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Artificial intelligence and its digital ethical dilemmas for elderly:

A Finnish nurses' perspective.

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Abstract/Summary

In the recent times, artificial intelligence has started to play a vital role to provide improved elderly care. However, it has its own digital ethical dilemmas which need to be explored.

This study investigates the role of AI and its digital ethical dilemmas associated with elderly care. The research utilized five semi structures qualitative interviews from nurses in Finland and qualitative content analysis to find out the results. The study relies on Jean Watson's theory of care.

 The study finds three main themes including human replacement, individual acceptance and responsibility. It is also observed that there is no one answer to overcome these dilemmas. Nurses and AI can be used as partners to overcome these issues and to gain the maximum benefits for elderly care. Moreover, nurses and elderly should be provided with proper support if they feel threatened. Research is concluded by providing recommendations and future research suggestions.

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1   Introduction

Artificial intelligence (AI) is now a days taking over every sector in life and healthcare is no exception either. The term "artificial intelligence" is used to describe the computer technologies with the similar intelligence as of a normal human being (EPSRC, 2019). Definition of AI is a very questioned concept. It usually refers to the machines designed by humans to perform difficult or complex tasks, store and process the information like the way humans do (McCarty, 2004). According to Ryan (2020, p.3) "AI it is an intelligence that is differentiated from natural intelligence; it is a constructed, artificial, or machine intelligence."

These machines can bring dramatic change in patient and administrative care for healthcare providers and pharmaceutical organizations. Several studies suggest that artificial intelligence can work same, or even better than humans in various tasks of healthcare such as disease diagnosis and treatment care (Davenport & Kalakota, 2019). Therefore, AI can play a vital role to assist and provide care for elderly as well.

Older population is increasing rapidly in many countries especially in Europe as it is one of the regions in the world with high number of older adults (Plaza et al., 2011). According to Eurostat (2021) in 2016, the number of elderly people aging 65 years or above were 19.2%, whereas 10 years ago this population was 14.9%. Moreover, Eurostat states that it is predicted that the EU-27's old-age dependency will apparently continue to rise and it will reach the mark of 56.7% by the year 2050. However, by that time there will be less than two health workers available to take care of an older person.

According to Finnish institute of health and welfare (THL), Finland is one of the countries with oldest population in Europe i.e., nearly 22% of population is of old age. The number of 65 years old adults will increase to 26% in 2030 and 29% in 2060 (THL, 2021). With this trend in the increase of older population, the need of specialized caregivers is also increasing (Heerinik et al., 2010). However, as mentioned above the number of caregivers will decrease significantly overtime. Due to increase in the workload of nurses, the number of working hours is not enough for the care and elderly support and Finland requires around 30,000 more nurses for elderly care by 2030 (Yle news, 2021).

A possible way to solve this issue is the use of artificial intelligence in the field of elderly care. AI can make it easy for elderly to live on their own for longer time by decreasing the

burden of family and caregivers (Mitzner et al., 2010). This as a result will also decrease the burden from healthcare staff. According to YLE (2016) It is estimated that 20% of nurses and community nurses' workload would be substituted with artificial intelligence and nurses can have more time for patient care. Artificial intelligence is playing a vital role in the healthcare sector. AI is already being widely used in transport and transfer of care supplies, its data monitoring and drug distribution (Taylor et al., 2016).

However, World health organization (WHO) states that the use of AI brings many ethical concerns (WHO, 2021.) These concerns are about privacy, care, responsibility, digital and technological development etc. Despite these concerns, many organizations are already using AI in at least some sectors. Moreover, the use of AI has become necessity for the success of the organizational staff (Lamberti et al., 2019).

With its increased use and dependence on AI, it is essential to realise and discuss the ethical dilemmas associated with the use of AI. Elderly are more prone to these issues due to their lower level of knowledge and inability to learn about new technologies (Vaportzis et al., 2017). Despite the role and importance of AI and its related digital ethical dilemmas, this topic is still under researched. This study will discuss the digital ethical dilemmas associated with the use of AI in elderly care settings to fill this research gap.

2   Background

This chapter of thesis explains what is AI and the role of AI in elderly care. Moreover, the chapter will discuss the use of AI and how it is changing the healthcare settings. Furthermore, it discusses the digital ethics of AI in nursing and elderly care. Lastly, it provides an overview of the study and determines the basis for aim of the study.

2.1   Artificial intelligence

AI refers to the role of machine that are designed to think like humans and imitate human actions (Bhbosale et al., 2020). It can also refer to machines that performs the actions of human mind such as problem solving and learning. The most impotent role of AI is the ability to take actions in order to achieve certain goals (Bhbosale et al., 2020). The definition of AI is mainly based on two views, the first one addresses the behaviour and actions with similarity to humans and other focuses on production and processing of human like skills (Swarte et al., 2019).

Moreover, AI can also be described as an intelligence that is different from natural intelligence. It is man-made, artificial or machine intelligence. It is a system that is made by humans to perform difficult tasks or to store the information or data the same way humans do. AI is the area of computer science that works and responds like humans. These work abilities include seeing, for example picture identification, listening as speech recognition and speaking like language imitation. These acts are done by humans but AI mimic these acts in order to function as humans (Ryan, 2020).

There are mainly two types of AI, known as narrow AI and general AI. Narrow AI is specific type of AI that is designed to perform a certain type of tasks that are single and simple in nature. The information or knowledge gained from these tasks are not instinctively transferred to the next level or to perform the next task. It is rather used for the defined applications (Macnish et al., 2019). Whereas, the other type i.e. general AI, is able to perform human cognitive abilities. It performs the complex or unfamiliar tasks without human interference (UK House of Lords, 2018).

2.2   Role of artificial intelligence

AI is the part of our everyday lives and it is being used widely even without our knowledge. The devices used in reasoning, solving the problems, making plans, judgments, language communications, finding routes for travels, voice and face recognition and interactive games on web etc. are few examples of AI (Bali et al., 2019).

AI is also being used in healthcare to detect the health problems (Yan et al., 2019). It is also used in law associations to predict the crime (Asaro, 2019). To detect the crop yields, AI is used in agriculture sector as well as in cities to minimize the overcrowding (Ryan, 2019). AI is not only used in storing and processing the data or information, it is also being used as physical assistance such as robots for the needy. However, it is important to know that not all the robots have AI.

In middle of ninetieth century, Alan Turing introduced Turing's test with an aim to check the intelligence level of machines. A game was designed to differentiate the level of intelligence between human and computer. This test predicted that after fifty years, there will be computer programs designed to pass this Turing test (French, 2000). However, it is not fulfilled yet and proves the complexity of human intelligence.

2.3   Artificial Intelligence and healthcare

The world is now transforming and a rapid development can be seen around the world in almost all the sectors e.g. societies, economies, cultures, politics, technologies and science including AI. AI is getting more popularity and making significant changes in almost all the fields and healthcare is no exception either. According to Guo et al. (2020) there is significant increase in literature about AI. In last 5 years, there is 45% increase in peer reviewed research in health care about AI. Despite the availability of literature on AI, ethical issues of AI however, are still in the development process.

The use and meaning of AI in healthcare can differ. AI is being used in electronic medical records, online patient education, storing health data, evaluation of social media, analytical modelling, observation of syndromes, mobile health and examining medical images etc. (Shaban-Nejad et al., 2018). AI can play a huge role in healthcare sector as a major fall in healthcare workforce can be seen in past few decades. It is mainly because of three reasons, 1. There are not enough doctors in the world. 2. Mostly doctors are getting older and retiring and 3. There is a huge demand of workers for chronic disease patients' care. The effectiveness of healthcare system relies on some factors like, disposal, convenience and the quality of healthcare provided from the healthcare workers (WHO, 2014). According to WHO (2016), the healthcare workforce is short globally and 17.4 million healthcare workers are needed for the care purposes. Moreover, the growing age of workforce is another issue associated with this shortage.

AI can play its role to overcome such issues faced by healthcare and nursing staff. Some of the problems that nurses face widely beside shortage of workforce are: less experience, piles of documentation, stress related to the limitations of organization or healthcare department, physical stress in result of actions like lifting patients and physical fatigues due to repeatedly bringing supplies to patients for the delivery of care etc (Clipper et al., 2018; McBride, Tietze, Robichaux, Stokes, & Weber, 2018). Moreover, Clipper (2018) states that this workload and physical stress drag nurses away from patient direct care, which affects satisfaction of patient and family and also increases expenses for healthcare department. Thus, AI can possibly solve this problem by performing these tasks to make it easier for nurses to deliver direct patient care and accomplish essential nursing tasks.

AI has already started to solve these problems and help nurses to achieve the goals. For example, "fetch and gather robots" help nurses to get the supplies. These robots go to the supply area, recognise and scan what supplies are needed and carry them to the patient care

setting (Clipper et al., 2018). These robots do not interact with patients or families. The role is to fetch the medications which allow nurses to spend more time with patients and their families. Moreover, "Robear" is another kind of robot that is used to lift patients safely and prevent physical stress for nurses who had to lift different patients many times per day (De Swarte, Boufous, & Escalle, 2018).

AI is so much more than just lift and gather. The role of AI is aggregating rapidly in healthcare field. Actions like diagnosis, feeding and bathing and changing the dressing are some examples of the role of AI. These duties are performed by AI and will improve more skills in future, just like a human or even better than humans. MY SPOON is an example of feeding assistance for patient. It is a robot that helps patient to eat (Barnard, 2017). Moreover, Robot bathtubs performs soaping and showering automatically for the patients (Beedholm, Frederiksen, & Lomborg, 2015). However, use of AI to assist nurses and increase efficiency and accuracy, comes with its digital ethical concerns. For instance, risking the dignity of a patient, loss of human contact, provision of personalized care, safety or security, autonomy, control and other digital errors etc. (Sharkey & Sharkey, 2010).

2.4 Elderly care and artificial intelligence

As discussed in the literature above, there is going to be the shortage of healthcare staff in coming years. It is estimated that next decade will double the number of elderly whereas, the birth rate will reduce. A huge number of elderly will need care. Germany will need 500,000 more nursing care personals by the end of this decade (Rothgang et al., 2012). Finland will also need around 30.000 more healthcare workers as discussed above. AI can help to overcome these shortages by performing certain tasks for elderly. For instance, lifting the bed, or closing the blinders or lights etc. This way nurses will have more time for essential care.

Moreover, there are some robots used in the area of healthcare that use AI to perform certain tasks and increase accuracy and reduce workload. These robots will help us understand the use of AI in elderly care. Care-O-Bot is a mobile robot assistance, which is intended to assist people in their daily lives. This robot has ability to navigate, grasp, interact along with a well-designed shape. Care-o-bot has ability to search for a way while avoiding any hurdles or obstacles. With grasping ability, it can open door and handle such daily tasks for disabled and elderly. It can also record from all dimensions by using its multiple censors. Moreover, it can learn new things by utilizing machine learning skills (Fraunhofer IPA, 2012).

Another robot called Casero have more of a service approach through the use of AI as it can transport meals, bed sheets, medicines, files or other such stuff within a hospital. Casero is simply a transport robot that is designed to help avoid running around for simple things and reducing the workload (Münch, 2017).

A robot named "Pepper" was presented in 2017 to help elderly and nurses by doing simple tasks in elderly homes. Pepper has ability to do tasks like turning the tv on, or reminding elderly to take their medicine. This is the first social humanoid robot and by the use of this robot, there is a possibility for elderly to be partially independent. Pepper is able to hear and see, so it can search for things on internet and speak up to the person. Moreover, pepper can recognize the atmosphere and things around through machine learning and AI (Vesper & Hoffmann, 2017). Hobbit is also a robot similar to Pepper. It can help elderly by removing stuff in the way and reducing the risk of falling. It helps elderly to live independently at home, call for help in case of emergency, search on internet and play music etc. (Münch, 2017).

These all are good examples of AI that can be used for elderly care to better assist the older population and to reduce the workload of nurses. The shortage of nurses for increased number of elderly people can be avoided with the help of AI.

2.5   Artificial intelligence and digital ethics

The term digital ethics have been used in literature since 1970s along with similar terms like computer ethics, robot or machine ethics (Guryanova et al., 2018). All these terms are related to digital ethics and address the ethical issues related to the right use of machines or moral use of digitalization.

Generally, ethics refer to the principles or moral actions of life for everyone (Pieper & Thurnherr, 1998). Digital ethics is the part of applied ethics and it is related to the ethics concerning digitalization. Rafael Capurro in 2009 wrote the paper about digital ethics and presented at Global Forum of Civilization and peace, in Korea. He was the first person who defined this term. He described digital ethics as "dealing with the impact of Digital ICT (Information and Communication Technologies) on society and the environment at large as well as with ethical questions dealing with the Internet digital information and communication media (digital media ethics) in particular." (Capurro, 2009). He is the first

person who introduced this term, the ethical challenges of technology however, have been discussed many times earlier than that.

Digital ethics are about respecting the morals and standards of life while living with digital technologies. It sets rules for correct actions that support freedom, justice and privacy. It doesn't set new rules of ethics or morals, rather it translates the already existed ethical values in shape that is useful for a digital society (Gründinger, 2018).

Digital ethics and elderly

There are many ethical concerns associated with the use of AI in the elderly care. Sherry (2011) and Turkle (2011) mentioned the worry that taking over the AI instead caregivers will minimize the real human interaction just like online socializing have substituted face to face interactions. So, the interaction between humans and robots is not ethically acceptable because machines only give the illusion of care, friendship or connection.

Another worry is how the privacy will be affected with assistive robots that have AI, such as carebots. There are many concerns for instance, private or personal talks with carebots can be heard or accessed by inappropriate listeners. Moreover, there is also a concern of fake emotional attachments with carebots. Carebots should not be used in elderly care, because they are not able to provide social and emotional needs to elderly. It will replace the human contact and elderly are more prone to get socially isolated (Sharkey & Sharkey 2010).

According to Sharkey and Sharkey (2006), emotional expressions of robots with AI are allowed as long as they are not manipulating the emotions, causing very minimal harm with clear and transparent robot design. Emotional manipulation is bad despite having a small number of benefits. But, it can also be applied to human caregivers.

Etzioni & Etzioni (2017) discussed that if robots with AI are considered as partners and not as substitutes, certain ethical issues can be avoided or lessened. There arises another question, if AI is treated as partners, how nursing interventions are going to be divided between caregivers and robots. The presence and duties of robots with AI and nurses are different to a huge extant. We cannot deny the fact that robots have so many different jobs as mechanic things, memorizing and recalling, but what about the emotions? Humans are the only choice and the AI cannot substitute that. As Etzioni and Etzioni (2017: 185) briefly explained the comparison of advantages but have not discussed the nursing duties or task division between humans and AI. However, they stated some examples. For instance, in case

of robots with AI, they are undoubtfully excellent in the tasks like retrieval of information and memory. So that they are best at remembering what medication patients has taken, the side effects and drug interactions. Comparatively humans, are best at reading expressions, listening to what they are saying and how they are saying it, and also understand the tone and touch. It will be interesting to find out how this partner relationship can work and increase the benefits.

3   Aim and research questions of the study

The aim of this study is to understand the digital ethical dilemmas associated with the use of AI for elderly care in Finland from Finnish nurses' perspective. Therefore, the research question of the study is formulated as follows:

1. What are the possible ethical dilemmas of AI faced by elderly?
2. How the elderly and nurses respond to the use of AI at workplace?

4   Theoretical framework

This section of the study will discuss about the role of care in nursing. Moreover, Jane Watson's theory of human care is also explained briefly. The digital ethical dilemmas of AI for elderly care are discussed using this theory of human care. The section further provides the assumption and carative factors of the theory. Lastly, the sections briefly describe the use of human care theory for this study.

4.1   Care in nursing

Caring is an essential human need and it is necessary for nursing practice. Nursing practice is known as shared living experience between nurse and the person being cared. In this process, nurses develop the knowledge base of nursing by developing and understanding the skills of caring (Cheung, 1998).

Mayeroff (1977) in his book "On Caring" explained the eight essential ingredients of care, Patience, knowing, alternating rhythms, trust, honesty, humility, hope and courage. Moreover Roach (1987) has described six Cs of caring, Competence, commitment, compassion, confidence, comportment and conscience. According to Boykin & Schoenhofer (2001), these ingredients establish characteristics for the caring of a person.

Knowledge and understanding about care help nurses to understand the person being cared to enable them to provide high-quality care (Patistea, 1999). Nursing care is described as interactive process that happens between nurse and patient during the time of vulnerability (Wolf et al, 1994).

4.2   Jane Watson's theory of human care

Theoretical framework of this study is based on Jean Watson theory of human care. Caring is a vital part of nursing and patient relationship therefor the theory of care is important and provides the essential needs of human caring. The theory provides meaning of patient care, their health and nursing (Braz-Evangelista et al, 2020).

Dr Jean Watson developed the theory of human caring between 1975 and 1979. While she was dean in University of Colorado. She combined this theory with her own experiences and opinions about nursing. Mainly, Watson wanted to focus and bring out the healthcare profession as its exceptional values, knowledge, its own ethics and a unique operation for the society (Gonzalo, 2019).

Watson proposed that nursing is consider as caring science through her experience, ideas, knowledge and nursing values. Watson linked nursing with empathy and caring, ensuring that nursing is solely associated with empathy and caring. She described the importance and presence of compassion and empathy while providing care for the patient and the families on personal as well as spiritual levels (Savieto & Leão, 2016).

According to Watson theory, "Nursing is concerned with promoting health, preventing illness, caring for the sick, and restoring health." The theory emphasis on offering care and healing besides the cure of disease. Watson describes that caring is essential part or nursing and can result in better health as compare to a medical treatment provided without care. Watson caring model refers that caring can enhance growth and a caring atmosphere accepts the person as how they are at the moment, and what a person may become afterwards (Alligood, 2017).

4.3   Assumptions of the theory

There are some assumptions of Jean Watson's theory of human care. These assumptions are as follows; (1) Care can only be provided interpersonally. (2) To fulfil the human needs of

care, caritive factors are needed. (3) better care help in promoting health and personal and family growth. (4) Acceptance of person current state and potential condition is accepted in care response. (5) In a care setting, person is able to take the best decision for themselves in the given time possible. (6) Caring science corresponds to the curing science. (7) Caring practice is fundament of nursing (Willis & Leone, 2017).

4.4 Major Concepts of the theory

The theory of human care states that the science and philosophy of care have four major concepts i.e. society, human being, health and nursing.

Society or environment delivers the standards that how people in society should behave and set certain goals. Watson states that caring has always been the part of every society and societies had certain people who cared for other.

Human being/ person /life or self are the words that Watson used in this context. She believed that human is the valued being to be cared. She referred a person as the sum of mind, body and soul.

Health is the wellness of mind, body and soul. Health is described as overall mental, social and physical fitness. Watson referred health to the general function in order to prevent illness or any effort made in order to avoid the illness.

Nursing is a human science. According to Watson, nursing consists of "knowledge, thought, values, philosophy, commitment, and action, with some degree of passion" (Willis & Leone, 2017).

4.5 Carative factors

Watson stated ten carative factors that are experienced by nurses to their patients in caring role. Watson developed these factors for care process that are suggested and could be considered for the provision of love and care. Watson distinguished the nursing care from medicine with the word "Carative". Which further evolved to the word "Caritas". Caritas is a Latin word which means "to cherish, to appreciate, to love or provide special attention" (Pajnkihar et al., 2017). Watson made it easier to understand the theory of care for readers by explaining the essential conceptions as interpersonal care, caring-healing consciousness and the ten carative factors (Pajnkihar et al., 2017).

Carative Factors	Caritas Process
"The formation of a humanistic-altruistic system of values"	"Practice of loving-kindness and equanimity within the context of caring consciousness"
"The instillation of faith-hope"	"Being authentically present and enabling and sustaining the deep belief system and subjective life-world of self and one being cared for"
"The cultivation of sensitivity to one's self and to others"	"Cultivation of one's own spiritual practices and transpersonal self, going beyond the ego self"
"Development of a helping-trust relationship"; became "development of a helping-trusting, human caring relation" (in the 2004 Watson website)	"Developing and sustaining a helping trusting authentic caring relationship"
"The promotion and acceptance of the expression of positive and negative feelings"	"Being present to, and supportive of, the expression of positive and negative feelings as a connection with deeper spirit and self and the one-being-cared for"
"The systematic use of the scientific problem solving method for decision making"; became "Systematic use of a creative problem solving caring process" (in the 2004 Watson website)	"Creative use of self and all ways of knowing as part of the caring process; to engage in the artistry of caring-healing practices"
"The promotion of transpersonal teaching-learning"	"Engaging in genuine teaching-learning experience that attends to unity of being and meaning, attempting to stay within others' frame of reference"
"The provision of supportive, protective, and (or) corrective mental, physical, societal, and spiritual environment"	"Creating healing environment at all levels (physical as well as nonphysical, subtle environment of energy and consciousness, whereby wholeness, beauty, comfort, dignity, and peace are potentiated)"
"The assistance with gratification of human needs"	"Assisting with basic needs, with an intentional caring consciousness, administering 'human care essentials,' which potentiate alignment of mind body spirit, wholeness, and unity of being in all aspects of care"
"The allowance for existential-phenomenological forces"; became "allowance for existential phenomenological-spiritual forces" (in the 2004 Watson website)	"Opening and attending to spiritual-mysterious and existential dimensions of one's own life-death; soul care for self and the one-being-cared for"

Table 1. Carative Factors and Caritas Processes by Watson (2008)

5   Research methodology

The aim of this chapter is to present the selected research method and explain the strategies and approaches of the research. Moreover, this chapter will explain the reasons behind choices of methodology and data collection in the study. The chapter begins with research approach, data collection and its analysis, and the chapter finishes with the reliability and validity of research.

5.1   Research approach

Qualitative method for data collection is the most common method used in healthcare research as focus groups and interviews (Britten, 1999 & Legard et al., 2003). Qualitative methodology is used to gather non-numerical data and has been commonly used among researchers (Crowther & Lancaster, 2012). According to Shuttleworth (2008), qualitative research design is used significantly by researchers and scientists to study human behaviours, motivations, ideas and themes. Keeping this in mind and the nature of current research, qualitative research methodology is used in this study.

To know about the use of AI and ethical dilemmas associated with its use for elderly care, there are three basic approaches that can be assumed for the research. These approaches include, deductive approach, inductive approach and combined or mixed approach. This research however, uses the inductive approach. Strauss and Corbin (1998: 12) state in the context of inductive approach that, "The researcher begins with an area of study and allows the theory to emerge from the data". In line with this, current study will use the inductive analysis to derive concepts and themes from the raw data through the researcher's evaluation. Moreover, inductive approach is used in qualitative research design and it is usually associated with interpretive viewpoint (Denzin & Lincoln, 2011).

5.2   Data collection

Interview is a type of qualitative data collection method and it is commonly used as data collection method in qualitative research methodology. Interview is the conversation between interviewer and interviewees. According to Crouch and McKenzie (2006: 484-485), one to one interview is one of the primary types of this data collection method. It can be different in styles and can be used in different frameworks.

There are mainly three types of interviews: (1) structured and standardized interview, (2) guided and semi structured interviews and (3) informal, narrative and open interviews (Eriksson & Kovalainen 2008: 78-79).

Semi-structured interviews will be conducted for this study to collect data mainly because the aim of this study is to grasp the deep knowledge and understanding of ethical challenges faced by elderly by the use of AI. This method will help to get the direct response of nurses that work in elderly homes about the ethical issues faced by elderly with the use of AI. Participants will be free to express their views about the topic and questions asked.

Moreover, semi structured interviews will allow the flexibility to choose from specific questions rather than asking the same type of questions in each interview. With the help of unstandardized interview, it will be possible to cope with changing need of participant and thus have a different and unique prospective each time. Moreover, semi structured interview allows interviewees to ask situational or transformed questions if needed, to make the research better but it is not necessary to include all these questions in the study (Saunders, Lewis & Thornhill 2007: 312).

5.3   Sampling

The target sampling for this study is to interview the nurses who are working in elderly care homes. The participants of the study were selected based on the certain criteria. First, the participant should be working with elderly care in Finland. That elderly care could be of any type for instance, disabled, psychiatric or old age homes. Moreover, they should be working with the direct care of elderly in Finland. Secondly, the participants must be working in such places for more than two years. Lastly, the participant should be a registered nurse (RN) and not a practical nurse (PN). As RN's have more responsibilities in providing care for patients compared to PN. Additionally, RN's have broader view of practice and can work independently. Whereas, PN's can provide assistance to the doctor or RN. The reason behind placing these criteria was to find the in-depth and direct answers about the use of AI and the ethical dilemmas associated with its use for elderly. Participants were found through personal contact because of the pandemic situation. Moreover, Face-to-face interviews were conducted from five study participants. The time set for each interview was 20 to 25 minutes. Interviews were recorded and transcribed. Interview questions were developed according to the research questions of study.

Depending upon the nature of the research semi structured interviews were conducted as they provide more flexibility to ask questions during the interview. Participants were contacted to discuss the time and place of interviews. The consent form was also prepared to get it signed from the participants. The questionnaire and consent form can be found in the appendix of this research study.

5.4 Data analysis

Saunders et al. (2007: 474) stated that qualitative data of a research has a complex nature, so there are some implications when it comes to analyse the qualitative data. Therefore, choosing an appropriate strategy is very important for the data analysis.

Hirsjärvi, Remes and Sajavaara (2009) stated that findings of a research must be interpreted and simplified. In this research, researcher interpreted it by analysing the collected data and draw conclusions out of them. Data analysis phase have been effective for the researcher to identify the nature of answers to the research questions. Analysis of the data was done after the interviews were transcribed (Hirsjärvi et al., 2009, 216-224). Moreover, inductive data approach was followed which describes as the way to general rules from the more specific observations (Polit & Beck, 2008: 755).

Researcher used the qualitative content analysis and decided about the questions and the methods of data collection beforehand. According to Hirsjärvi, Hurme and Sajavaara (2009) it is suggested that the method of data analysis should be planned before data collection and this planning can be used as guideline at the time of interviews and transcribing them. This process helped author to plan the data collection method and enhance the process of analysing the collected data.

The interviews were video recorded as suggested by Seale & Silverman (1997:380) the use of audiotape, videotape and valuing the small details when transcribing the data can allow the recorded data to be more comprehensive and objective.

After the interviews were recorded, author did the transcription of interviews. The process of transcription was thorough and author went through the transcribed data several times in order to avoid any errors. Subsequently, the proofreading was also a part of transcribing the recorded interviews. The first key step in extensive data analysis is to read it thoroughly (Maylor & Blackmon 2005: 349). The data was distributed in certain categories to sort the analysis process of bulk information. However, the categories were changed and removed

during the process. According to Bogdan & Biklen (1997:161) coding categories for the collected data is the process to sort it descriptively in order to physically separate the given topic from other data. For the coding and categorizing, Lichtman (2012)'s 3 C's of data analysis have been followed. 3c's are Codes, Categories and concepts.

5.5   Ethical considerations

As long as the ethical considerations of the study are concerned, certain actions were taken to protect the rights of participants. Firstly, the participants were provided with the guarantee of keeping the responses confidential, when required. Participants were made fully aware of the confidentiality of the response through invitation letter. Secondly, participants were assured of the voluntary nature of their participation and they could withdraw themselves from interview anytime they wanted. Moreover, there was not any kind of gender or race discrimination. According to Sekaran (2003) an interviewer should not ask the questions of obtrusive nature and never put pressure on participants about responses, that an interviewer expect them to give in face-to-face interview. Therefore, such situations were avoided to get the best possible responses.

Another responsibility for the data collection was to secure it properly to avoid the accidental loss and unauthorized access. According to Finnish National Board on Research Integrity (TENK 2019) researcher has the responsibility to ensure that the research meets the ethical concerns. There are some factors that should be observed to process the personal data. For example, legal basis of data, indication of data controlled, planning the research, removing personal data if it is of no use for study and inform participants about the protection of the rights and personal data (TENK, 2019).

According to TENK (2019) "Research is the quest for knowledge obtained through systematic study and thinking, observation and experimentation. While different disciplines may use different approaches, they share the motivation to increase our understanding of ourselves and the world in which we live." There are following general ethical principles: 1) researcher should respect the autonomy and dignity of participants, 2) researcher respects cultural heritage and diversity and 3) the research doesn't cause any harm or risk to the participants. Moreover, Finnish National Board on Research Integrity (2019) also mentioned some principles in order to avoid the harm for the participants. These rights are: a) consent of voluntary participation of the participants, b) participants can discontinue anytime they want, c) to make it easy to withdraw for participants at any time, as easy as it is to give, d)

give enough time to decide about participation and enough information needed, e) receive enough information about aim and possible risks of the participation, f) must be informed about the researchers and who will be able to access the data of participant.

All these above-mentioned rights and regulations were met in order to assure the ethical protection. The data was collected with all these considerations and it was assessed by the researcher only. Moreover, it will be destroyed after it is no longer needed for research and participant will be informed about it.

6   Results

This chapter of the study presents the findings of the data collected through interviews. The interpretations of the collected data will be presented to analyse the use of AI in elderly care and ethical dilemmas associated with its use in elderly care. Moreover, the direct quotes of the participants will provide the validity for the study and deeper understanding of research subject. The themes and subthemes are presented in Figure 1.
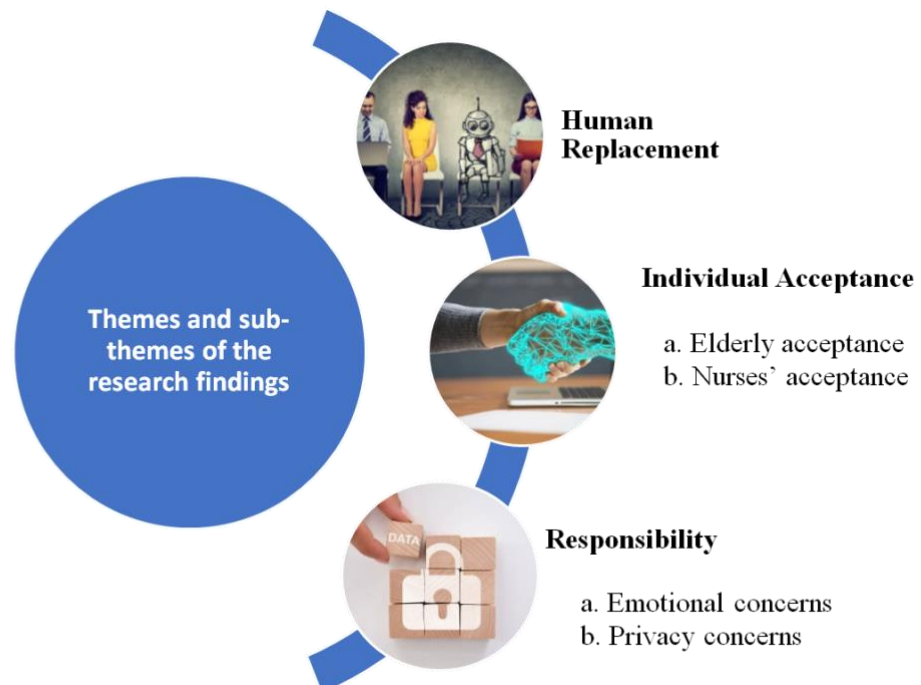

Figure 1: Digital ethical concerns of AI in elderly care; themes and subthemes

This figure indicates three main themes and subthemes from the collected data. These themes and information about participants are explained further in this chapter of the study.

6.1   Introduction of participants

The first question of the interview was of introductory nature to get familiar with the participants. The questions briefly asked about the age, gender, education, experience and workplace of the participants. The table 2 of the study presented below depicts the details of the participants.

Participants	Age in years	Gender	Education level	Experience in years	Workplace
P1	33	Male	Bachelors in Healthcare	2	Elderly & disabled care
P2	36	Female	Bachelors in Healthcare	8	Elderly care home
P3	30	Female	Bachelors in Healthcare	3	Elderly psychiatric care
P4	40	Male	Bachelors in Healthcare	6	Elderly care home
P5	34	Female	Bachelors in Healthcare	10	Elderly care home

Table 2: Participants' information

As the table 2 of the study shows two of the participants were male with rest of them being females. All of the participants had bachelor's level of education in the field of healthcare with varying age and level of experience. The work place names are kept anonymous however, the type of workplace is presented in the table above.

6.2 Human replacement

Conventionally, nurses have been providing care to the patients and elderly. They develop trust and understand the patients and provide caring to the needy. As discussed in the literature review of the study, this understanding helps nurses to provide high quality care. However, current use of AI in nursing makes nurses feel undervalued and virtually absent in certain situations and decision making. Therefore, it was important to find out what nurses believe about AI replacing them at work places to provide more effective and efficient service to the elderly. Hence, this question was asked in the interview.

Most of the interviewees stated that they are very happy to work alongside the AI as it makes their life and work very easy in most cases. Elderly care is more effective and efficient with the use of AI and it saves time. However, none of the respondents believe that AI can replace nurses for elderly care. Respondents believe that AI cannot provide the emotional and physical support at the same level as a human can. One of the respondents' state that,

> *".... The AI reduces the delays and workloads and increases accuracy but it lacks sensations and feelings. So, I believe AI cannot replace human beings as the nurses' presence is very valuable to control, monitor and feel the situations." (P3)*

Another respondent mentioned that,

> *".... AI can never work effectively without human touch. I believe AI can provide maximum benefits only when controlled and monitored by human beings." (P4)*

He further explained that AI is good in many ways but emotional support is best provided by the nurses. One of the respondents (i.e. P5) explained that,

> *".... I do not think AI will replace nurses. it is sometimes difficult for elderly to understand and use AI and even hard sometimes for nurse to use AI. Moreover, artificially intelligent robots can never provide human touch and emotional understanding."*

It can be concluded that according to the respondents AI cannot replace the nurses for elderly care. AI definitely provide quick and efficient services and it is good in monitoring and helping in some situations but it cannot provide the emotions and care at a human level. In line with the *Jean Watson theory of human care*, which emphasis on offering care and

healing besides the cure of disease, it is concluded that human touch and understanding and emotional care is of vital importance for elderly. As one of the respondents said,

> *"…. There is no way AI can do better than a nurse in elderly care. Expression is a language itself for a care worker. The way an elderly smile and talk is a sign itself that a nurse can understand much better than AI even though they have emotional understanding at some level." (P1)*

6.3 Individual acceptance

The older population is increasing and there is a huge demand of nurses and caretakers to support and monitor such population. AI can help to reduce the workload and can precisely and quickly assist the elderly in certain daily tasks as well. Moreover, it can learn and adapt quickly from the environment and it can be very beneficial for the elderly. However, the question remains how the elderly and nurses accept to the AI considering it may not have emotions and intelligence like a human? And it may take the job from nurses. The researcher got the insights of study participants about this phenomenon.

6.3.1 Elderly acceptance

Study participants mentioned that it can vary from person to person and from situation to situation. In some cases, if the patient or an older person is educated and friendly and can quickly learn to interact with AI, it could be an ideal situation to use and benefit from AI. However, in other situation where a patient might expect more emotional care or where it is difficult to understand, learn and interact with AI, its acceptance may be difficult. As one of the participants mentioned that

> *"…. Let's group them into normal and dement elderly. Normal ones can accept and learn quickly compared to elderly who have dementia and Alzheimer's and those who are bed ridden. It is difficult for some and easy for others." (P2)*

Another participant stated that,

> *"…. It depends on the clients. Some people are open to accept AI and new technology and other aren't very familiar. So, they might reject or not cooperate to use AI." (P3)*

Other participants also mentioned that the AI acceptance depends on the capabilities, physical and mental condition and nature of the persons in elderly homes. However, they

agreed that despite the difficulties, AI still plays a vital role to help, assist and better manage the elderly care and in some cases to quickly inform about a panic situation. These findings are line with the extant literature that AI can play a vital role in the field of healthcare.

6.3.2 Nurses' acceptance

AI as the machines acts in a way to mimic human being and thus it can replace humans at a workplace. Robots and other such machines with AI can replace nurses to take care of the elderly. AI may not fully replace nurses but it can be considered by the nurses either way. Nurses may consider it as a help and assistance or as a threat for their job security.

One of the participants described AI as:

> *".... I think of something that replaces human being, like machine or anything. These days we talk too much about robots, but I think, not exactly robots, but maybe any machine that does human work." (P5)*

Most of the participants believed that AI is going to play a vital role in the near future but at the same time all of them believed that nurses' presence is of utmost importance.

One of the respondents said,

> *".... we should not be scared of AI considering its drawback rather we should find out the approach to efficiently use it for eldercare." (P4)*

Some of the interviewees said that future AI could be more productive and human friendly. One of them stated that,

> *".... we are expecting more AI in the near future and it would be amazing to have such AI that explain for instance the level of pain or such other suffering of a patient who cannot communicate." (P2)*

This points out that nurses are well familiar with the importance and need of AI for elderly care and thus are willing to accept it but not at the cost of their job. Nurses believe that AI can play a very productive role if it is partnered with healthcare staff. Such AI and nurses' partner relationship can be very helpful to achieve the desired results of improved eldercare.

Participants also provided examples of AI from their workplace including patient handling, medication management, chatbot and patient monitoring etc. Hence, participants were well familiar with the AI and its use for elderly care and with its advantages and disadvantages.

6.4 Responsibility

Digital ethical dilemmas of AI are of utmost importance for the strategy makers, healthcare staff, elderly and their families. Emotional and privacy concerns are on the top of this chart. Even though AI can have other issue like fault or misunderstanding etc. but lack of real emotions and data privacy are considered as the major concerns. Study participants discussed these issues for better understanding of the phenomenon at workplaces.

6.4.1 Emotional concerns

It is believed that AI may lack real emotions and care and it cannot be ethically acceptable and this in return can create issues for elderly care. AI may not understand or respond according to the real emotions and it may rather act according to the previous learning or understanding of a certain situation.

AI can be used where it can be benefited to the maximum level and nurses can take the role when it comes to the emotions. As one of the respondents said,

> *".... AI can help at broad level but the nurses' involvement is necessary to control the faults and failures and understand the emotions. Human life is important to save in case of AI failure." (P1).*

Another participant (i.e. P3) also mentioned that,

> *".... There will be more advantages if we know how to benefit from AI but there should be humans behind it for better emotional care."*

Participants strongly believed that AI can never provide an emotional care like a Nurse. Despite the fact that AI may have emotional understanding at some level but it can never replace real humans. Fake emotions can rather cause harm for elderly sometimes, more than its benefits. One participant stated that,

"The way an elderly smile and talk is a sign itself that a nurse can understand much better than artificial intelligence." (P1)

6.4.2 Privacy concerns

Respondents of this research study agreed to the fact that AI does bring digital ethical and privacy concerns at the workplace and nurses need to find the balance regarding how to use it in the best possible way.

Privacy concern remains another big issue as discussed in the literature above since AI can keep record of patients and can hear or even forward the details to the third parties. One of the respondents explained that,

"…. When the data is stored and it can be leaked, it's hard to know where it will end. Recently there was a big issue in Finland when all the data of patients were stolen and made publicly available. Moreover, if someone is watching you all the time, you may get scared that your privacy is violated." (P3)

Privacy is usually at risk with the use of AI as it is hard to fully control it at this stage of the use of AI. Especially, when patients are monitored all the time with an aim for better care. As participants said,

"…Yes, privacy is absolutely violated at some scale." (P1)

"When somebody is constantly watching you, your privacy is violated and you do not feel comfortable" (P4)

"… Machines are designed to do certain task and they will do those tasks without considering the privacy issues and it will be hard for elderly to convince a machine" (P5)

All in all, the respondents agreed that there are digital ethical concerns including emotional and privacy concerns at the work places where AI is used. However, it can be minimised by the proper involvement and better management by the nursing staff and policy makers and also by including elderly. Moreover, digital ethical regulations can be improved and circulated among such working environments to reduce these risks and benefit from AI at larger scale.

7 Discussion

This chapter presents a discussion of the research findings and methodology. Moreover, it highlights the importance and use of AI in elderly care and what are the ethical dilemmas associated with its use. Moreover, this chapter also provides the insights based on the interviews and presents its conclusion, limitations and future research suggestions at the end.

7.1 Discussion of the research findings

Based on the results of the semi structured interviews, the main findings of the research are presented in this section of the study. The research findings about the replacement of human being are in line with the literature above. Sherry (2011) and Turkle (2011) mentioned that AI can minimize the real human interaction if replaced by the nurses. The study findings show that AI cannot replace nurses as in certain situation nurses can better understand human emotions, their history and can also control the panic situations. Moreover, AI can help at very broad level and nurses can benefit from it to provide improved services to the elderly for instance medicinal care, lifting the elderly, monitoring from distance and diagnosis etc. However, nurses believe that system cannot be replaced fully with AI only as it may create chaos in some situations. Human interference and interaction are of utmost importance for improved care and proper management.

Moreover, research findings show that acceptance of AI may vary from one person to another. As long as the use of AI is easy for elderly to understand and they do not feel threatened or do not have any privacy concerns, they accept it. However, elderly do not show positive attitude to the AI if they have privacy concerns for instance if they feel someone is continuously monitoring, listening or sharing their data with the third parties. According to Ho (2020), use of AI may be acceptable and beneficial if considering clinical and ethical factors while designing these technologies. Elderly' level of education, mental and physical health and willingness also plays a major role to use and adopt AI at workplaces.

Findings of the study depict that there are few ethical issues that occur due to the use of artificial intelligence for elderly care. Most common ethical issues are understanding real emotions, privacy breach, safety and transparency and algorithmic fairness. Lack of real emotions and data privacy are considered the major concerns. It is evident that these ethical dilemmas do prevail in the elderly care sector but nurses believe that in the near future AI could be more reliable, efficient and effective. They believe that current digital ethical issues

and other obstacles will be addressed and AI will be updated for improved and secure healthcare. However, as mentioned in the literature above, Sharkey and Sharkey (2006) stated that emotional expressions are allowed in the robots with AI if they are not manipulating real emotions. Study findings also show that the privacy concerns with the use of AI can be solved with proper management by the nurses and policy makers.

Research findings suggest that AI and nurses can work as partners to support each other for better outcomes and these findings are in line with the previous work of Etzioni & Etzioni (2017) as they state that if robots with AI are considered as partners and not as substitutes, certain ethical issues can be avoided or lessened.

Based on the findings it is suggested that AI can only provide the desired care and best results to the elderly if digital ethical issues are addressed and if elderly and nurses are provided with proper education and understanding of its use. Moreover, if nurses or elderly feel threatened by any means they should be provided with clarification or solution to overcome these threats and implement the use of AI.

7.2 Methodological discussion

Watson's theory of human care places person as the focus of patient centred care. According to the theory, a person or patient should be treated with dignity, compassion and respect. This approach improves the caritas process, nurse's assistance in healing, treating person as what they are and what they may become, establish real relationships and help in development of humanity (Watson, 2008).

The theory provides insight for person care to achieve high goals of harmony and care for social, emotional, and spiritual wellbeing. It is essential goal in elderly care settings to provide the empathy, care and provision of respect. According to Ienca et al., (2018) with the outcomes of health promotion and care, there is also a need to think about how AI may affect older adult's emotional, relational and psychosocial needs. Use of AI may lead to many concerns about interpersonal care and the effects of using AI for care and healing process. Since the theory states that the person should be treated with dignity, compassion and respect. It was important to know how AI will comply with these factors to provide better care by not compromising with these ethical dilemmas.

Research found out that dignity, compassion and respect can be achieved when AI is properly monitored itself. It should be working as a partner with nurses instead of taking the

whole responsibility as it may breach the rules of dignity, compassion and respect otherwise. Moreover, this partner relationship is important to achieve high goals of harmony and care for social, emotional, and spiritual wellbeing of elderly. These assumptions are made from the collected data which is considered reliable and valid if tested again in the same research settings.

The reliability and validity of a research is of huge importance to ensure the quality of research. The validity is to find either the findings of research are actually what they are supposed to be (Saunders et al., 2007). According to (Yin 2009), validity explains the accuracy, credibility and trustworthiness of a research study. The method of data collection for this study is qualitative, one-to-one interviews that are done on a small scale. According to Crouch & McKenzie (2006), this kind of small samples enhance the research validity of fine and in-depth analysis of real life.

Reliability of a study means that the research techniques and methods show consistent findings of the research. Mainly in qualitative research, when researcher repeats the same study, it gives the similar information (Easterby-Smith, Thorpe & Lowe, 2002). During the questioning process, all the participants are asked the same questions to maintain the internal consistency. All forms of questions in the study provided similar answers. However, Robson (2002) says that there are few threats to the reliability of the study i.e., Participant bias, participant error, observer bias and observer error.

Participant bias takes place when participants of the interview do not provide information entirely. This could be due to anonymity or voluntary nature of the information being provided. Saunders et al (2007) stated that participants of the research should provide some part of information in order to avoid sharing the whole sensitive data. In order to avoid participant bias, there was enough time scheduled before interview to build a trustworthy relationship and provide with all the details about how they cannot share the information if they do not want to. Moreover, participant error can also take place as a result of boredom, tiredness or stress. During the interviews, all these factors were kept in mind to avoid the participant errors.

Observer bias may take place if the nature, body language or speech of interviewer lead to biasness. Observer bias can happen when "when observers give inaccurate responses in order to distort the results of the research" (Saunders et al., 2007). Observer bias can take place if

interviewer makes a systematic error. In order to avoid any errors, interview questions were reviewed and interview process was done carefully.

7.3   Conclusion, limitations and recommendations

The collected data shows that there are three main themes of the study findings i.e., human replacement, individual acceptance and responsibility. It is concluded that AI is not expected to replace humans rather it is seen as a partner for improved elderly care. Nurses happily accept the AI as a partner for support and precision in the decision making. However, the level of acceptance may vary for elderly considering their willingness, education, health and awareness.

AI alone is not expected to take the responsibility of emotional and privacy concerns. Human being i.e. nurses are considered to better understand the human emotions and to better handle the privacy issues of elderly compared to AI. However, despite its digital ethical concerns, AI as a partner is considered very beneficial, efficient and effective.

Like any other research, this study also has its own limitations. First of all, the interviewees and elderly care places are selected from the city of Vaasa, Finland only. Moreover, even though the author communicated and tried to avoid the respondents' biasness, the semi structures qualitative interviews may include the respondents' biasness and may not maintain a neutral attitude. Moreover, the data is collected only from few nurses and from a small city of Finland therefore, its limitation is that it may not be generalized outside the similar settings.

The future researchers should keep these limitations in mind to enhance the research work. It is recommended to interview more nurses from different cities to have more reliable and generalized results. Moreover, the future researchers should also include the elderly at their home setting as they may respond differently to the AI compared to those staying in the elderly homes.

Lastly, the future research should also consider the impact of covid-19 on the use of AI and ethical issues for elderly care. Since many nurses and health care workers have been occupied and there is more need of care and AI to help support the elderly, it would be interesting to see how the pandemic situation has affected this sector and how the future research findings may vary from the results of this study.

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Appendices

Appendix 1. Questionnaire

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Semi structure interview guide

1. Tell about yourself

    - Age
    - Gender
    - Education level
    - Experience of elderly care
    - Work organization

2. Do you know what is Artificial intelligence?

    - If yes, kindly give examples
    - If No, we may not continue

3. How do you think elderly respond to the use of AI?

    - Positively, are they willing to learn about AI? please explain/ give example
    - Negatively, please explain/ give example

4. Do you think there are any ethical dilemmas associated with the use of AI in elderly care?

    - If yes, please explain.
    - If not, please explain.

5. What is your opinion if robots replace the nurses for the care of elderly?

    - It will positively influence, please explain.
    - It will influence negatively, please explain.

6. Is there anything else you would like to add about the topic?

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Consent form

Research*: Artificial intelligence and its digital ethical dilemmas for elderly: A Finnish nurses' perspective.*

Background*: AI plays a vital role in every field these days and especially it has a very important role in the field of healthcare. It is very importance to find out the ethical dilemmas associated with AI in elderly health care.*

Aim: To gain better understanding of the digital ethical dilemmas associated with the use of AI for elderly care in Finland from Finnish nurses' point of view.

Research questions:

3. What are the possible ethical dilemmas of AI faced by elderly?
4. How the elderly and nurses respond to the use of AI at workplace?

I am a final year student in nursing degree program at Novia University of applied sciences. I am conducting this interview for research purpose. With this consent you agree to:

- Confirm that you have read and understand the topic of the study and have had the opportunity to ask related questions which have been answered fully.

- Understand that your participation is voluntary and you are free to withdraw at any time. Moreover, you can skip and leave certain questions of the research if you do not feel to answer.

- Understand that the answers provided by you, are going to be recorded and looked at by responsible individuals i.e., researcher and supervisor only. The material will be coded to keep confidentiality and will be destroyed after the thesis presentation

- The thesis will be published on Theseus website.

Participant signature: _____

Date: _____

Researcher: Ayesha Bano, Bachelors of Nursing, NoviaUAS

Supervisor: Rika Levy-Malmberg, Senior Lecturer, RN PhD, NoviaUAS