be prevented by the smart home system.	"I don't prefer to let the children use because they may trust in strangers and scammers, then I cannot control. What if they use my account share my data to scammers. What if they use my e-wallet to buy something. This is dangerous and uncontrollable." (T2, pg40)

Challenges of hacker/scammer (HACKER)	Challenges are faced by the firewall of the security system to prohibit the cyber-attacks from the hacker and scammer that may cause the privacy data outflow	"I don't prefer to let the children use because they may trust in strangers and scammers, then I cannot control. What if they use my account share my data to scammers. What if they use my e-wallet to buy something. This is dangerous and uncontrollable." (T2, pg40) "..I would rather have more privacy than more convenience because I think there's always a limit to how much control the smart systems should have over my home, because what if there's a hacker that hacked into my system.." (T3, pg48)

1.4 Energy Usage and Efficiency

Code	Description	Examples
Implementation that values energy efficiency (ENERGYEFF)	Lists the applications or technologies that tries to minimize the use of energy.	

Solar Panel (SOLAR)	Solar panels generate electrical energy for applications or devices connected to them via direct sunlight or intense UV light. Unlike most other devices that requires electrical flow from local power plants, solar panels could produce energy through natural means and are self-sustaining.	"... having solar panels would definitely be more eco-friendly because it uses outside energy ..." (T3, pg45) "I think that energy-efficient components such as low-power motors could be applied in the design and solar power could be used." (T4, pg52)
Smart Scheduling Algorithms (ALGORITHM)	Algorithms that make intelligent decisions when allocating resources or determining the order of execution for tasks in a system. For instance, these algorithms could help devices to save energy during inactivity. They adjust energy consumption patterns in response to signals indicating high demands or low supply.	"...incorporating a battery saving mode when it's not in use, because a lot of the times these automated pet care systems only work during certain times, for example, feeding times or when the pet has gone to sleep or something like that, depends on the security system. So, I think having that kind of battery saving mode will definitely reduce the environmental impact." (T3, pg45) "An automated system could also include smart scheduling algorithms to optimize energy use, activating specific functions

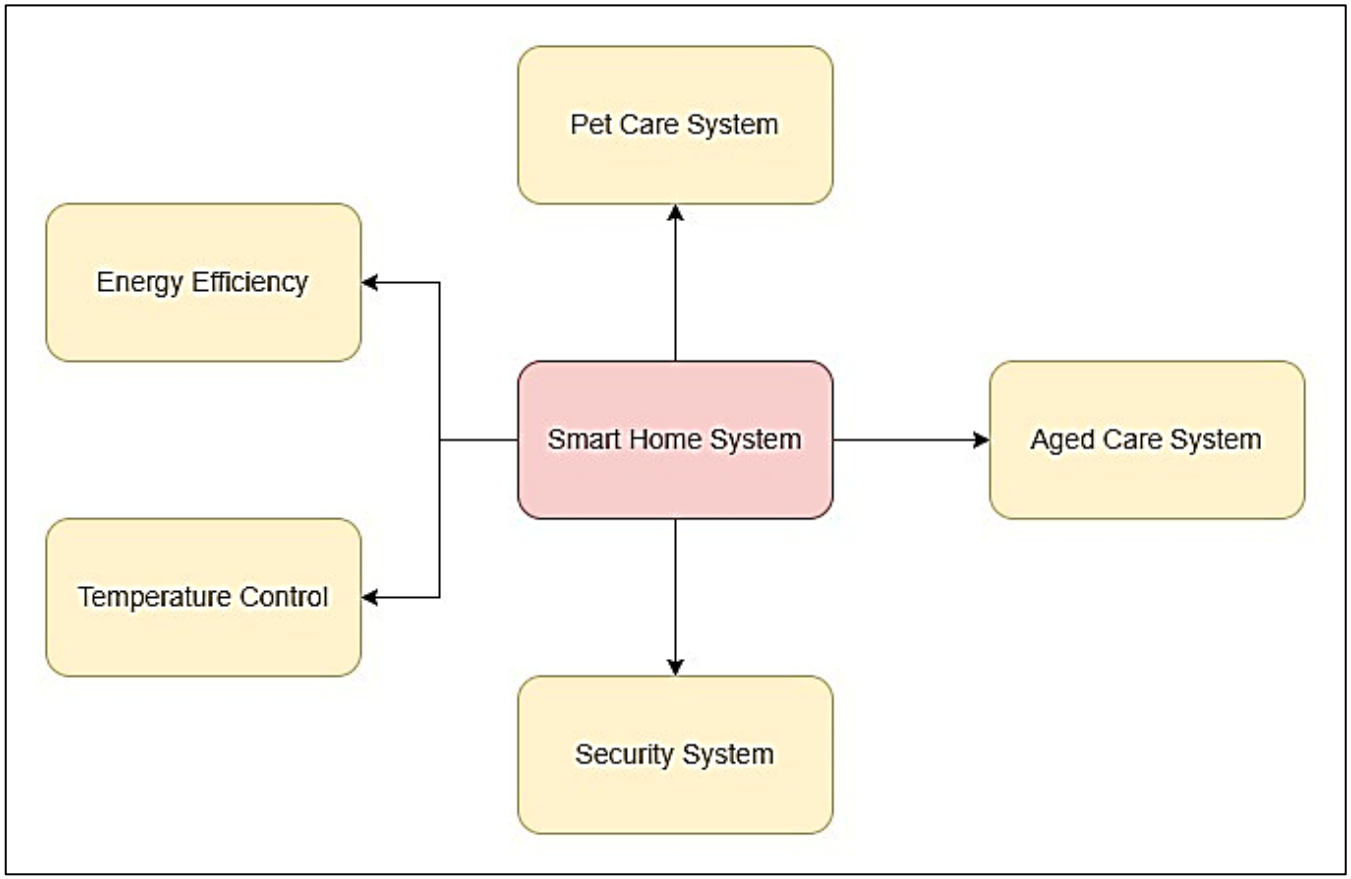
		only when needed." (T6, pg65-66) "the system does not need to stand by all the time and change it to schedule mode." (T1, pg34) 34/47 individuals agree that air conditioner can be effectively scheduled by the smart home system. (Survey) 31/47 individuals think that smart home systems should control interior air conditions based on weather data. (Survey)
Energy-efficient sensors (EESENSOR)	Sensors designed and optimized to minimize energy consumption while still effectively performing their intended functions. These sensors often incorporate advanced power management features, such as the ability to enter low-power sleep modes when not actively sensing. The main implementation will be in air-conditions, which take high amounts of power.	"For instance, energy-efficient sensors could minimize power consumption while still providing effective monitoring." (T6, pg65) "Sustainable pet care systems could incorporate energy-efficient sensors, use biodegradable materials, and employ AI algorithms to optimize resource usage." (T8, pg78) 40/47 individuals prefer to have a smart home system that manages its air conditioners' usage to

		prevent energy overconsumption. (Survey)

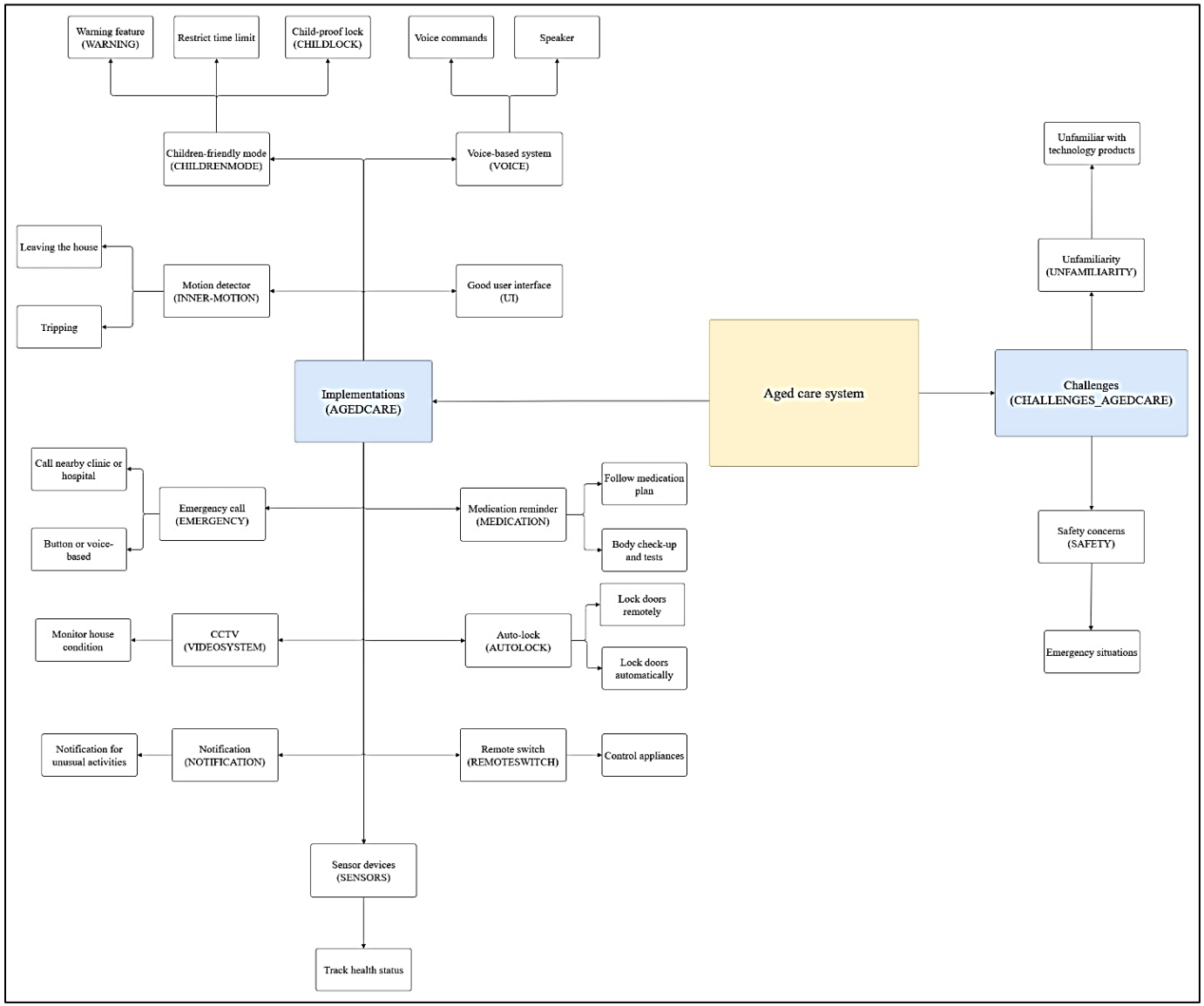
2.0 Affinity Diagram

The diagrams below are the affinity diagrams that shows the various themes drawn from the interview transcripts and literature review.

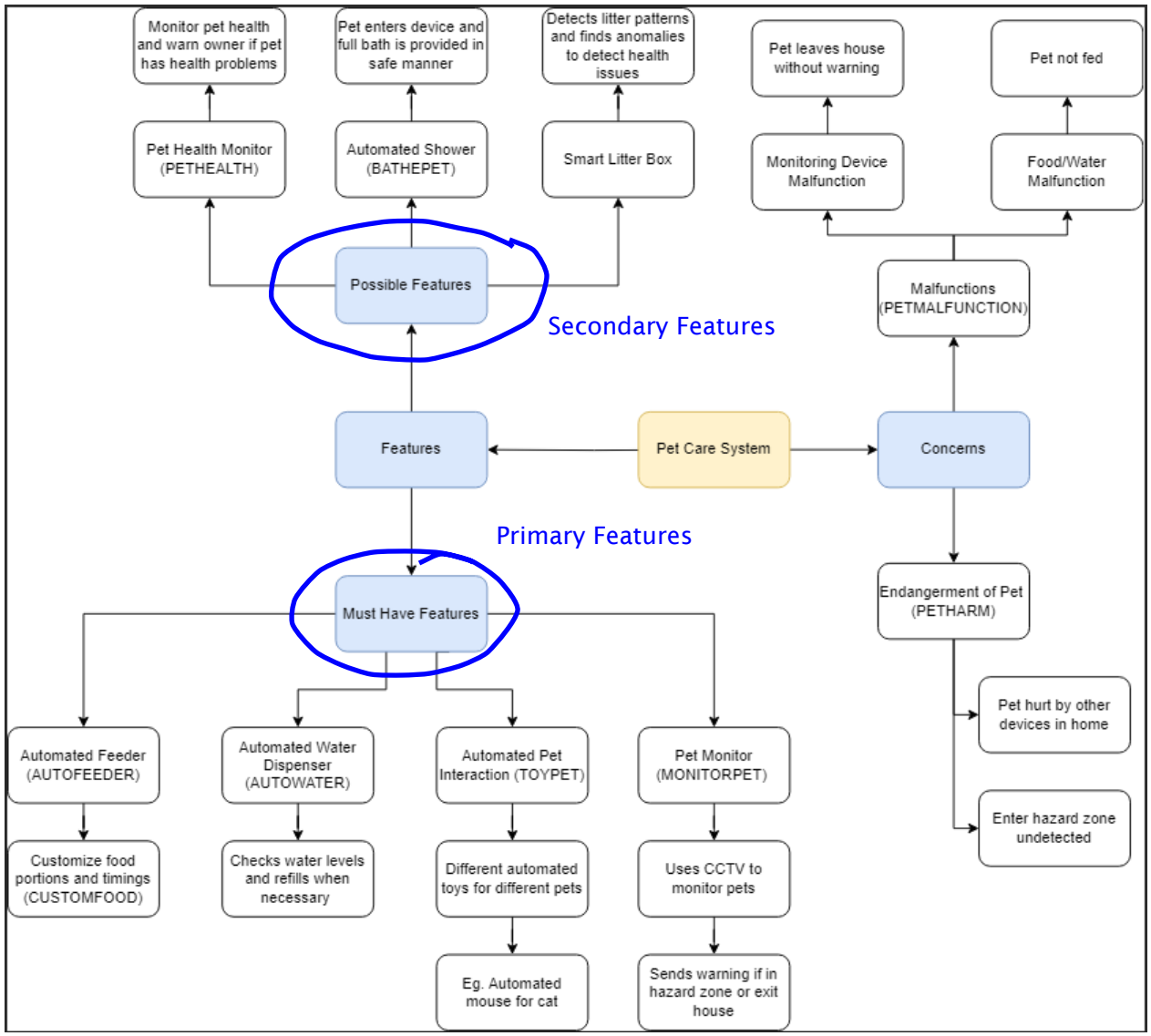
2.1 Main Diagram



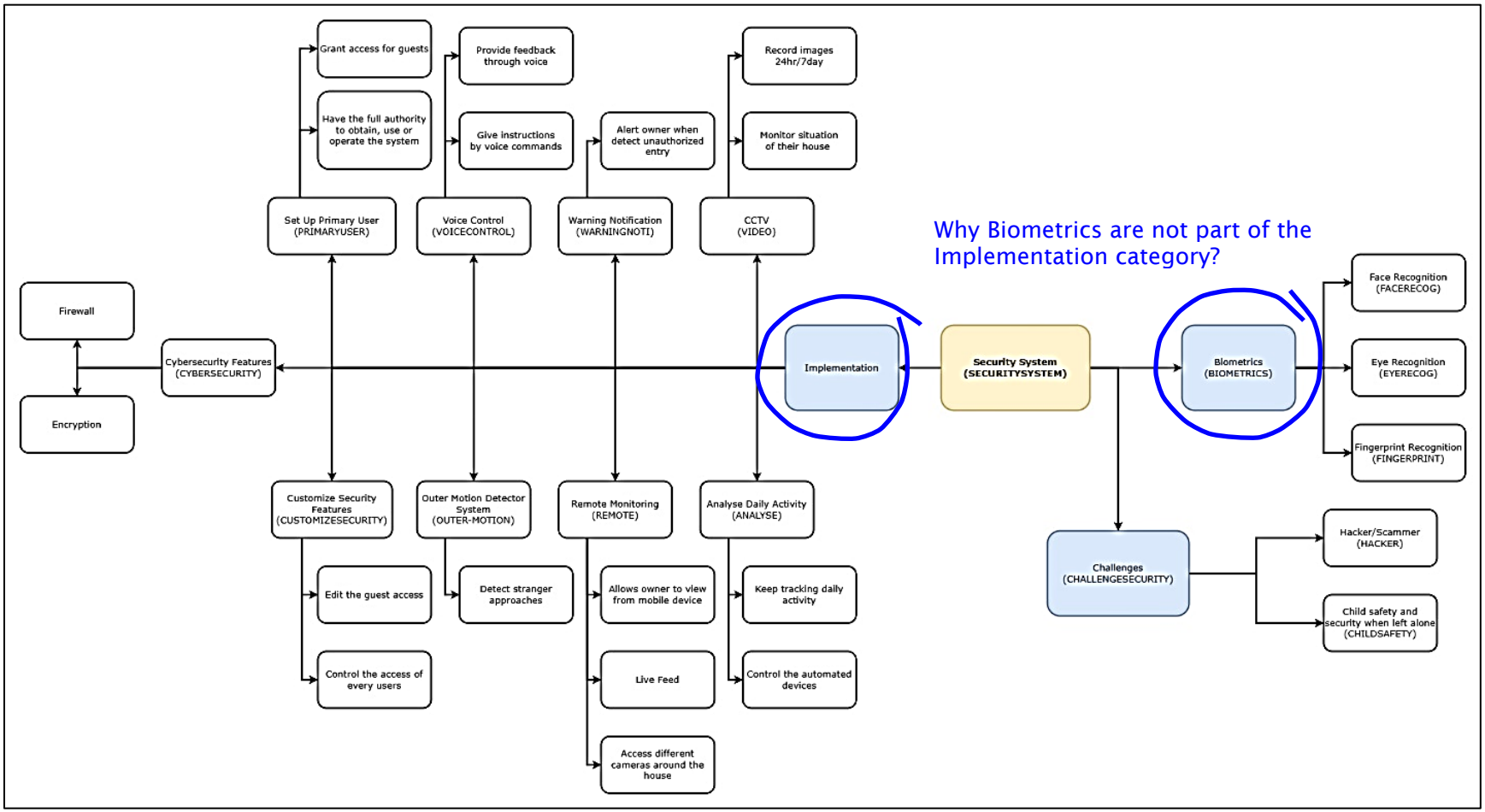
2.2 Aged Care System Diagram



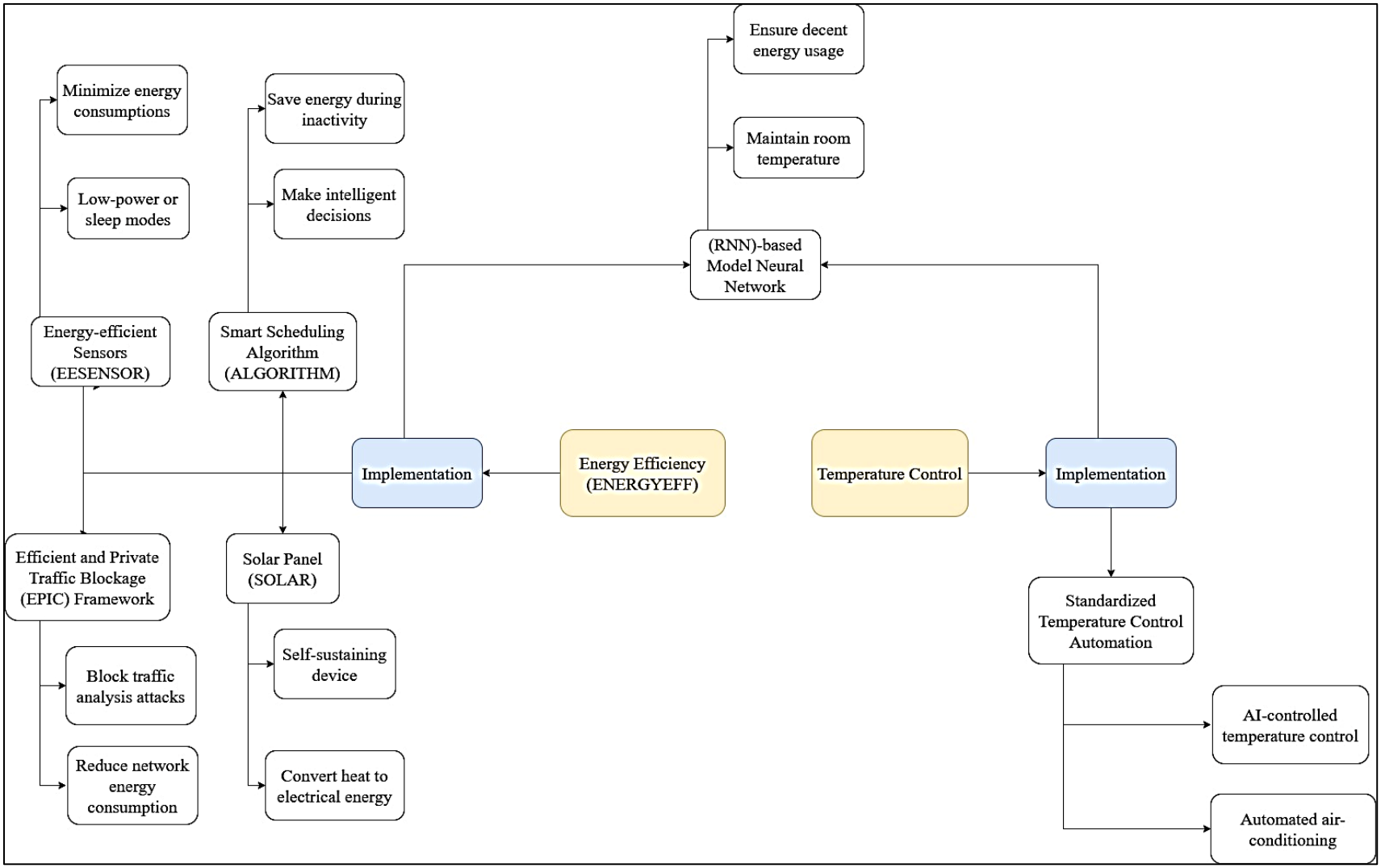
2.3 Pet Care System Diagram



2.4 Security System Diagram



2.5 Energy Efficiency and Temperature Control Diagram



3.0 Appendices

3.1 Transcript 1

Participant 1: Male, 18, a high school student, living with his parents and his pets

Interviewer: We are a group of students from University of Southampton Malaysia and we are facilitating this focus group interview to research more about the smart home systems from the user's perspective. The goal of this interview is to gain some valuable insights from the potential users of this system to enhance the usability and user experience of the aged care system. You have been selected as one of the Participants as you have been identified as a potential user that might provide unique opinions on the smart home area. Our research project as a whole focuses on the interaction design of smart home technology, with particular interest in the area of automated pet care and aged care systems. Prior to the interview you will be briefly introduced to the topic of the interview and you will be required to sign two consent forms (one to sign and return and one to keep). The interview will take approximately 15 minutes and it is semi-structured.

Participant: Yes, I understood it already

Interviewer: Do you understand what a smart home system is?

Participant: Yes. I knew it since I saw a lot of owners install the smart home system for their new home.

Interviewer: Can smart home technology significantly improve the quality of care system? Would you use it for your parents and why?

Participant: Yes definitely. Since my parents is older and plan to retire, then they will spend a lot of time at home, so I am worried about their situation at home. *[SAFETY]* Through this smart home system, I can get the real-time information about them.

Interviewer: Is customization a key feature in smart home systems for personalized aged care? What would you like to customize and why?

Participant: Yes. I would like to customize the medicine reminder function with an alarm which ring the buzzer that can help us to remind our parents when there is no one inside the house especially for someone who always forget the things to do. *[MEDICATION]* Moreover, I would like to have emergency call services for the injured case and help us to save our elder at home. *[EMERGENCY]*

Interviewer: What do you think should be a priority when designing a smart home system for old people? Why?

Participant: I think a smart home system should include a video-based system such as CCTV to monitor elder's motion which can help the children to recognize the elder activities at house. Since the motion is detected, then we can receive notification through our smart home system to get know what is happening and how to cope with it. *[VIDEOSYSTEM, VIDEO]* Some sensor devices should be worn by the elderly user to detect their heart rates and respiratory rate to remind them don't do some extreme activities and rest when there is a need. *[SENSORS]*

Interviewer: Could you name a few challenges that could be addressed by smart home technology in aged care? Do you have any suggestions to overcome it?

Participant: Since the smart home system provide a lot of features, but then if no one teach the elderly users to use then it may be challenge as they cannot interact with that system. Besides, if they cannot interact properly, then this system will become useless in that home. *[UNFAMILIARITY]* Thus, a good user interface of smart home system should be provided in order to make people maximize the use of it to control our home and provide aged care to our elderly user. *[UI]*

Interviewer: What are the features that you would find useful or would be interested in for an aged care system? Why?

Participant: It is convenient for the elder to control it and provide a quality care for the elder at home such as play the YouTube movie for those who don't know how to use digital devices, remind them to have meals on time.

Interviewer: What is the most effective notification system that you could think of for elderly users? Why?

Participant: Voice-based system which allows elderly user who have eyesight problem and don't know how to read texts. Besides, the bigger font size on the screen should be provided make ease of use.

Interviewer: Imagine a futuristic pet care system for smart homes. What sci-fi feature or capability would you love to see integrated into this system for your pets?

Participant: Pet care should include feed, groom, clean their shelter automatically and others to provide a quality care for their precious pet. If all the features are provided, I would glad to have this system in my home.

Interviewer: If automated pet care systems were designed to be sustainable and eco-friendly, what features do you think it could incorporate to maximize energy efficiency or reduce their environmental impact?

Participant: They can track the daily routine of the pet to refill feed, water, clean their poo based on the analysis. Then, the system does not need to stand by all the time and change it to schedule mode. *[ALGORITHM]*

Interviewer: Do you believe that the use of automated systems would throw off the balance of you and the system providing personal attention and care to your pets? (Are there ways to improve this balance?)

Participant: It would not affect the balance of you as long as we are the one who provide companion to the pet, but the system would only provide their basic needs. It is totally different things provided to the pet.

Interviewer: Are there any concerns you have regarding the safety and well-being of your pets when relying on automated systems in a smart home?

Participant: I would afraid that the pet will enter some dangerous zone such as the drawer which store the sharp object. *[MONITORPET]* Other condition is that the system maybe not so smart detect the fall of pet consider as an emergency condition but then it just jump and run in the home.

Interviewer: Can you suggest any specific enhancements or new features that would make automated pet care systems more valuable to you as a pet owner?

Participant: The translator which helps us improve our interaction between owner and pet. Automated cleaning system is provided as it is difficult to help some pet to shower since they are scared of water. *[BATHEPET]*

Interviewer: What type of biometric authentication do you prefer (Fingerprint, face recognition, password, access card, key)? Why?

Participant: I would prefer face recognition as it is more convenient to authenticate our identity. If we use fingerprint, we still need put our finger on the verified machine but through face recognition, we only need one camera. *[FACERECOG]*

Interviewer: Are you comfortable sharing your personal data with the smart home system? If yes, then will you allow it to record your daily activities? If not, then why?

Participant: Yes, it can help me to schedule some household cleaning activities without my instructions, then it can do it itself. Besides, I hope it can automatically play music during my bedtime.

Interviewer: Do you prefer your smart home system to have a children-friendly mode? Why? (PS: children may lead strangers to their home without parents' permission)

Participant: No, as they may touch the wrong buttons such as emergency call which may lead to the waste of resources of public. The worst case is that the children may lead strangers to the home and moreover the stranger may stole something from the home and hurt the children or elder.

Interviewer: What do you think a smart home system security feature should include? Why?

Participant: Give the warning notifications when someone is trying to enter your home but keep give wrong authentication message to the strangers. It can quickly remind the owner to check their CCTV to know the situation. *[WARNINGNOTI]*

Interviewer: How much control do you want your smart home system to have?

Participant: through the voice control which may be easy to explain what we want to do or ask the smart system such as "Hey, Siri". Besides, I hope it can control all the automated machine and schedule them to help me do households to reduce my energy. *[VOICECONTROL]*

Interviewer: In your experience, what are some effective design patterns that could enhance the security of smart home systems? (answer some specific questions, setting primary user,…)

Participant: Setting a primary user who is especially the owner of the house. Then, when there is someone who cannot enter the house, then we just ask the primary user access the people to have the authentication to enter. Besides, give the right to the primary user to add, remove, and update their control to some smart lock at home. For example, don't access the right of children to enter the kitchen which may consists of dangerous object and a lot of foods. *[PRIMARYUSER]*

Interviewer: Thank you for your time and valuable input. Is there anything you would like to add that we haven't mentioned?

Participants: It is really a good potential system as it can provide a lot of features we need to help us in order to enhance our quality life such as aged care system, pet care system, and alert notification. That's all for today.

Interviewer: Thank you so much.

3.2 Transcript 2

Participant 2: Female, 25, a quantity surveyor, living with her family and pets

Interviewer: We are a group of students from University of Southampton Malaysia and we are facilitating this focus group interview to research more about the smart home systems from the user's perspective. The goal of this interview is to gain some valuable insights from the potential users of this system to enhance the usability and user experience of the aged care system. You have been selected as one of the Participants as you have been identified as a potential user that might provide unique opinions on the smart home area. Our research project as a whole focuses on the interaction design of smart home technology, with particular interest in the area of automated pet care and aged care systems. Prior to the interview you will be briefly introduced to the topic of the interview and you will be required to sign two consent forms (one to sign and return and one to keep). The interview will take approximately 15 minutes and it is semi-structured.

Participant: Ok. Understand.

Interviewer: Do you understand what a smart home system is?

Participant: Yes, because I saw a lot of owners using the smart home system for their new home.

Interviewer: Can smart home technology significantly improve the quality of care system? Would you use it for your parents and why?

Participant: Yes, I would use it for my parents because they actually reduce some of my burdens when taking care of them during the time I am not at home.

Interviewer: Is customization a key feature in smart home systems for personalized aged care? What would you like to customize and why?

Participant: That's good because it can set a reminder function like give a reminder to old people and my parents to take medicine when I am not at home.

Interviewer: What do you think should be a priority when designing a smart home system for old people? Why?

Participant: Definitely it should have a sound-based system to have voice control because old people now know Mandarin and dialect more, so the voice control of the smart home system should include the voice control through dialect. And also the bigger font of the apps. *[VOICE, VOICECONTROL]*

Interviewer: Could you name a few challenges that could be addressed by smart home technology in aged care? Do you have any suggestions to overcome it?

Participant: The main issue I think is that aged care system for the people used to take care of the elders, parent to take care is ok. The problem is when you need to apply this smart home system on your parents like your parents need to take medicine when you are not at home, they don't know how to stop the alarm or the reminder on the apps.

Interviewer: What are the features that you would find useful or would be interested in for an aged care system? Why?

Participant: Why they will have the feature…okay.. Actually it is convenient for the elder/old people to control it and help to remind the old people to take medicine, then to go take shower or do something.

Interviewer: What is the most effective notification system that you could think of for elderly users? Why?

Participant: Voice-based system because it can speak out and remind people like using voice, not a sentence on the screen. *[VOICECONTROL]*

Interviewer: Imagine a futuristic pet care system for smart homes. What sci-fi feature or capability would you love to see integrated into this system for your pets?

Participant: Definitely it should help on feeding, grooming and cleaning, and taking a bath because it is a dangerous(challenging) action to the pet owner. *[BATHEPET]*

Interviewer: If automated pet care systems were designed to be sustainable and eco-friendly, what features do you think it could incorporate to maximize energy efficiency or reduce their environmental impact?

Participant: Pet owner have a very struggling problem because they have to clear the poo and crap, so if the smart home system can help to convert to the poo become the organic fertilizer should also can help to reduce the pollutant.

Interviewer: Do you believe that the use of automated systems would throw off the balance of you and the system providing personal attention and care to your pets? (Are there ways to improve this balance?)

Participant: I think it is half half because machine only can provide the physical need but the mentally need is cannot replace by machine and the system.

Interviewer: Are there any concerns you have regarding the safety and well-being of your pets when relying on automated systems in a smart home?

Participant: Yes. They will wait in front of the feeding machine; they will not request the need from the owner. And then they will attack the feeding machine if they are not fulfilled their feed

Interviewer: Can you suggest any specific enhancements or new features that would make automated pet care systems more valuable to you as a pet owner?

Participant: Yes, definitely I need the translator because I have a various type of pets like the fish, cats and tortoise. I need to know more what they want and what the need. Because the fish is just keep quiet and swim,swim. I don't what they want and that's the problem.

Interviewer: What type of biometric authentication do you prefer (Fingerprint, face recognition, password, access card, key)? Why?

Participant: I would prefer eye recognition because it is convenient and fingerprint maybe affected when I touched the verification path, they may have some dusts which may affect the working and also the face recognition will not look like same everyday as girls got make up and emotion also affect the working. *[EYERECOG]*

Interviewer: Are you comfortable sharing your personal data with the smart home system? If yes, then will you allow it to record your daily activities? If not, then why?

Participant: Actually it is half half because I don't concerns share my privacy on online websites. But to enhance the system to make it better, it is a need, compulsory as I share the data like the challenges I faced is every morning before I go work every day, I don't have enough time to prepare my breakfast and don't have enough time to do some household. If I can share the data to the system, maybe it can help to enhance and control the time limit like it can help to prepare my breakfast before I go working before ten minutes I go out from my home. I can control the vacuum machine everyday from 10am to 12pm because the system will know that this time won't have people in my home, it can directly control the vacuum machine working. *[ANALYSE]*

Interviewer: Do you prefer your smart home system to have a children-friendly mode? Why? (PS: children may lead strangers to their home without parents' permission)

Participant: First, I don't have the child. And at the second, I NOT agree and I don't prefer to let the children use because they may trust in strangers and scammers, then I cannot control. What if they use my account share my data to scammers. What if they use my e-wallet to buy something. This is dangerous and uncontrollable. *[CHILDSAFETY, HACKER]*

Interviewer: What do you think a smart home system security feature should include? Why?

Participant: The motion detector system should be included because when stranger is approaching my house and try to get into to my house. I hope that the system can detect the motion that people get in my house and then send notifications to my handphone, so I can know that someone get into my house and I can call police at that time. *[WARNINGNOTI, OUTER-MOTION]* Not like after I go back home and I saw and I found it, then I try to call police and also

what if can give the warning like ring the buzzer to alert them and my neighbor and then the strangers will get out from my house.

Interviewer: How much control do you want your smart home system to have?

Participant: No matter how much system in my house. I just want to control everything through my handphone because now handphone is the necessity in my life. I just need one clip to control everything. That's all. Simple and easy.

Interviewer: In your experience, what are some effective design patterns that could enhance the security of smart home systems? (answer some specific questions, setting primary user,…)

Participant: Usually people just open the app and do control smart home system. If I cannot sign in and log in to my system, there is an error of the system, maybe they can do double or triple verification like setting up bio-data like fingerprint, and second Gmail verification and third it can use like answering the security question because like we have three verification then the people not easy to access and entry to pass my system and control the things because it could not.

Interviewer: Thank you for your time and valuable input. Is there anything you would like to add that we haven't mentioned?

Participants: Okay. From the questions, I can find that the systems are potential like the pet feeding system because nowadays a lot of people feeding pets and then they not just one pets, two, three, four and also got so many type of pet like fish, turtles and cats. Just like I said just now, they can feed them in one sound on the same time, so they improve the system make it easy to use. *[AUTOFEEDER]* And the last one they should include the security system, which is the most important one.

Interviewer: Thank you so much.

3.3 Transcript 3

Participant 3: Female, 21, student, has a dog

Interviewer: You can go through this consent and sign if you agree, and you can verbally read these statements.

Participant: I have read and understood the Participant Information (dated 7 Nov 2023) and have had the opportunity to ask questions about the study. I agree to take part in this study. I understand my participation is voluntary and I may withdraw at any time and for any reason.

Interviewer: Firstly, do you understand what a smart home system is?

Participant: Vaguely, but not very distinctly or clearly.

Interviewer: Ok, so a smart home is a home embedded with different electronic devices to allow you to control the lights, air conditioner, fan, and so on, by using voice command, or through a phone application to make it easier for you. The following questions will be about this, do you understand, or would you like further explanation?

Participant: Yes, I understand.

Interviewer: So, let's move on. Could you start by telling me whether you think that smart home technology could improve the quality of care systems, such as systems to take care of elder people and children?

Participant: Yes, I do believe that smart home technology can improve the quality of the care systems. For children, I believe that smart homes can definitely aid parents, look after their children when they are away, especially if both parents are away for work for a long period of time or from morning to night. Also, it could ease the burden on the parents also if there is something such as security systems embedded in the smart home. So, if any emergency happens, the parents will know immediately and this goes the same for the elderly, especially grandparents because they always have emergency situations, such as medical conditions that require urgent

care, or for example, if they fall, because grandparents cannot pick themselves up most of the time, so they need someone to help them. So, something like a smart home can aid in this type of situation.

Interviewer: If that is the case, would you use it for your grandparents and why?

Participant: For me, I think I would most likely use it for grandparents, because they always face emergency situations, and a lot of the times, if grandparents are not sent to an old folks' home, they are left alone at house and sometimes, they are too weak to call for help, as I have experienced that before. *[SAFETY]* So, I think smart homes can help adults that are away and if anything happens, the smart home can also notify the adults and they can rush back to their house immediately. *[WARNINGNOTI]*

Interviewer: Do you think customization is a key feature in smart home systems?

Participant: Yes, I do believe for smart homes, customization is quite important because every household's needs are different.

Interviewer: What would you like to customize and why?

Participant: I think the first thing I would like to customize for my smart home is security features, because in this day and age, a lot of data would need to be collected for the sake of efficiency as the more data the system has on a certain household, the better that smart home can predict the behaviors of the household. However, this is, to some people, an invasion of privacy. So, I would like to be able to customize what kind of data the smart home can collect from me and my family, and who is allowed to view this kind of data. *[PRIMARYUSER, CUSTOMIZESECURITY]*

Interviewer: What do you think should be a priority when designing a smart home system for old people?

Participant: I think one thing would be something like security cameras that I can view at any time through digital device like a phone, and also something like a notification that can either

remind the elderly, or remind anyone else that is looking after the elderly to take their medication on time. *[VIDEOSYSTEM, VIDEO]*

Interviewer: Could you suggest a few challenges that could be solved by smart home technology in aged care?

Participant: I believe one of the challenges, as I mentioned earlier in the interview, is accidents, especially when it comes to elderly falling constantly because there's always medical conditions related to that. So, one way the smart home can address this is they will be able to detect certain unusual behaviors of the elderly based on their daily routine. And, if they believe that the elderly is in danger, or is in urgent need of medical care, it will send a notification to either the people caring for them, the adults or grandchildren or anyone, and they'll be able to know immediately and they will be able to either call an ambulance, or rush back home. *[NOTIFICATION, INNER-MOTION, SAFETY]*

Interviewer: Could you suggest some features that you would find useful or interesting in aged care system?

Participant: I think one useful feature would be reminders to either go for hospital checkup, or reminding the elderly to take their medication on time, because most of the time, the elderly themselves will forget, especially if they are facing mental issues like Alzheimer's, but also especially for the people caring for them, because caring for elderly is a very tough job, so this kind of notification system from a smart house would definitely be very useful. *[MEDICATION]*

Interviewer: What is the most effective notification system that you could think of for elderly users?

Participant: This one relates to the previous answer that I gave, which is medication notification reminders, and I think another notification system that is also quite effective would be whether the elderly has gone out of the house or not, because I noticed another problem with elders is, also because of something like Alzheimer's, they would often leave the house without warning, and the smart home could easily detect whether the elderly has gone out of the house, or is going

to go out of the house, and maybe perhaps they would also be able to lock the doors, or sound an alarm to the neighbours or to the people caring, so they would be able to stop the elders from going outside and endangering themselves. *[NOTIFICATION, AUTOLOCK]*

Interviewer: Now, try to imagine a pet care system for smart homes. What features would you suggest to include into this system for your pets?

Participant: I think for pets, the first thing that comes to mind is automated feeding systems, because for example, if I am away for an entire day or even for a long period of time, I would like to have a pet care system that can help feed my pets on time. Also, I think another good feature to have would be able to detect whether my pet is sick, and then it would be able to contact the clinic and book an appointment.

Interviewer: If pet care systems were designed to be sustainable and eco-friendly, what features do you think could maximize energy efficiency or reduce their environmental impact?

Participant: For an automated pet care system, I think having solar panels would definitely be more eco-friendly because it uses outside energy and incorporating a battery saving mode when it's not in use, because a lot of the times these automated pet care systems only work during certain times, for example, feeding times or when the pet has gone to sleep or something like that, depends on the security system. So, I think having that kind of battery saving mode will definitely reduce the environmental impact. *[SOLAR, ALGORITHM]*

Interviewer: Do you think that using pet care systems would be hard to maintain the balance of you and the system providing attention and care to your pets?

Participant: I think for the most part, no, because automated systems they would only need to handle certain daily routines. However, an automated system would not be able to, for example, take my dog out for a walk or actually bonding with my pet during our free time. So, I think there will be a fine, good balance between the automated care system caring for my pet and for me actually caring for my pet.

Interviewer: Are there ways to improve this balance?

Participant: I think for automated pet care system, we as owners shouldn't rely too much on this kind of systems. For example, feeding times and also watching over our pets when we're away, for example through security, camera or sensors are reasonable enough. However, we should also spend time with our pets, for example actually playing with them and making sure they are not sick ourselves, not just through a system in the house, because that could also fail some of the time. So, I think that's a way to keep the balance.

Interviewer: Then, do you have any concerns regarding the safety and well-being of your pets if you rely on automated systems?

Participant: I think there's definitely a big concern, even though technology right now is really advanced, especially with AI (Artificial Intelligence) and ML (Machine Learning) and all. However, these systems could always fail, no matter how fail-proof they are, and if we rely too much on this kind of automated system, for example, if we are leaving our pet alone at home all the time, that is also quite irresponsible as a pet owner. So, I think it is better if there is a security system installed in this kind of automated pet care system, we should not be overly reliant on it anyway. Just make sure your doors and windows are locked anyway, and the security system is just a second measure. *[MALFUNCTION]*

Interviewer: Could you suggest some enhancements or new features that would make automated pet care systems more appealing to you as a pet owner?

Participant: I think another enhancement or feature I think would make it more attractive is definitely a security system, because if I'm away, for example, for a week, and then I don't have anyone to help look after my pet, and I also can't send them to a pet hotel or anything like that, I think having a proper security system that is linked to my phone and, maybe it can also be linked to a trusted neighbor's phone as well, just to make sure my pet is properly at home and has not escaped. So, in relation to that, I would also appreciate a feature that detects whether the pet has gone out of boundary from the home and would immediately alert the authorities if, under the second stance, it really does run away. *[MONITORPET]*

Interviewer: As you've stressed a lot about the importance of security, so what type of biometric authentication do you prefer, such as fingerprint, face recognition, password, access card, keys?

Participant: I think the biometric authentication I'm most comfortable with is fingerprint and password.

Interviewer: Could you elaborate more why you choose these?

Participant: I think it's because we're more used to fingerprints through our smart phones, and password is also very commonly used in smart phones, which is why I'm more inclined to do that. And, as to why I don't like the others, for example face recognition, is because of a matter of personal security preference. I don't want that much information on me when it comes to authentication. And as for access card and keys, traditionally it's good but then, it could always be lost. So, I believe fingerprint and password is the best way to go. *[FINGERPRINT]*

Interviewer: Are you comfortable with sharing your personal data with the smart home system?

Participant: I think in any kind of smart home system, you always have to be comfortable to some level, otherwise we wouldn't be able to use a smart home anyway, because a smart home means collecting a certain amount of data on you and what else in the household. So, if you're not comfortable with it, then the smart home wouldn't have a purpose.

Interviewer: So, will you allow it to record your daily activities?

Participant: As mentioned before, yes, because if it doesn't record my daily activities, then the smart home wouldn't know my preferences, it wouldn't know how to be "smart", it wouldn't know what my daily routine is, it wouldn't know when to turn on the light. For example, when I wake up, when to feed my pet, maybe at night, 8 o'clock every day, so to some extent, yes, I would have to allow it even if I don't really like it. *[ANALYSE]*

Interviewer: Do you prefer to have a children-friendly mode in your smart home system?

Participant: I believe yes, especially if I have children at home, I think having a child-friendly mode is definitely better because children are quite smart. They may or may not be able to have access to the smart home system if it's on a cell phone, because children are smarter than we think. So, definitely, as a lot of applications having a child-friendly mode, would definitely help.

Interviewer: What security features do you think a smart home system should include?

Participant: I think one of the features would be sensors and also cameras, because I believe cameras and sensors kind of go hand-in-hand. For example, if there is a sensor, then the smart home would detect someone coming in, and then that would automatically, in my mind, turn on the security camera to see who is there, because I believe that is also a feature for a lot of already built security systems, as you wouldn't want the camera to be on 24/7, which is also kind of a privacy issue, so having a sensor plus the camera would definitely be more efficient.

Interviewer: How much control do you want your smart home system to have?

Participant: I think this is a kind of a balance between convenience and also personal privacy, because the more convenient you want, the less privacy you'll be able to have, and if you want more privacy then it will be less convenient, in a sense of a smart home, so it's very much a give or take thing. So, if it came down to me, I think I would rather have more privacy than more convenience because I think there's always a limit to how much control the smart systems should have over my home, because what if there's a hacker that hacked into my system and knew every single thing about the household if I give it 100% control, as owners, we also have to think about that danger, so I think having a 50%-50% balance, or more privacy compared to more control is a better way to go. *[HACKER]*

Interviewer: In your experience, what are some effective design patterns that could enhance the security of smart home systems?

Participant: I think one design pattern would be two-way authentication, because, again, this has also been implemented in quite some, for example, banking systems, they always want two-way authentication just to make sure it's you that is accessing the system, for example if you want to

customize anything. And also, one thing would be having a firewall and also educating users on how to actually protect themselves while using the smart home. *[CYBERSECURITY]*

Interviewer: That's all for our interview. Thank you for your time and valuable input. Is there anything you would like to add that we haven't mentioned?

Participant: I think I've covered everything I need to do, so no.

3.4 Transcript 4

Participant 4: Woman, 20, student, has two dogs

Interviewer: Now, you may read through the consent form and read the statements verbally if you agree to this consent.

Participant: I have read and understood the Participant Information (dated 7 Nov 2023) and have had the opportunity to ask questions about the study.

I agree to take part in this study.

I understand my participation is voluntary and I may withdraw at any time and for any reason.

Interviewer: Firstly, do you understand what a smart home system is?

Participant: Yes

Interviewer: Then, we will proceed with the interview. Thank you for joining me to talk about smart home systems. Could you start by telling me whether you think that smart home technology could improve the quality of care systems, such as systems to take care of elder people and children?

Participant: Yes, I think that there is potential in smart home technology to improve the quality for care systems, such as enhancements in security and medication management.

Interviewer: Then would you use it for your grandparents and why?

Participant: I would consider using it for my grandparents, as I will feel more secure when they are alone at home, and I do not need to worry about their safety and health if there is medication management that will remind my grandparents to take their medicine on time. *[MEDICATION]*

Interviewer: You mentioned about reminders to take medicine. What is the most effective notification system that you could think of for elders?

Participant: I think that the simplicity and ease of use should be prioritized when designing a notification system for elders. I would recommend wearable devices as it is light, easy to wear, and it could be worn for all day. However, it might require charging or changing batteries, so incorporating a speaker that would announce a reminder to take medication based on the schedules might be a better solution. *[VOICE, UNFAMILIARITY]*

Interviewer: Do you think customization is a key feature in smart home systems?

Participant: Customization is indeed important in smart home systems because many users have different needs, preferences and lifestyle.

Interviewer: If that is the case, what would you like to customize and why?

Participant: I would prefer to customize security and privacy settings, as I am more concerned about personal safety. For example, customizing user permissions and guest access, notification preferences, setting privacy zones and auto-lock settings. *[CUSTOMIZESECURITY]*

Interviewer: What do you think should be a priority when designing a smart home system for elders?

Participant: I would prioritize their safety and health monitoring as there are various cases where the elders passed away due to incidents when they are alone. So, the system should include features that could ensure their safety.

Interviewer: Could you suggest some features that you would find useful or interesting in a smart home system?

Participant: I think that the features that could ensure their safety would be useful. For example, fall detection, emergency buttons, monitor their vital signs and provide warning to their guardians if any unusual activity is detected. As for interesting features, I would suggest integrating interactive cognitive game that could help maintaining the mental health and memory of elder people. Besides, financial management tools that could assist their owner with bill payments, budgeting and financial planning would be quite appealing too.

Interviewer: Could you suggest a few challenges that could be solved by smart home technology in care systems and ways to overcome them?

Participant: Sure. I think that falls and accidents are a major concern for the elderly, especially when they are staying alone. Fall detection sensors could be installed in the smart home system and the guardians would be alerted when any unusual activity is detected. Emergency calls that are voice-activated could also be included so the elderly could seek for help immediately too. *[EMERGENCY, INNER-MOTION]*

Interviewer: Ok, now let's talk about pet care systems. Try to imagine a pet care system for smart homes. What features would you suggest to include into this system for your pets?

Participant: The feature that I would love to include is automated feeding. This would be convenient for the owners that are busy at work or on business trips. There could be food dispensers that would dispense food based on the schedule and portion set by the owner. As for water, I would prefer that the water dispenser could provide water all the time so that my dog would stay hydrated. *[AUTOWATER, CUSTOMFOOD]*

Interviewer: If pet care systems were designed to be sustainable and eco-friendly, what features do you think could maximize energy efficiency or reduce their environmental impact?

Participant: I think that energy-efficient components such as low-power motors could be applied in the design and solar power could be used. Besides, energy usage could be optimized by letting the devices go into low power modes when unused. *[SOLAR]*

Interviewer: Do you think that using pet care systems would be hard to maintain the balance of you and the system providing attention and care to your pets?

Participant: In my opinion, I think that the bond between me and my dog would not be affected by the system as there are some activities that could not be done by the system, such as taking my dog for walks and playing with it.

Interviewer: Are there ways to improve this balance?

Participant: Although the pet care system could take care of my dog, I would still spend time with it whenever I am free as this system is only an approach to ensure my dog's safety and health whenever I am busy. For example, I would feed my dog myself whenever possible instead of relying on the automated feeding, bring my dog for walks and play with it.

Interviewer: Do you have any concerns regarding the safety and well-being of your pets if you rely on automated systems?

Participant: Yes, I am concerned about technical failures, such as electricity shortage and malfunctions of the devices. This may disrupt some critical functions like feeding, monitoring and security features. Hence, I would prefer to have a backup plan such as applying solar panels and have regular checking for the devices.

Interviewer: Could you suggest some enhancements or new features that would make automated pet care systems more appealing to you as a pet owner?

Participant: As I have two dogs, I would like to implement biometric identification to ensure that the system responds correctly as the food and the portion is slightly different for both of them. Other than that, I would like to be able to have video calls with them even if they are alone at home, without requiring the assist of other family members. *[CUSTOMFOOD]*

Interviewer: I noticed that you have put a lot of thought into security concerns. What type of biometric authentication do you prefer, such as fingerprint, face recognition, password, access card, keys?

Participant: I would prefer face recognition and fingerprint recognition as they are more convenient and unique. Personally, I think that these two are more user-friendly as it is easy to use and we always have our face and fingerprints along with us, which would be helpful for people that are forgetful. *[FINGERPRINT, FACERECOG]*

Interviewer: Are you comfortable with sharing your personal data with the smart home system, such as your biometrics and daily activities?

Participant: Yes, I think that sharing some personal data is helpful for it to have a better performance.

Interviewer: Do you prefer to have a children-friendly mode in your smart home system?

Participant: Yes, children-friendly mode could ensure their safety and this mode might help in enhancing their ability to interact with the smart home system as the user interface would be simpler to understand. Also, parents could set restrictions and monitor the usage so that the children would use the system properly. *[CHILDRENMODE]*

Interviewer: What security features do you think a smart home system should include?

Participant: User authentication is important to make sure that only authorized users have access and can control the system. Remote monitoring should also be included so that the users are able to monitor their home and receive alerts for unusual activities. *[PRIMARYUSER, REMOTE]*

Interviewer: How much control do you want your smart home system to have?

Participant: Personally, I would prefer automation for my smart home system. For example, the smart home system should handle daily activities like adjusting temperatures, turning on and off the lights and managing security based on the schedules that have been set.

Interviewer: In your experience, what are some effective design patterns that could enhance the security of smart home systems?

Participant: In my experience, I would recommend encrypting the data using end-to-end encryption to prevent eavesdropping and ensure that the data is unreadable even if it is intercepted. Secure communication protocols should also be used, such as HTTPS for web applications and WPA3 for Wi-Fi networks. *[CYBERSECURITY]*

Interviewer: Thank you for your time and valuable input. Is there anything you would like to add that we haven't mentioned?

Participant: You are welcome, and no, I think that's all from me.

3.5 Transcript 5

Participant 5: Male, 45, working in the computer science industry for over 15 years

Interviewer: Good day. Thank you very much for agreeing to participate in this interview. This interview is performed by us, myself, Arun, and my group members, who are under the year two of BSc of computer science at the University of Southampton, Malaysia. This interview is for a project that we will be producing a smart home application, which can aid caretaking of youth elderly and pets, hence respective questions will be asked. May I please request for your verbal concern before I start the interview? If you wish to not answer any questions or stop the interview prematurely, please just state so. Do you please give your consent.

Participant: I'll give you, my consent.

Interviewer: Okay, thank you very much. I'll start with a few general questions before going into the elderly youth questions, pet-related questions and any temperature and security questions. So, can I start with just asking you, do you know what a smart home is? A simple yes or no would do.

Participant: Yes, I know.

Interviewer: Okay. Would you be interested in having a smart home that can take care of those under you or yourself?

Participant: Not the full smart home, but only some features.

Interviewer: What features would you be looking for and what would you not?

Participant: For me, the things I'm looking for, be like cameras, cameras, those, you know, when you're on off switches, those on off fan lights. Yeah, they're good. And maybe renewable energy.

Interviewer: Given the situation that you could have a smart home that can take care of the dependence, would you trust a smart home to do something like that?

Participant: Not 100%

Interviewer: but would you be okay to depend slightly on it?

Participant: Slightly it depends. Maybe 50%, 50%, but not more than 50%.

Participant: Okay, understand. Okay, so now I'll just ask you some questions in regards to taking care of either elderly or youth. You can interpret it on what's more convenient to you as in either a child or an elderly. So, the first question would be, would smart home technology significantly improve the quality of care you give to any dependent?

Participant: Yes, it will.

Interviewer: How so?

Participant: So, take for example, turning on lights, some elderly people, they can't walk to a switch, or they can't walk that much to access a lot of things. So those remote on and off buttons that we can have using your phone to turn on, maybe not a phone but a tablet probably. Those kinds of features will be useful for elderly people, for youth like child and all that. *[REMOTESWITCH]* Certain safeguards like you can't turn on the switch on your own like you know with a parent. You know when you want all the TV, you need better dealt approval before you want the TV or even go to certain channels here. So those kind of features in smartphone, the smartphones can be useful for youth. So, they don't simply access dangerous areas during certain times and things like that. So that's how I would see quality of care being improved.

Interviewer: So, then that would also be a priority when designing if am I correct?

Participant: Yep. Alright. Safety accessibility.

Interviewer: Alright. So, in the scenario that smartphone technology is developed in like in age care as in young and old, is do you think there will be any challenges and if so, what challenges do you think that there will be as a user?

Participant: So, problems that I'll have with an existing smartphone is the adaptability to my pattern of usage. So, take for example, which areas do I consider as dangerous areas for youth not to access? Different homes are designed differently. So, you can't have one smartphone fit all houses. So, let's say if I have a very old house, where there's no smart, I mean a very old house where when I say like over 70 years old or things like that, before even the smartphone concept came about. So those houses you want to implement a smartphone is very difficult because the power supply, the switches and all that are already different.

Interviewer: And yeah, understand. So then obviously, as you mentioned, there's no, there's suggestion, you can't really do anything about the older ones, but do you think that smart homes will be able to be implemented to the current and modern houses effectively?

Participant: Based on what I see in the market right now, even if you don't have a smart switch, there are solutions for those kinds of switches. So yeah, I would say with the new and these days, the switches are all standardized in design. So, it is easier for the new houses to adapt to smart home.

Interviewer: Okay. Say you have an elderly or youth under your care, and there's a notification system for any alerts, what would you prefer? Like would you prefer a buzzing to smart your smartphone, smartwatch or somewhat alarming the house? What would you prefer?

Participant: So, it depends on who is going to be the host notification for. For example, if I'm an adult, and I have an elderly person and a youth baby. So, for the elderly person who has got like hearing problems, things like that, that vibrator on your smartphone or watch could be useful. People like me, there are also those cameras and SMS and WhatsApp notification. The cameras see what's going on in the house. And the notifications are always telling me if there was a power trade, or something happened and things like that. So, it depends on who's being notified. So, if I got an elderly person in the house and someone is to notify the elderly person and who got hearing problems probably, and what would be an ISI problem, they must have some kind of buzzer, some kind of voice and some kind of simple alert, like you know, those siren alerts. So, because I have an auntie who's in West Alzheimer's. In her house, she tends to think that night-

time is early morning. So, whenever she opens the door, there'll be an alert that says that it's, you'll inform what time you sit, and you're not supposed to go out. So, then she'll realize that she not supposed to go out. So that's also a type of smartphone for Alzheimer's people.

Interviewer: Alright. Thank you very much for the for the elderly and youth section. I'll just move on to some pet related questions. First, do you have a pet right currently or have had a pet in the past?

Participant: I have had a pet in the past.

Interviewer: Alright. Just some simple questions and since it's not in the present. Imagine that there's a futuristic pet care system for smart homes. Let's say that there's any capability in the sci-fi features you can think of. What would you like to see in a system for your pet if you had one?

Participant: Well, there'll be two things here. Let's say if my pet is a dog because different types of pets could different types of features than you may want. So, for a dog, I would have the automatic food dispenser and water dispenser. So, whenever they are food is, whenever it's time for you to eat or drink, that their bowl is always replenished. And for a dog that is very active and things like that, there is that automatic throw you're holding. So those kinds of toys where they are self-managed toys, or maybe like an android that acts a mouse or something like that, that can run around so that the cat can be active and occupied, preventing them from doing any damage to the furniture and things like that. So, with the type of things that I would like to see in a smart home. *[AUTOFEEDER, AUTOWATER, TOYPET]*

Interviewer: Would you personally think that want it to be sustainable and eco-friendly if it were to be implemented?

Participant: About the pet related question?

Interviewer: As you said, automatic feeders and things, it's something that it needs to be active is energy and eco-friendliness, like a matter for you for pet-related smart applications.

Participant: So, these applications for the pet especially I don't see consuming that much of energy because it's on the timer basis you can automatically turn on and turn off. But yeah, I mean as long as it's the material that is that's used to build these things are sustainable and it doesn't consume that much of energy then it should be okay.

Interviewer: All right. Do you think that if you use these automated systems to take care of your pet, do you think the like relationship between you and your pet will be affected because obviously the person or attention will be less you won't be directly giving your pet the food and such?

Participant: So, the way that I look at this is that these automated systems are only useful when I'm not in the house. Yeah, but if I'm in the house I usually won't depend on this system So when I'm in the house or present in the house, I would feed my dog food watering my food put water myself, play with my dog myself. So, these systems are only replacement when I'm not a present.

Interviewer: Alright. Do you would you have any safety concerns of your pet on relying on automated system?

Participant: Because pets do not understand their environment, especially, robot vacuum cleaners. And those kinds of things. So, they might be intimidated by that kind of technology in the house. So, they might get hurt by that kind of smart home technology. But in terms of like these dispensers and even the toys, some toys, if they were to not implement properly and start throwing things in the hazard zone. So that can cause harm to the pet as well. So those kind of safety concerns is what I have. *[MALFUNCTION, PETHARM]*

Interviewer: Okay. So that's it for the pet for the section for the pets. And lastly, there's just a few general questions for temperature and security related. So just to start off, what biometric authentication do you prefer?

Participant: The ones that I prefer are usually fingerprint picture recognition. So those are biometrics. But the past one access card and key sometimes you might lose it. And when you lose it, then other people access them, they can get access to your, to you, home. So, for me, I'm more

comfortable with fingerprints and facial recognition. That's also voice and iris recognition. So that kind of biometrics is better. *[FINGERPRINT]*

Interviewer: Right. In the scenario that a smart home is implemented for you, are you comfortable with sharing your personal data as in allowing you to record your daily activities and so.

Participant: No, not at all. And the reason being currently technologies like Alexa nest. Where they observe your patterns of activities in your house. And they will use that data to transmit back to Amazon or Google. And they start predicting all your next activity. So yeah, I'm not very comfortable with what I do in my home to be shared also. So, in the terms of recording activities, you would provide enough to record at all. So, so just the thing because when it comes to recording, right, if the smartphone design is like a hive mind. I'm not very favourable. That is where it collects every time sending to some hive and they make decisions there. But if the intelligence can be localized to the home only. So, it means like if detects my patterns and then start making decisions on its own. I'm probably more comfortable with that, but even then, also requires AI and machine learning. So, I'm not sure how well that can be implemented that is not like hive mind.

Interviewer: All right. Okay, so the next question is what's the mean security feature you would like in your smartphone. Smart home. Yeah, in a smart home system, what's your mean security feature that you would like it to like to release the end up. It can either be like the security of entrance and exit or something like as you said, the data privacy kind of security of not allowing any hackers in what your priority would be.

Participant: So, the two side types of security I want first is intuition detection. So, anyone breaking into the house. I want my smartphone to be able to detect and get the kind of issues like for example, sounding the alarm in for me the police and things like that. The other type of security is the software and ID security. It's like my house being defended by a firewall. That people cannot just come in by the Wi-Fi or pack my Wi-Fi switch and come inside. So that to

expect the one is the physical inclusion detection and another one is the firewall for Wi-Fi. *[CYBERSECURITY, OUTER-MOTION]*

Interviewer: All right, just a final question before I end this interview. Let's just give this on. Can I please have your answer for discussion in like a percentage of like how much you would want control and how much your smart home should have control. So how much control do you want over your smart home to have over your house in terms of you versus the AI.

Participant: This one I don't know how to answer it in percentage, but because different scenarios, the percentage are different. Like for example, keeping track of our fridge food. So that one I want my AI to 100% control it. There is not how much food is in the fridge. What is lacking? You know, you want me to buy this. Same goes for prescription drugs and consumables are basically. So, that one 100% my smart home to manage it. I just going by and fill it up whenever it's. But things like controlling the temperature of the shower. Controlling the temperature of the room. I may not want the system to be 100% managed by the AI. I probably want some control already. So, like for example, if there's nobody in the house, I want my AI to off the temperature and everything. The icon and everything. But if there's someone in there, what temperature the person wants. So, I would say 50 50 between the AI and users. *[ANALYSE]*

Interviewer: So, to you, it's important that you can set which areas you have more control in which areas that AI has more control.

Participant: Yes, I mean, some things are I want it to be my peripheral and I don't think about it. But there's some things I wanted to be in front of my attention to. To make sure it doesn't get awkward. Or doesn't get uncomfortable.

Interviewer: Alright, those are all the questions we have. Is there anything you'd like to add on in general?

Participant: So, based on this set of questions and the project that you're doing. Smart homes may have a lot of aspects to it. And those aspects to the smartphone may be related to the elderly, the bad security and temperature. Things like power source, water source, utilities

basically. And then that things like. So that's the power. I mean, that's the utilities and then that's the environmental like floods in immaterial natural disaster areas. So, spot homes can do more to protect that. Which take for example, like in natural disaster areas, it's raining too much. The home knows that it's going to be a flood coming. Or if there's a high-grade wind. Then they know there's a tornado. So those kind of predictions for the smartphone can be important. Because sometimes the government takes up a like Hawaii and all that. Whenever there's a brush fire and things like that. The homes are always the last people to know. So, the smartphone can be like an early warning, early detection warning system. All right. Thank you very much for your insight. Yeah.

Interviewer: That with that, I would like to conclude this interview. Thank you very much for your time.

3.6 Transcript 6

Participant 6

Interviewer: Now, the first question. Do you think that smart home technology can improve the quality of the care system significantly?

Participant: Undoubtedly, smart home technology holds immense potential to elevate the quality of the care system, particularly for the elderly. The continuous monitoring of health metrics, coupled with timely reminders for medications or medical appointments, can greatly enhance the overall care experience. For instance, if a smart system detects a potential health issue or a missed medication, it can promptly alert caregivers or healthcare professionals, ensuring swift intervention. This not only fosters a proactive approach to healthcare but also provides a sense of security and independence for the elderly individuals.

Interviewer: In your opinion, do you think that customization is a key feature in smart home systems for personalized aged care? If you agree, could you give some features you would like to customize and share your reasons?

Participant: Customization is paramount in smart home systems for personalized aged care. The ability to tailor the system to an individual's specific needs and preferences is a game-changer. For instance, customizing reminders based on medication schedules or personal routines ensures that the system aligns seamlessly with the user's lifestyle. Personalized health monitoring is another crucial aspect; having the flexibility to track specific health indicators relevant to an individual's medical conditions enhances the system's effectiveness. This customization not only makes the technology more user-friendly but also empowers the elderly to actively participate in their own care. *[MEDICATION]*

Interviewer: What do you think should be a priority when designing a smart home system for old people and why?

Participant: The top priority in designing a smart home system for the elderly should be simplicity and ease of use. Many older individuals may not be familiar with advanced technology, so

creating an intuitive interface is crucial. The system should be designed with minimal complexity, ensuring straightforward navigation and interaction. *[UI, UNFAMILIARITY]* Prioritizing simplicity not only addresses potential technological barriers but also makes the system more accessible and user-friendly for the elderly. This approach fosters a positive user experience, encouraging widespread adoption among the aging population.

Interviewer: Could you name a few challenges that could be addressed by smart home technology in aged care? Do you have any suggestions to overcome them?

Participant: Several challenges in aged care can be effectively addressed by smart home technology. One notable challenge is medication adherence. A smart system can provide customized medication reminders and even dispense pills at the right times, significantly improving adherence rates. Another challenge is the timely detection of health issues; continuous health monitoring through the smart system can detect anomalies and alert caregivers or healthcare professionals promptly. To overcome potential technological barriers, it's crucial to provide comprehensive user training and support to ensure that both the elderly users and their caregivers can make the most of the technology.

Interviewer: What features would you find useful for an aged care system and why?

Participant: In an aged care system, a comprehensive set of features is essential. Fall detection and emergency response capabilities are indispensable for ensuring the safety of elderly individuals living alone. Additionally, integrating health monitoring features like blood pressure, heart rate, or glucose level tracking provides a holistic approach to managing chronic conditions. A medication management system that includes reminders and dispensing features addresses the challenge of medication adherence. These features collectively contribute to a robust aged care system that not only prioritizes safety but also actively supports the health and well-being of the elderly population. *[SENSORS]*

Interviewer: What is the most effective notification system for elderly users and why?

Participant: The most effective notification system for elderly users is one that employs a combination of visual and auditory cues. Visual indicators, such as notifications displayed on a centralized screen or through subtle light signals, cater to individuals with varying levels of hearing ability. Simultaneously, audible alerts, such as gentle chimes or spoken reminders, ensure that those with visual impairments can receive important information. *[VOICE]* This dual approach enhances the likelihood that elderly users will promptly notice and respond to notifications, contributing to the overall effectiveness of the smart home system in providing timely information and assistance.

Interviewer: Moving on to the next part, this section of the interview is about pets in smart homes. Imagine a futuristic pet care system for smart homes. What sci-fi features or capabilities would you love to see integrated in this system for your pets?

Participant: In envisioning a futuristic pet care system, one sci-fi feature I'd love to see is a real-time communication interface. Picture a system that allows me to interact with my pets remotely, using advanced visuals and sounds. This could include a holographic projection of myself, interactive toys controlled through a mobile app, or even a virtual environment for them to explore. The idea is to bridge the gap between physical separation and emotional connection, providing both mental stimulation and a sense of presence for our beloved pets when we're not physically at home.

Interviewer: Okay. If automated pet care system were designed to be sustainable and eco-friendly, what features do you think it could incorporate to maximize energy efficiency or reduce their environmental impact?

Participant: Creating sustainable and eco-friendly automated pet care systems involves integrating energy-efficient features and reducing environmental impact. For instance, energy-efficient sensors could minimize power consumption while still providing effective monitoring. *[EESENSOR]* Additionally, incorporating materials that are easily recyclable or biodegradable in the construction of pet-related devices contributes to reducing environmental footprint. An automated system could also include smart scheduling algorithms to optimize energy use,

activating specific functions only when needed. *[ALGORITHM]* These features collectively make the system not only pet-friendly but also environmentally conscious, aligning with the broader trend towards sustainability.

Interviewer: Do you believe that the use of automated systems would throw off the balance of you and the system providing personal attention and care to your pets? Are there ways to improve this balance?

Participant: There is a potential concern that relying on automated systems might disrupt the balance of personal attention and care for pets. However, I believe that it's more about how these systems are integrated into our daily routines. To maintain a balance, it's crucial to supplement automated care with dedicated quality time. This could involve setting aside specific periods each day for interactive play, walks, or simply bonding with our pets. Additionally, incorporating features in automated systems that simulate human interaction, such as recorded voice commands or programmed play sessions, helps bridge the gap. Ultimately, it's about finding a harmonious blend of automated assistance and genuine personal connection.

Interviewer: Do you have any concerns regarding the safety and well-being of your pets while relying on automated systems in a smart home?

Participant: Certainly, one concern is the potential for technical malfunctions or system failures that could impact the safety and well-being of my pets. It's crucial to have fail-safes and regular system checks to ensure that automated devices function as intended. Another concern is the loss of the human touch, as automated systems might lack the nuanced understanding of a pet's behavior. To address this, incorporating features like emergency shut-offs, remote monitoring, and integrating AI algorithms that learn and adapt to individual pet behaviors can mitigate these concerns. Striking a balance between automation and human oversight is key to ensuring the safety of our furry companions.

Interviewer: Can you suggest any specific enhancements or new features that would make automated pet care systems more valuable to you as a pet owner?

Participant: Enhancements that would make automated pet care systems more valuable include advanced health monitoring capabilities. For instance, integrating sensors that can track vital signs, detect early signs of illness, or monitor dietary patterns could provide invaluable insights into my pet's well-being. Additionally, incorporating interactive features like treat dispensers or customizable play sessions adds an element of enrichment to their daily lives. Cloud connectivity that allows real-time updates and remote control via a smartphone app ensures that I can stay connected and intervene if needed. These enhancements collectively make the system more comprehensive and tailored to the individual needs of my pets.

Interviewer: For the final part of this interview, this section is about temperature and security-related questions in smart homes. What type of biometric authentication do you prefer? For example, fingerprints, face recognition, password, access card, and many more. Why?

Participant: I prefer biometric authentication, particularly face recognition. It's convenient and secure, eliminating the need to remember passwords or carry physical keys. Face recognition is non-intrusive and provides a seamless entry process. However, it's crucial to ensure robust security measures to prevent unauthorized access and protect personal information. *[FACERECOG]*

Interviewer: Do you feel safe sharing your personal data with a smart home system? If so, will you allow it to record your daily activities?

Participant: I am comfortable sharing certain personal data with the smart home system, such as necessary information for security and customization. However, the extent to which I allow recording of daily activities depends on the purpose and how the data is handled. Transparency about data usage and robust privacy settings are essential. I would be more willing to share data if it contributes to system improvement and customization rather than for external purposes.

Interviewer: Do you think that it’s a good idea for smart home systems to have a children-friendly mode? Why? Also keep in mind that children may lead strangers to their home without parent’s permission if they are not careful enough.

Participant: Yes, a children-friendly mode is important for added security. Children may inadvertently share access codes or information, leading strangers to the home. Implementing a mode that restricts certain functions or enhances security protocols when children are alone helps prevent unauthorized access and ensures the safety of both the children and the home. *[CHILDRENMODE]*

Interviewer: What do you think a smart home system security feature should include in general and why?

Participant: A comprehensive smart home system security feature should include multi-factor authentication, encrypted communication channels, and regular software updates to address vulnerabilities. Additionally, real-time monitoring and alerts for unusual activities ensure prompt response to potential security threats. Integrating AI-driven anomaly detection enhances the system's ability to adapt and proactively protect against emerging security risks. *[CYBERSECURITY]*

Interviewer: How much control would you want your smart home system to have?

Participant**:** I prefer a smart home system that provides a balance of automation and user control. While certain functions can be automated for convenience, having the ability to manually override or customize settings is essential. This ensures flexibility and allows me to adapt the system to my preferences and changing needs over time.

Interviewer: That’s the end of this interview. Thank you for your time and valuable inputs. Your opinions would help us to enhance the usability and user experience of out project.

3.7 Transcript 7

Participant 7: Male, 20, student

Interviewer: Good day. Thank you for agreeing to participate in this interview. This interview is expected to last at most 15 minutes. The interview will be about a potential smartphone application, which is being developed as a prototype for this for a project under year two of Bachelor of Computer Science at University of Southampton Malaysia. My group and myself will be interviewing you to ask about a smart home system, which is going to be developed, which can aid the caretaking of youth, elderly and pets. Hence respective questions will be asked. I now ask whether you give your verbal consent for this agree for this interview before I start.

Participant: Yes, I give my consent.

Interviewer: Okay, thank you very much. So, I'm just going to start with some general questions is just a quick one. Do you know what a smart home is? Yes, or no?

Participant: Yes.

Interviewer: Would you be interested in having a smart home take care of those under your care, such as your pets, maybe your future children or elderly?

Participant: Yes.

Interviewer: Would you trust a smart home system to care for your dependents?

Participant: Yes, I would.

Interviewer: Okay, so now I'm just going to ask about some elderly and youth questions. Would a smart home technology significantly improve the quality of care you can give to any dependent?

Participant: Yes, it would.

Interviewer: In what way?

Participant: Well, because my dependent doesn't live with me, so the smart home can be there for them 24/7, instead of having me to travel back and forth.

Interviewer: So, for you, it's about being able to control it virtually while they also get a care by the smart home.

Participant: Yep.

Interviewer: Okay, that sounds great. What customization would you want for the future in smart home systems for care. And what would you like to customize and why?

Participant: I would like it to be a feature, but is it a key feature? Is it key then, no?

Interviewer: As in, like, what would be an important feature for you?

Participant: Important features. I guess the most important one would be something to monitor their health and to ensure something doesn't happen or something, if something did happen, we would be notified. And things that a system daily tosses, walking and stuff. *[SENSORS]*

Interviewer: So, when you say walking support, do you mean like a physical AI robot there supporting them?

Participant: Yes.

Interviewer: All right. So, you name a few things which you find important. What do you think would be like a challenge area when creating a smart home to care for like the young or the old?

Participant: Hmm, would be a challenge area. Any examples on that?

Interviewer: An example of which is like you said, the AI which supports walking, a challenge area for that could be that the AI might not always give the perfect balance. So, it would try to move faster than the elderly's capable of which can be a programming area obviously.

Participant: I see. Then one of the challenge areas in monitoring the health would be when they take the more monitoring device off, then it would send probably a false signal or when the watch accidentally falls on, then it would send a false signal to the caretakers.

Interviewer: Do you have any suggestion to like to overcome what you think would be a problem?

Participant: Not at the moment, no.

Interviewer: All right. We'll just move on then. Let's say there's a notification system for alerts. is this something you'd want? As you mentioned, it is. And how would you want it? Would you like your smart phone to buzz? You want like the police or authority to be informed, through smart watches? What would you like?

Participant: Hmm. In this case, if something were to happen, it would most likely be a health issue. So, I would prefer it to be probably an alarm on a device that I carry, probably a smartphone or even a smartwatch if I have it. And whether I wanted to alert the authorities; I would put it as what do you call a quick dial for the caretaker. *[NOTIFICATION]*

Interviewer: Okay, so you wouldn't want it to directly contact authority, but you would like it to be an option in the scenario of an emergency.

Participant: Yes.

Interviewer: All right. So that's it for age-related questions. So now moving on to pet-related questions. First of all, can I ask do you currently have a pet or have had a pet in the past?

Participant: I have had a pet in the past. I currently do not.

Interviewer: Me and I asked what type of pet is it? Is it a dog or cat or anything else?

Participant: It was an outdoor dog.

Interviewer: All right. So, in the following questions, we can just imagine that you currently have a pet and you're caring for it. And these are some features which could potentially be there for

your pet. So, for the first question, let's imagine that you're in a sci-fi and you can have any features possible for caring for your pet. What would you like to see?

Participant: Hmm. That's a good question. I would like again, a health monitoring device to check if my pet is in a good health condition. What else? Maybe an auto feeder? But that's already in the present. So yeah, the only thing I can think of right now is something that can monitor their health 24-7. *[PETHEALTH]*

Interviewer: All right. So, in your case, you said that you want something to monitor like your pet's health. And obviously, if it were to be designed to be sustainable and eco-friendly, would you prefer it to be energy efficient and reduce environmental impact or would you be more caring about like how well it performs regardless of the environment?

Participant: Oh. I would... Oh, that's a good question. Okay. I would then the environmental impact is all of course important. And I will put that first up to a certain extent. And probably if it starts to jeopardize my pet's health, then I would well not do that. Yeah.

Interviewer: So, what you're saying is its environment is important up to a certain point that your pet is still healthy and safe.

Participant: Yes.

Interviewer: Now just continuing, do you think that using automated systems in the case that I'm asking, that's just pretend that there's an automatic feeder and there's also an automatic play toy. So, when I say automatic play toy, it's something that the pet automatically gets to have entertainment from. Do you think that this would throw off the balance between you and your pet? So that means the system cares for the pet more and then the pet is less attached to you.

Participant: Hmm. Yes, it would definitely throw off the balance.

Interviewer: Is this a problem for you?

Participant: It will if I use it too much. If I use it sparingly, like when I go on maybe maybe whole holidays where I won't be home for a few days, then I will use it. But if I am home, I will at least make the bit of time to spend with my pet instead of using the automatic play toy.

Interviewer: Do you have any concerns about the safety and well-being of your pet when relying on automated systems in a smartphone? Go, yes. Do you elaborate?

Participant: The biggest issue would be a malfunction. If something were to corral, then well, I would have known because the malfunction, if my pet suddenly had an injury or a heart attack, I guess. And the smart house malfunction and I wasn't notified about it. Yeah, that would be my biggest concern of malfunction. *[MALFUNCTION]*

Interviewer: With that, I would just like to conclude the pet section. And now just some final few questions about temperature and security-related, which are some extra features which we are looking to implement also.

Interviewer: First of all, there's biometric authentication obviously, which is-what is your preference? Do you prefer fingerprint, facial recognition, retina scan, and which one do you pick and why?

Participant: Hmm. This is for a smart home?

Interviewer: Yes, this is for a smart home and control over the smart home, whether it be directly in the house on the panel or on your smartphone.

Participant: Oh. If that's the case, then I would prefer a fingerprint and a retina scan.

Interviewer: Why is that?

Participant: I wouldn't go for face recognition because, in my opinion, it's, I would say it's easy to bypass that, but I know it's not that easy, but it's easier than the other two. And I chose a combination of fingerprint and retina scan. Well, it's more of extra security. We don't want to rely on you. *[EYERECOG, FINGERPRINT]*

Interviewer: Moving on. Are you comfortable with sharing your personal data with the smart home system?

Participant: Yes.

Interviewer: Since you said yes, would you allow it to record your daily activities?

Participant: Yes.

Interviewer: Moving on, do you prefer your smart home system to have a child-friendly mode? Child-friendly mode. Why not? For example, it takes care if the child touches anything or something. Would you want that in your house, or would you prefer that it does like, focuses more on like the adults in use?

Participant: Well, as a question asked, it's a child-friendly mode so I can toggle between the normal mode and the child-friendly mode. Right. Yeah. So, if that's the case then, yeah, I would prefer to have a child-friendly mode in the smart house.

Interviewer: If you were an owner of a smart home system, what is the most important security feature to you?

Participant: Oh. I think it's the most important security feature. Hmm. It would be I guess the ability to keep the house safe. But if that's not what you're looking for, then a close second would be privacy.

Interviewer: And just the final question before we conclude this interview. Please give this answer in that ratio of you to the smart home. How much control do you want to have over your home? In comparison to you versus the smart home?

Participant: Hmm. In the ratio, yes. Yes, in the ratio. Okay. 65 to me, 35 to the smart house.

Interviewer: Could you explain your ratio?

Participant: Yeah. I would, well, I would like it to be all automated, but I wouldn't want to rely on the smart house too much. That would automate everything. I want to have control of the things that happen in my smart house. So, 65 to 35 is a, to me, a reasonable ratio in which I have control over my house, but still having the smart house, automate and do the stuff that it does.

Interviewer: With that, I would just like to conclude the interview. Thank you very much for your time. Is there anything you'd like to add on?

Participant: Nope.

Interviewer: Okay. Thank you very much for your time once again. And with that, I'd like to conclude the interview. Thank you.

3.8 Transcript 8

Participant 8

Interviewer: Now, the first question. Do you think that smart home technology can improve the quality of the care system significantly?

Participant: Smart home technology has the potential to revolutionize the aged care system. Features such as remote health monitoring, fall detection, and medication reminders can enhance the safety and well-being of the elderly. Additionally, smart home devices can provide companionship through virtual assistants, reducing feelings of isolation.

Interviewer: In your opinion, do you think that customization is a key feature in smart home systems for personalized aged care? If you agree, could you give some features you would like to customize and share your reasons?

Participant: Customization is crucial for personalized aged care. Tailoring the system to individual needs allows for specific health monitoring, medication plans, and daily routines. For example, customizing reminders for specific medications or adjusting the lighting and temperature preferences based on personal comfort can significantly improve the overall experience for the elderly.

Interviewer: What do you think should be a priority when designing a smart home system for old people and why?

Participant: The priority should be user-friendliness and simplicity. Elderly individuals may not be tech-savvy, so an intuitive interface and easy-to-use devices are essential. *[UI, UNFAMILIARITY]* Prioritizing seamless integration into daily life ensures that the elderly can adopt and benefit from the technology without feeling overwhelmed.

Interviewer: Could you name a few challenges that could be addressed by smart home technology in aged care? Do you have any suggestions to overcome them?

Participant: Challenges include resistance to technology, potential privacy concerns, and the need for ongoing support. To overcome these, education on the benefits of smart home technology is crucial. Providing user-friendly interfaces, addressing privacy concerns through robust security measures, and offering continuous technical support can encourage acceptance and adoption.

Interviewer: What features would you find useful for an aged care system and why?

Participant: Features like health monitoring, medication reminders, emergency response systems, and cognitive stimulation activities would be valuable. These address the specific needs of the elderly, promoting both physical and mental well-being. Additionally, integration with social platforms or video calls can combat loneliness.

Interviewer: What is the most effective notification system for elderly users and why?

Participant: A combination of audible alerts and visual cues on user-friendly interfaces is effective. Audible alerts ensure those with impaired vision can be notified, while visual cues cater to those with hearing difficulties. Customizable notifications, allowing users to set preferences based on urgency, contribute to a more personalized experience.

Interviewer: Moving on to the next part, this section of the interview is about pets in smart homes. Imagine a futuristic pet care system for smart homes. What sci-fi features or capabilities would you love to see integrated in this system for your pets?

Participant: Integrating a sci-fi feature like real-time emotion analysis for pets would be fascinating. Imagine a system that interprets your pet's emotions and communicates them to you, fostering a deeper understanding and strengthening the human-animal bond.

Interviewer: Okay. If automated pet care system were designed to be sustainable and eco-friendly, what features do you think it could incorporate to maximize energy efficiency or reduce their environmental impact?

Participant: Sustainable pet care systems could incorporate energy-efficient sensors, use biodegradable materials, and employ AI algorithms to optimize resource usage. Additionally, features like automatic portion control in pet feeders can reduce food waste. *[EESENSOR]*

Interviewer: Do you believe that the use of automated systems would throw off the balance of you and the system providing personal attention and care to your pets? Are there ways to improve this balance?

Participant: Automation should complement, not replace, personal attention. Maintaining a balance involves setting aside quality time for interactive activities with pets. Customizable automation schedules and features that encourage human-pet interaction can help strike this balance.

Interviewer: Do you have any concerns regarding the safety and well-being of your pets while relying on automated systems in a smart home?

Participant: My safety concerns include system malfunctions and power outages. Redundancy measures, like backup power sources and fail-safes, would be crucial. Regular system checks and prompt customer support for troubleshooting are also essential to ensure the well-being of pets.

Interviewer: Can you suggest any specific enhancements or new features that would make automated pet care systems more valuable to you as a pet owner?

Participant: Integrating a pet health monitoring system that tracks vitals, activity levels, and potential health issues would be immensely valuable. This proactive approach allows pet owners to address health concerns early, enhancing overall pet care. *[PETHEALTH]*

Interviewer: For the final part of this interview, this section is about temperature and security-related questions in smart homes. What type of biometric authentication do you prefer? For example, fingerprints, face recognition, password, access card, and many more. Why?

Participant: Face recognition is preferable for its convenience and non-intrusiveness. It eliminates the need for physical cards or keys, providing a seamless and secure authentication method. *[FACERECOG]*

Interviewer: Do you feel safe sharing your personal data with a smart home system? If so, will you allow it to record your daily activities?

Participant: I am comfortable sharing data for essential functions like security and automation. However, transparency in data usage policies is crucial. I would allow limited recording of activities for security purposes, provided the data is encrypted, and user privacy is prioritized. *[CYBERSECURITY]*

Interviewer: Do you think that it's a good idea for smart home systems to have a children-friendly mode? Why? Also keep in mind that children may lead strangers to their home without parent's permission if they are not careful enough.

Participant: Yes, a children-friendly mode is essential for enhanced security. This mode could restrict access to certain features and provide additional safety measures, ensuring that children cannot inadvertently compromise the security of the home. *[CHILDRENMODE]*

Interviewer: What do you think a smart home system security feature should include in general and why?

Participant: A robust security feature should include encryption protocols, regular software updates, and two-factor authentication. Additionally, real-time monitoring and alerts for unusual activities ensure prompt response to potential security threats. *[VIDEO, CYBERSECURITY]*

Interviewer: How much control would you want your smart home system to have?

Participant: I prefer a balance where I have control over essential functions such as security and energy management, while routine tasks can be automated. Customizable settings, remote access, and the ability to override automated processes provide the level of control that aligns with individual preferences.

Interviewer: In your experience, what are some effective design patterns that could enhance the security of smart home systems?

Participant: Effective design patterns include a user-friendly interface for easy management of security settings, regular security audits, and the implementation of AI algorithms to detect and respond to suspicious activities. Multi-layered authentication and encryption at both hardware and software levels contribute to a robust security framework. *[CYBERSECURITY]*

Interviewer: That's the end of this interview. Thank you for your time and valuable inputs. Your opinions would help us to enhance the usability and user experience of out project.

3.9 Consent Form 1

The below appendix shows the consent form.

Consent Form

Ethics reference number: **24744.A4**	Version: 1.0	Date: 23 Oct 2023
Study Title: Student interviews for COMP2213		
Investigator: **Beh Shu Ao**		

Please read the following and indicate to the researcher verbally (i.e. yes/no) if you agree with the following statements:

Data Protection

I understand that information collected during my participation in this study is completely anonymous / will be stored on a password protected computer/secure University server and that this information will only be used in accordance with the Data Protection Act (1998). The DPA (1998) requires data to be processed fairly and lawfully in accordance with the rights of participants and protected by appropriate security.

:

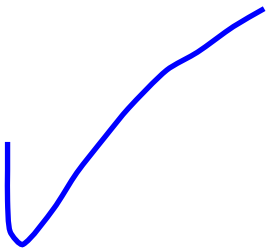
I have read and understood the Participant Information (dated 23 Oct 2023) and have had the opportunity to ask questions about the study.

I agree to take part in this study. I understand my participation is voluntary and I may withdraw at any time and for any reason.

If the participant has verbally agreed to the above, and consented to take part in the research, the study may commence.

Signature of participant:

Date: 10/11/2023



3.10 Consent Form 2

The below appendix shows the consent form.

Consent Form

Ethics reference number: **24744.A4**	Version: 1.0	Date: 23 Oct 2023
Study Title: Student interviews for COMP2213		
Investigator: **Beh Shu Ao**		

Please read the following and indicate to the researcher verbally (i.e. yes/no) if you agree with the following statements:

Data Protection

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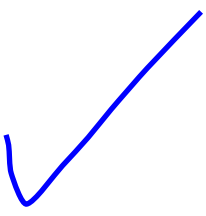
If the participant has verbally agreed to the above, and consented to take part in the research, the study may commence.

Signature of participant:

Date: 10/11/2023



3.11 Consent Form 3

The below appendix shows the consent form.

Consent Form

Ethics reference number: **24744.A4**	Version: 1.0	Date: 23 Oct 2023
Study Title: Student interviews for COMP2213		
Investigator: **Lim Xin Win**		

Please read the following and indicate to the researcher verbally (i.e. yes/no) if you agree with the following statements:

Data Protection

I understand that information collected during my participation in this study is completely anonymous / will be stored on a password protected computer/secure University server and that this information will only be used in accordance with the Data Protection Act (1998). The DPA (1998) requires data to be processed fairly and lawfully in accordance with the rights of participants and protected by appropriate security.

:

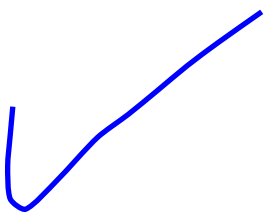
I have read and understood the Participant Information (dated 23 Oct 2023) and have had the opportunity to ask questions about the study.

I agree to take part in this study. I understand my participation is voluntary and I may withdraw at any time and for any reason.

If the participant has verbally agreed to the above, and consented to take part in the research, the study may commence.

Signature of participant:

Date: 7/11/2023



3.12 Consent Form 4

The below appendix shows the consent form.

Consent Form

Ethics reference number: **24744.A4**	Version: 1.0	Date: 23 Oct 2023
Study Title: Student interviews for COMP2213		
Investigator: **Lim Xin Win**		

Please read the following and indicate to the researcher verbally (i.e. yes/no) if you agree with the following statements:

Data Protection

I understand that information collected during my participation in this study is completely anonymous / will be stored on a password protected computer/secure University server and that this information will only be used in accordance with the Data Protection Act (1998). The DPA (1998) requires data to be processed fairly and lawfully in accordance with the rights of participants and protected by appropriate security.

:

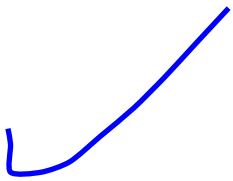
I have read and understood the Participant Information (dated 23 Oct 2023) and have had the opportunity to ask questions about the study.

I agree to take part in this study. I understand my participation is voluntary and I may withdraw at any time and for any reason.

If the participant has verbally agreed to the above, and consented to take part in the research, the study may commence.

Signature of participant:

Date: 7/11/2023



3.13 Consent Form 5

The below appendix shows the consent form.

Consent Form

Ethics reference number: **24744.A4**	Version: 1.0	Date: 23 Oct 2023
Study Title: Student interviews for COMP2213		
Investigator: **Arun Prakash**		

Please read the following and indicate to the researcher verbally (i.e. yes/no) if you agree with the following statements:

Data Protection

I understand that information collected during my participation in this study is completely anonymous / will be stored on a password protected computer/secure University server and that this information will only be used in accordance with the Data Protection Act (1998). The DPA (1998) requires data to be processed fairly and lawfully in accordance with the rights of participants and protected by appropriate security.

:

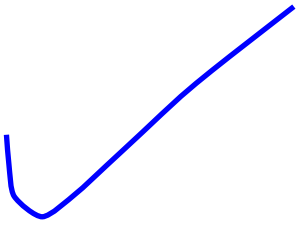
I have read and understood the Participant Information (dated 23 Oct 2023) and have had the opportunity to ask questions about the study.

I agree to take part in this study. I understand my participation is voluntary and I may withdraw at any time and for any reason.

If the participant has verbally agreed to the above, and consented to take part in the research, the study may commence.

Signature of participant:

Date: 13/11/2023



3.14 Consent Form 6

The below appendix shows the consent form.

Consent Form

Ethics reference number: **24744.A4**	Version: 1.0	Date: 23 Oct 2023
Study Title: Student interviews for COMP2213		
Investigator: **Tee Chee Hong**		

Please read the following and indicate to the researcher verbally (i.e. yes/no) if you agree with the following statements:

Data Protection

I understand that information collected during my participation in this study is completely anonymous / will be stored on a password protected computer/secure University server and that this information will only be used in accordance with the Data Protection Act (1998). The DPA (1998) requires data to be processed fairly and lawfully in accordance with the rights of participants and protected by appropriate security.

:

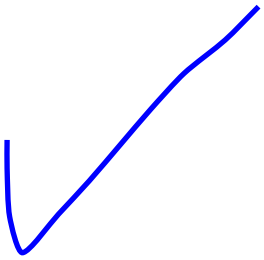
I have read and understood the Participant Information (dated 23 Oct 2023) and have had the opportunity to ask questions about the study.

I agree to take part in this study. I understand my participation is voluntary and I may withdraw at any time and for any reason.

If the participant has verbally agreed to the above, and consented to take part in the research, the study may commence.

Signature of participant:

Date: 10/11/2023



3.15 Consent Form 7

The below appendix shows the consent form.

Consent Form

Ethics reference number: **24744.A4**	Version: 1.0	Date: 23 Oct 2023
Study Title: Student interviews for COMP2213		
Investigator: **Arun Prakash**		

Please read the following and indicate to the researcher verbally (i.e. yes/no) if you agree with the following statements:

Data Protection

I understand that information collected during my participation in this study is completely anonymous / will be stored on a password protected computer/secure University server and that this information will only be used in accordance with the Data Protection Act (1998). The DPA (1998) requires data to be processed fairly and lawfully in accordance with the rights of participants and protected by appropriate security.

:

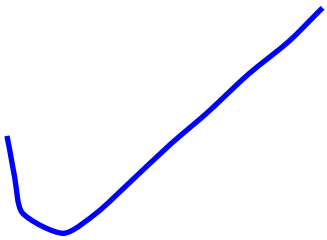
I have read and understood the Participant Information (dated 23 Oct 2023) and have had the opportunity to ask questions about the study.

I agree to take part in this study. I understand my participation is voluntary and I may withdraw at any time and for any reason.

If the participant has verbally agreed to the above, and consented to take part in the research, the study may commence.

Signature of participant:

Date: 14/11/2023



3.16 Consent Form 8

The below appendix shows the consent form.

Consent Form

Ethics reference number: **24744.A4**	Version: 1.0	Date: 23 Oct 2023
Study Title: Student interviews for COMP2213		
Investigator: **Tee Chee Hong**		

Please read the following and indicate to the researcher verbally (i.e. yes/no) if you agree with the following statements:

Data Protection

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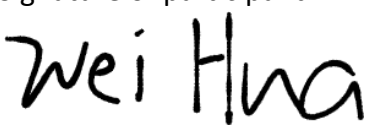
:

I have read and understood the Participant Information (dated 23 Oct 2023) and have had the opportunity to ask questions about the study.

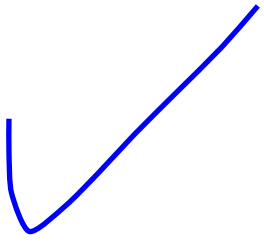
I agree to take part in this study. I understand my participation is voluntary and I may withdraw at any time and for any reason.

If the participant has verbally agreed to the above, and consented to take part in the research, the study may commence.

Signature of participant:



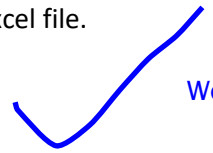
Date: 13/11/2023



3.17 Survey Form

It will be attached in the submitted file which is an excel file.

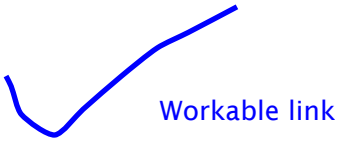
Attached link: Smart Home System Survey.xlsx



3.18 OneDrive Link

A OneDrive link will be attached below that contains all the files, including the recordings, transcripts, consent forms, code books and survey form.

Attached link: COMP2213_Group5_HandIn#2 - OneDrive (sharepoint.com)



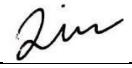
4.0 Rubric

Group Hand-In 2 (15% of module total)			
	1 – 2 marks	**3 – 4 marks**	**5 – 6 marks**
Code Book (6 marks)	Codes and themes are listed and described.	Codes and themes are listed and described, in enough detail that another researcher could apply them.	Well-considered and useful themes are listed, well described, and illustrated with example quotes. Consideration is given to resolving potentially ambiguous codes.
Coded Transcripts (6 marks)	Transcripts provide a sufficient record of the conversations, with evidence of codes having been applied.	Transcripts are well structured and contain useful metadata; provide a good record of the conversations and have evidence of codes being applied.	Transcripts are well-structured and contain useful metadata; provide a good record of the conversations and have evidence of codes being applied consistently and comprehensively.

	1 mark	**2 marks**	**3 marks**
Affinity Diagram (3 marks)	Affinity diagram shows themes drawn from interviews, and some relationships between them.	Affinity diagram shows themes drawn from interviews; shows and explains relationships between them.	Affinity diagram shows themes drawn from interviews and literature; shows and explains relationships between them.
Clarity, Referencing and Presentation (3 marks)	Meets most of the presentation and referencing guidelines.	Meets all of the presentation and referencing guidelines.	Meets all of the presentation and referencing guidelines. Very well presented and easy to follow.
18 marks total			

Group Coursework – Individual Mark Distribution Form
COMP2213 2023/24

Your group coursework requires good teamwork – you need to organise yourselves to work together. As students you are responsible for self-organising, appropriately sharing the responsibilities, and distributing workload evenly.

Student Name	**Student Number** e.g. 12345678	**ECS ID** e.g. xyz1g16	**Student Signature**	**Individual contribution [%]**	**Date** dd/mm/yyyy
Arun Prakash	33043132	ap1a21		100	20/11/2023
Beh Shu Ao	33354723	sab1e22		100	20/11/2023
Lim Xin Win	33296855	xwl2n21		100	20/11/2023
Tee Chee Hong	34402926	cht1c22		100	20/11/2023
			TOTAL % >>>>>>	400	

Record here your proposed distribution of the total number of marks awarded to your group. Please enter names, usernames (e.g. xyz1g17) and the percentage of the total group effort contributed by each member. Each member MUST sign and date the form before submission to confirm that they agree with the proposed distribution. Without signatures from all group members, marks will be awarded evenly. Only one fully-completed form per group is necessary. As a first step, if your team is having problems, speak to the teaching team.

The contribution percentages must total 400% for a group with 4 students or 500% for a group with 5 students. The individual marks will be calculated as follows:

Individual Marks = Group Marks × Individual Contribution (%)

Example: A group of 5 students achieve 20/30 marks in their Group Hand-In #1 coursework. The team declare that two team members contributed slightly more than the other three and agree on allocating

110%, 110%, 93.3%, 93.3%, 93.3%. The first two students will receive 22/30 (being 20 x 1.1) and the remaining three will receive 18.7/30 (being 20x0.933).

If you are having issues with a particular group member, please try to resolve these first. Second, flag potential problem with the teaching team. **Please note the teaching team reserves the right to reject or modify a Coursework Marks Distribution form.** A form may be rejected or modified by the teaching team if it is incorrectly filled out, if the group has not document meeting minutes or group work, or if there is a large discrepancy in one student's awarded marks when no issues have been raised with the teaching team prior.