

A QUALITATIVE APPROACH TO THE PUBLIC PERCEPTION OF AI

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ABSTRACT

Since the Dartmouth workshop on Artificial Intelligence coined the term, AI has been a topic of ever-growing scientific and public interest. Understanding its impact on society is essential to avoid potential pitfalls in its applications. This study employed a qualitative approach to focus on the public's knowledge of, and expectations for AI. We interviewed 25 participants in 30-minute interviews over a period of two months. In these interviews we investigated what people generally know about AI, what advantages and disadvantages they expect, and how much contact they have had with AI or AI based technology. Two main themes emerged: (1) a dystopian view about AI (e.g., 'the Terminator') and (2) an exaggerated or utopian attitude about the possibilities and abilities of AI. In conclusion, there needs to be accurate information, presentation, and education on AI and its potential impact in order to manage the expectations and actual capabilities.

KEYWORDS

Artificial Intelligence, machine learning, public perception, qualitative study, technology

1. INTRODUCTION

Between the years 1951 and 2022, PubMed records around 150.000 publications relating to Artificial Intelligence (AI). There has been a considerable increase in its scientific interest ever since the Dartmouth workshop on Artificial Intelligence in 1951. This interest, however, is not confined to the scientific community. The public engagement with AI has also grown over the past 20 years, especially since 2009 [1]. When googling AI in the year 2000, the results would have been around 37.000 results. Now, this number is at 3 billion results. This underlines the exponential growth of available sources, from which to extract information about the topic. Alongside this digital and scientific forum, there also remains a noteworthy social and cultural representation of AI. According to Wikipedia (2022), between the year 1927 (the movie *Metropolis*) and today (the movie *Je suis Auto*, 2022) around 150 movies were produced that include either AI as a technology, a theme, mood, or discussion.

In 2021, the European Commission revised the *Coordinated Plan on Artificial Intelligence* which is a set of goals and recommendations for the development and uptake of AI in the European Union. One of its key policy objectives is to implement AI as a societal good, that is, *for* people. The general public is one of the main stakeholders in this discussion and its perception influences the integration of AI in society and everyday life [2]. To estimate the impact AI has and could have on society we should understand what it is, what it does, and how and where it is implemented. AI is a term coined by a group of computer scientists at the Dartmouth workshop on Artificial Intelligence [3] and refers to the ability of a computer to perform actions commonly associated with human intelligence [4]. Until then, this definition has undergone various adjustment and now adds up to a composite that describes AI as the field of science in which we develop technologies that displays certain cognitive tasks in an intelligent manner [5]. Some of

these tasks include image, face, and object recognition, speech translation, movie synchronisation, or transportation [6], [7], [8]. AI is used as a tool to quickly and efficiently analyse large amounts of data by implementing pattern recognition algorithms that are applicable for the task at hand. These tools may be in the form of software (i.e., algorithms, deep learning, neural networks) and hardware (i.e., robots, machines, cars). An essential feature of AI is large amounts of data with which algorithms can be trained in various desired (or undesired) ways [9], [10]. AI is thus a tool which automates part of the cognitive labour which, otherwise, would be carried out by humans [11]-[16]. The technologies that employ AI are the focus of this study.

But what makes people accept AI-based technology? Many papers, studies and books have been written on the topic of technology acceptance, and the connected mediating influence of perception of the technology [20], [21], [22]. However, the invention of something does not necessarily lead to its acceptance [22]. On the one hand, people have to know something exists and, on this base, have the chance to draw informed decisions about accepting it. On the other hand, and often in spite of their knowledge about the technology, people still might refuse to accept a technology out of personal or affective reasons, even though the technology is also beneficial for them [23], [24]. Additionally, the technology also has to be useful, easily accessible, and provide an addition to an otherwise less efficient type of work [24], [25] [20]. Nonetheless, rejection, or more precisely, not accepting a technology might still ensue [26], [27]. Technology acceptance is, thus, a multi-factorial process. During this process a person, the (potential) user, evaluates whether they approve of the advertised technology based on several systemic, individual, and context-related influences. Understanding which aspects and factors influence the deliberation process is key to produce an acceptable, and for the developer profitable, product [21]-[27].

The next question is: Who accepts the technology? Different people of interest i.e., different stakeholders, such as health care worker, politicians, doctors, lawyers, engineers, to name a few. However, should the general public even be included in the acceptance process? In a recent study on public deliberation about the topic of AI, Lehoux, Miller and William [28] used a scenario-based approach to bring ethical challenges regarding AI-technology to the public's attention. The aim of the study was to gain insights into the public's imagination, and to validate the value of citizen's participation in the field of responsible research and innovation. This is a good example of public engagement for research purposes which is an essential part of technological integration within society [29]. Therefore, the public *should* be considered as an important constituent of the development and implementation process and the adoption of innovative ideas in general, and new technologies in particular.

According to AI-watch, a website by the European Commission monitoring AI developments and progress, there are over 1000 AI firms and more than 400 patents in AI-technologies (i.e., software and hardware). These figures only represent the current situation in Germany. Furthermore, the EC acknowledges that the general public might not be able to '*fully understand the workings and effects of AI systems*' (EC: AI ethics guidelines, 2021, p.23), which is a reasonable assumption, based on the myriad of different AI-applications, algorithms, and technical jargon. However, this is no reason not to engage them in a manner that is accessible to a non-expert in the field. It is evident that AI is already in widespread use in society and everyday life, with a broad range of individual differences, user diversity aspects, privacy, and trust issues, all of which need to be considered in this line of research [30], [27], [31]. This widespread availability and continuing development creates a need for a thorough understanding of the stakeholders perspectives regarding those technologies.

The development, in the scientific, political, and societal sphere, favours more investigations of the public perception of AI [32]. The multi-level growth of both societal and scientific interest in

AI opens various new perspectives on, and opportunities for epistemological, ethical [33], judicial [34], and technological discussion [35] [36] [9] [37]. While the public’s exposure to the concept of AI and thus its perception has shifted increasingly into the empirical focus [38] [39] [40] [41], there remains a need for further and, due to the rapid ongoing development of technology, updated insights into the public’s perception[28]. This study aims to provide additional qualitative insights into the public’s knowledge of, contact with and expectations for AI.

1.1. Questions and Logic of Research

To achieve an understanding on public perceptions and mental models of AI technology and to learn about potential knowledge-gaps, misconceptions regarding expectations as well as acceptance-relevant barriers, we carried out a qualitative interview study in which laypeople were asked about their knowledge about AI, expectations in different application contexts, individual wants and needs but also potential barriers people see when using AI technologies

The qualitative approach was chosen to better understand the individual reasons people might give and their explanation for (not) using or accepting AI. The findings might help researchers understand sensitive information and public communication strategies related to AI technology. The results can be used to develop educative materials which might help to further support the public’s understanding of AI technologies which they will encounter in everyday life. Likewise, technical designers and computer scientists developing AI technologies might also benefit from such early cognitive concepts as it gives them a sense of where laypeople have difficulties with adopting, understanding, or using AI-based technologies.

2. METHOD

2.1. Participants

Participants were recruited from the social network of the researcher. The final sample included N = 25 participants. Information on the demographic variables can be found in Table 1. No prior knowledge about AI was necessary for the interviews but three participants (2 males; 25yrs. and 63yrs., and 1 female; 59yrs.) had previous working experience with AI technology or had worked in the technology industry. The remaining sample had no prior professional experience with AI or AI-based technologies. All participants were notified prior to the interview about the careful and anonymised processing of their personal data, that the interview was voluntary, after which, they all gave their informed consent to participate in this study.

Table 1. Sample statistics

Variable	N	Percentage %	
Gender	25	100	
Females	14	56	
Males	11	44	
Age	Mean	SD	Range
	43,72	21,65	21-82

2.2. Procedure

To assess personal-level knowledge and understand subjective attitudes about AI we chose a qualitative approach with open-ended questions. These questions were asked in semi-structured interviews over a period of one month and after careful analysis of the existing literature on the topic. The interview guideline was developed from November 2021 to January 2022. First, a literature review was conducted to find relevant areas of use for AI. Four areas were found to be the most relevant for the current research purposes. The areas were (1) Finance, (2) Mobility, (3) Communication, and (4) Healthcare [42] [8]. On the basis of these areas and the corresponding literature, we developed the open-ended questions and metaphors for the interview-guideline. The interviews were designed to be as explorative as possible to avoid influencing the participants. This approach is useful when examining the particular reasons people give and the attitudes they hold about a topic. The explorative approach was adapted from existing studies [51], [52], to evaluate mental models—i.e., the participant’s subjective view—about AI. There were four segments in the interview guideline. All segments were intended to elicit the most spontaneous response that the participants had, without too much deliberation or concentration on technical details. The first segment of the guideline was about general AI knowledge that each participant might have, and areas of use that would come to mind. The second segment asked participants to indicate what reasons there were to use AI (i.e., advantages) or not to use it (i.e., disadvantages). After this segment, the third question was about existing contact (unaware or aware) with AI or AI-based technologies. The last segment included a list of metaphors from which participants should choose the option that would best describe what AI is for them personally.

The interview started with a general introduction to the topic, the name and field of interest of the researchers, and the overall aim of the project. To avoid bias, no specific information was given about AI or technologies based on it. During the interview participants should firstly, explain what AI is, and secondly, what advantages and disadvantages they would consider it to have. Then, participants were asked to describe AI in their own words, and finally encouraged to name a metaphor which would best describe AI for them. These metaphors could be chosen from a list in their handouts or from the participants’ own imagination. To assist the participants on how to answer, additional sub-questions were introduced if needed. These questions were further divided into the private sphere (home & work) and the public sphere (public places or transportation).

2.3. Data Analysis

The interviews were carried out in February 2022 via Zoom, Skype and, in some cases, in person. The interviews lasted between 30 min and 1 hour. Four participants (>80 years) were interviewed together. The remaining 21 participants were single person interviews. All participants were handed a copy of the interview guideline in which they could follow each question. The interviews were audiotaped and transcribed in March 2022. The transcripts were evaluated by the researchers and categorized based on recurring themes in all the interviews, and pre-existing themes found in the literature. The categorization was performed in MAXQDA (2018) [53]. The study was carried out in Germany and in German. Selected quotes from the interviews were translated to English for this publication.

3. RESULTS

The results of this research will be presented in the order of the original interview guideline. The first interview question was as follows:

3.1. ‘What do you already know about AI?’

This question was answered very similarly among the participants. It was intended to invoke the first knowledge and thoughts about the topic that came to mind. Eight people had some, but not a lot of prior knowledge about AI:

“Not much, just that it is technology that becomes intelligent through humans, not by itself.” (F23)

“Basically nothing, I have never concerned myself with it, only some stuff you pick up from the media.” (F59)

Others said they had no prior knowledge *“I have no idea at all” (M50)* or no real prior knowledge *“Well, honestly, I have no real idea what it is” (M58)*. Some indicated to have never thought about it: *“[...] I never thought about it” (F61)*.

In contrast to this, 11 people had an idea – sometimes very accurate – about what AI is. There were, again, very similar answers to the first question:

“Well, AI is Artificial Intelligence. I would define it as machine learning, that is, based on some particular dataset or data, the AI can create knowledge and from which it can draw conclusions.” (M25)

“So, I think that AI means an algorithm that can learn, and which is implemented in a machine.[...] and AI can speed up processes and make them easier in order to save money, time [...] something where machines get human abilities to make human life easier.” (F58)

3.2. ‘Where is AI implemented?’

Here, too, similar answers were common among participants. All, but one (F74), participants indicated that AI was built in their smart-phones for face-recognition, navigation, or speech recognition (SIRI). Some participants also mentioned smart-home technologies like Amazon’s ALEXA or the PHILLIPS HUE system. The next most frequent answer was autonomous driving or automated assistance system in cars (e.g., automatic braking, lane assistant, blind-spot assistant). Other areas of implementation included—in order of frequency— medical technologies, industry, video games, and science (i.e., research). Exemplary results and areas of use are summarised in Table 2.

Table 2. Summary of ‘Where AI is implemented’.

Technology	Area of Use
Autonomous driving	Mobility
Traffic lights	Transportation
Approximation	Engineering
Software to detect group dynamics in stadiums	Software Public Entertainment

3.3. 'What is the difference between an AI-based technology and non-AI technology?'

The most common answer was that AI is something that learns. One participant (M25, with prior knowledge about AI) explained that:

‘I would say that the [AI] system learns, that is, it analyses data. By means of this data analysis and the acquisition of new data, it learns and adapts to the individual needs and the purpose for which we developed the system. ‘(M25)

Another view about AI was that ‘‘it’’—meaning AI as an individual in its own right—develops into something ‘‘for itself’’:

‘Well, I think about AI as this individual that develops, and other technology [not-AI] does not, because it only acts on entered programming codes. ‘(F47)

Two participants (F80 & M82) discussed the issue of AI as something functional, as opposed to something emotional or social. For them, AI, could never ‘‘know’’ the emotions or ‘‘represent them (F80)’’ in the way humans do. Overall, the 25 participants all mentioned that AI, could not, or should not be seen as something empathic, emotional or as a ‘‘social agent’’:

‘[...] it will be able to do everything, but emotions, it should not be able to do. ‘(F80)

‘[...] yes, I think recognizing emotions, that is a step too far. ‘(M82)

*‘My emotions are none of its business!
[...]my emotions belong to other humans. ‘(F74)*

Another participant also shared this sentiment indicating that emotions are something reserved for human beings:

‘Recognise emotions...under no circumstances. They are reserved for humans ‘(M24a)

Another participant agreed with the classification and said that:

‘Exactly, AI should not be seen as something social! ‘(M58)

One participant elaborated on this classification saying that, even if it (AI) could recognise emotions, she would not want it to act on them:

‘(When the AI recognise sadness) [...]oh she is sad, let us play a happy song...I am quite old-school in that respect...then I’d rather stay sad, nothing should turn this around (laughs) ‘(F24a) (brackets added)

This last answer was shared by another female participant with regard to the individual description of AI:

‘Well, I see AI as a Servant or Advisor because the human aspect...well, this will never be the case for me. [...] friend? Well, how?! I do not share (my emotions) with my computer. ‘(F59)

3.4. ‘What are reasons to use AI?’

Following the question of the difference between AI and non-AI, participants should now give reasons to use AI. The most common answer was the usefulness of AI because it would make processes or work easier. The answers are summarised in Table 3 below.

Table 3. Reasons to use AI and advantages.

Reason to use AI	Advantages
Language Translation	Translate any language
Cleaning Robot	Convenience
Make life easier (cleaning robots)	Convenience
Efficiency	Saves time

The following quotes were extracted from the transcript to explain some of the reasons participants gave for using AI:

“In the own home it would make sense to use it to make life extremely easier, like these robots that clean or care for patients at some point.” (F50)

“It probably would make things easier when it takes over easy task. The cleaning robot would be an example for this.” (M24)

“Because it is faster, it can detect faster. But also, that the progress is faster. Maybe it is, on the other hand, not too good because one loses touch with rationality. But it is important that it moves along (AI), and that it is being used.” (F80)

3.5. ‘What are reasons not to use AI?’

Participants were asked to indicate reasons not to use AI. Their answers are divided into subsections. These sections represent categories created in the MAXQDA [53] data analysis and are based on the answer given by the participants. Most of the time participants showed some level of concern regarding AI. These levels of concern were divided into the following subcategories.

3.5.1. Data Privacy Concern

Data privacy was distinct from personal privacy. In this sample the participants were more concerned with their personal data (i.e., name, social security number, bank statements), than with their own privacy (i.e., the right to be left alone or *“picking my nose, without being watched” (F59)*). All participants were concerned that their personal data could be used to their disadvantage (e.g., higher insurance payments).

“[...] things that concern me individually, I reckon there are certain aspects were the AI is being misused, the personal data.” (M25)

3.5.2. Privacy Concern

Privacy was defined by one participant as the individual’s sphere in which one has no need to change one’s behaviour in either a negative or positive way. This participant associated this type

of privacy with a decreased cognitive load due to the freedom of not being watched. She underlined the importance of being able to be left alone:

“That you can be just the way you are. [...] even when the own behaviour has no negative consequences, but just that...being able to be burden free“ (F25)

Another participant had a concern regarding the private sphere and dignity of other, particularly older, people:

“[...] or when older people are monitored in a room [...] I think believe there are personal contexts which become endangered such personal privacy. “(M25)

3.5.3. Loss of control

In addition to this concern of both data privacy and personal privacy, some participants worried about losing control over an autonomous system. There were differences, however, in what this “loss of control“ included:

“What it (AI) should not be allowed to be is more intelligent than the human that has developed it and if one loses control over it. “(M24)

“It should definitely not be able to program itself! Power of the machines and whatnot...If you have watched Terminator, you surely wouldn't want that. If it is intelligent and develops a personality with own interests like: “I do not like asparagus“, for example...this would be a problem. “(F42)

“[...] yes, both, loss of control and privacy (as areas of concern“ (F59)

“[...] it depends on how it's done...or is it like the Terminator...like this autonomous machine “(M50)

These were concerns related to the presentation of AI in the media or movies. There was another facet of loss of control regarding the software and algorithm development and implementation. One participant, who had worked in the technology industry, said:

“The AI-system needs to be supervised...not by the system itself, of course, because then it becomes rogue[...] that is the problem with AI...that, due to money issues, the mistakes in the original codes are being transferred to the technologies we use today. And then the AI provides faulty output “(M63)

3.5.4. Surveillance Concern

In line with this reasoning some participants had concerns about surveillance. There were two levels of concern. First, that AI might monitor people. Second, that people might not sufficiently monitor AI. This distinction was not made by all participants. Two participants (M25 & M63) have a professional background in the area of AI and reported specific, industry related concerns.

(A) AI monitoring people:

“If older people are constantly being watched in their room via a camera and are under surveillance...that, I think, is not acceptable at all!“ (M25)

(B) People monitoring AI:

“For me it’s just scary because I know about the source of error. If it is done the way my company used to do it, then I definitely don’t want that because, if so, it cannot work!”

This participant also gave a reason for their view:

“The reason is: Money. Because it is more expensive to sufficiently monitor the system. I am convinced that no company, no government, doesn’t matter who it is exactly...no one would be willing to do this in such a way that it works adequately”(M63)

3.5.5. Question of Responsibility

The final concern was about responsibility. In one case the participant was referring to the public transportation system (e.g., autonomous trams):

“I think if the tram will be able to drive by itself one day, the question of responsibility arises...in the case of an accident that is.”

However, this participant also added a statement about the state-of-the-art of this specific technology:

“But I think if we reach the level of technology at which we are able to do this, it is definitely a good thing.” (M24)

Other participants had different facets of responsibility in mind:

“From my point of view, it should be forbidden to use the (AI-based) tracking on the internet...not only as an adult, it pushes me towards buying stuff that I do not need...I also think that teenagers and children are heavily influenced by this. Their whole nature and personality”(F42)

“I think that before someone were to use an AI, it should not be possible without my consent. It should not happen that a doctor won’t treat me because I have not given my consent.”(F74)

“[...]it should not share this with my insurance...there, my affinity for data privacy is popping up.”(F25a)

3.6. Metaphors

This part summarises participants personal associations with the term AI and related metaphors or ‘pictures’ that came to mind. The most common metaphor for AI was *servant* or *advisor*. Only one participant (M25) indicated that, for him, AI is something ‘*social*’, like a ‘*guardian angel*’. The other participants described AI in terms of something that is *functional* i.e., used for a specific task. For practical reasons, not every quote from the transcripts could be used in this section. However, in the following section the overall themes, and some additional quotes, will be discussed and a list of the metaphors is presented in Table 4 and respective frequencies in Figure 1 below.

Table 4. Metaphors for AI.

Metaphors
Advisor
Servant
Patron
Guardian angel
Roommate
Helper
Friend
Ruler

Other Metaphors like ‘Roommate, Friend, or Someone equal to me’ were categorically rejected by most participants. Only two participants said AI was ‘above me (F25)’ or ‘considered [AI] a friend (F59)’.

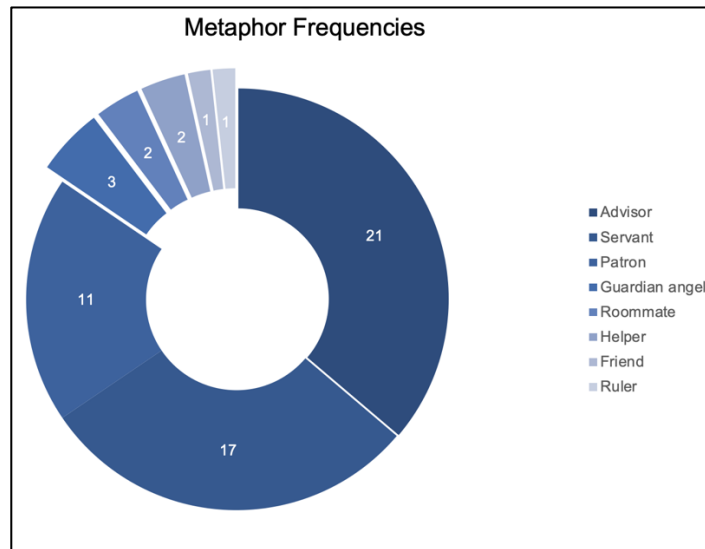


Figure 1. Metaphor for AI Frequencies

4. DISCUSSION

4.1. General Summary

This study used a qualitative approach to investigate people’s knowledge, expectation, and perception of AI. It applied open-ended questions to assess what people generally know about expect of, and how much contact they had with technology that is based on AI. Examples included smart phones, laptops, tablets, cars, and medical technology such as diagnostic and prognostic tools. This was done to assess what people consider about a new technology and which aspects they tend to focus on in terms of knowledge, perception and subsequently acceptance.

Participants in this sample had all heard of the term AI. However, the answers to what AI specifically is, varied greatly. In general, the participants had a good grasp of the basic function of AI and AI-based technology. The general understanding of AI was relatively good. Overall, the participants were also open to the ideas and promises of AI. The results suggest that the participants in this study were generally open to a ‘new’ technology such as AI, without

necessarily knowing the exact way the technology works, but rather, understanding its aim, the broad way an e.g., diagnostic algorithm reached a conclusion, or the general transparency of the system itself to answer the question of responsibility in case of a malfunction.

During the interview most participants were interested in the possibilities that AI holds and also curious about what it can and cannot do at the moment. However, there was a inaccurate judgment about how widespread AI really is in everyday life. Although most participants used a smartphone, not all of them considered it to be AI-based. Furthermore, some people thought that AI is clearly defined. This shows a certain discrepancy between science and society. In science, as discussed in the introduction, we do not have one clear definition of AI. Instead, a composite of different elements is created to come up with a working definition based on context. This definition, however, is by no means complete and applicable in every context. During this study participants ascribed AI to systems that were not AI and forgot to do so in cases where a technology is actually based on it. We will come back to this point in the section about the relevance of the present study.

Now we will focus on a different kind of discrepancy between the participants themselves. We will discuss two standpoints that originated from differential exposure to and understanding of AI. Most participants answered the open-ended questions without mentioning either utopian or dystopian views. Nonetheless, some participants mentioned either utopian (i.e., exaggerated views on what AI can do) or dystopian views. (i.e., unrealistic views on what AI could “become”).

4.2. Dystopian Views on AI

There were some answers that showed either an exaggerated view, that is, ascribing to AI what it cannot—or could not—actually do. Or an unrealistic view in the sense that, some participants associated AI with dystopian scenarios from movies such as the *Terminator*.

“It should definitely not be able to program itself! Power of the machines and whatnot...If you have watched Terminator, you surely wouldn’t want that. If it is intelligent and develops a personality with own interests like: ‘I do not like asparagus’, for example...this would be a problem.”(F42)

This dystopian view about ‘what AI can do’, was in response to the item: *AI can program itself*. The item-based part of the interview is not part of the current study. It was not further specified what *programming* means nor what *itself* would include. However, it seems that some participants had an inherently bad or negative association when thinking about losing control over an AI system:

“What it (AI) should not be allowed to be is more intelligent than the human that has developed it and if one loses control over it.”(M24)

Almost all participants associated something *functional* rather than *social* with AI. Although this might not lead to a dystopian view per se, this trend indicates that AI is considered to be something that might be able to surpass the *functional* abilities of humans (e.g., diagnosing patients, data analysis, object detection). While there is currently no general-AI, that is, an all-purpose system that can transfer knowledge to any domain, it is important to consider possible concerns and implication of such a system ad hoc [43], [44], [45]. The people who knew what AI *actually is* indicated that, for them, it is something very transparent and useful. The people who had no idea about AI could not form this opinion and, thus, described AI as something opaque or *threatening*. The part of AI, commonly known as machine learning, is a very complex statistical

process of calculating different weights from input data to generate an output. However, the technical details were not explained by any participant because it is not common knowledge, and also beyond the point of this study. Still, and as mentioned in the introduction, the missing understanding of the workings and effects of an AI system, could have motivated the European Commission to propose an organisation that will provide a technical certificate, attesting an AI system's transparency, fairness, and accountability. There is a clear political understanding of the discrepancy between knowledge within the general public and an accessible source of information in the 'AI Now Report' from the year 2018 as well as the European Commission's 'Ethics guideline' from 2021. The implementation of AI-based devices into everyday life should be based on an informed consent. To be able to give a truly informed consent, it is important that the provided information is accessible to the user or user group. In the realm of AI-system and machine learning algorithms, this is currently not the case for most users [54].

4.3. Utopian Views on AI

In contrast to the dystopian associations is an exaggerated utopian view on AI. One participant ascribed to AI abilities which it cannot perform. The following quote is a good example:

“[...]when I get up in the morning to make coffee and it knows what I want...that is an advantage. But on the other hand, it doesn't forget and when it is intelligent..., and has a personality, everybody does, and it does too...“(F42)“

This view is not utopian per se because it does not describe AI as something desirable. Rather it exaggerates the potential abilities that AI can have. Intelligence is not the same as personality. However, one cannot blame this participant for holding this view, because of the way that AI is being portrayed in the movies (e.g., the *Terminator*, *Her*, *Ex-Machina*). These movies portray AI as being completely autonomous and super-human. By presenting AI in such a way, people might get the wrong impression about AI's actual abilities. Furthermore, this depiction tends to under represent what AI can, and how it is currently working in everyday life e.g., smartphones, factories, cars, computer vision, to name but a few. To know that this, too, is AI would help people understand the potential of this technology, and in turn accurately evaluate its true benefits (or barriers). This particular association was an exemplary result of the way movies can influence the perception of technology. The influence of the popular culture, and especially from movies, on technology perception, is a well-established concept [55]. Therefore, this relationship is another relevant angle for future studies.

4.4. Relevance

The relevance of this study is first, its explorative summary of subjective knowledge and attitudes towards AI. Second, the outline of potential barriers that might occur during the development and implementation process of AI-based technologies. The qualitative nature of this study assessed the reasons for a particular attitude or subjective perspective on a certain benefit/barrier in terms of AI development, use, and implementation. On the one hand, participants' expectations were (subjectively) influenced by their own contact with AI systems. On the other hand, this view might also have been moderated by the exposure to the media and popular cultures' presentation of AI. In future research, the results of this study need to be quantified to validate a reliable association between the variables perception and acceptance of AI [1], [28], [46].

According to one participant (M63), the discussion about AI and its technological implementation has seen a steep increase since the year 2000 due to the developments in computing abilities. In line with this claim is, Fast and Horvitz [1]. They found that public discussion too has increased since the year 2009 (coinciding with the release of the critically

acclaimed movie: *Terminator Salvation*). In their systematic review of New York Times articles on the topic of AI over a period of 30 years, Fast and Horvitz discovered a similar trend in public perception, with a discussion about AI that is usually more optimistic than pessimistic. This shows that still today, after more than a decade of exposure to AI, people still hold on to some of the narrow concepts about AI, and thus, tend to worry about losing control over AI. In line with this finding is also the concern people have about issues and questions of (moral) responsibility, data privacy, privacy, and security. These are all relevant elements because they can influence how people think about a technology, and if they accept it or not [9] [39] [46].

As addressed in the introduction, the acceptance of technology is a complex process. To avoid spending extensive amounts of time and energy careful consideration about this process is needed from developers, policy makers and other economic, political, or social stakeholders. This study is a first step in trying to understand what people consider to be important. It summarises a snapshot of people's attitudes and reasons which can help with the design as well as implementation of AI based technology by keeping in mind that, sometimes, there is a clear concern or fear, about a technology, that can be addressed by the developers.

Another relevant point is the knowledge and curiosity that people have about technology. Although there were participants who did not know a lot about AI, they still were curious about its potential and its future. Often these participants took issue with the opaqueness of AI, and they were uncertain if they could trust it. By providing a sufficient amount of transparency and public education on the technology, and co-developing AI-technologies with, and for people, many of the mentioned fears can be resolved. Therefore, this study can also be used as a roadmap to avoid these certain pitfalls.

Technology usually develops alongside the context and the society it is being developed for [45], [46]. Breakthroughs like the steam engine, the computer or, nowadays AI, tend to occur in a period during which, there is both a need for the new technology, and the resources to realise it [47], [48], [49]. The rapid development and investment in AI are facilitated by the increase in computing power, hard drive storage capacities, market interest in AI-products, and large amounts of available, and often unavailable, data [17], [18], [19]. However, the use of these technologies, in everyday life still depends upon the right perceptions of, accepting attitude towards, and need for implementation.

4.5. Strengths & Weaknesses

The main strength of this study was its reliance on purely explorative concepts. The open-ended questions were posed in such a way that any answer was possible and could be considered. The main interests for this study were the spontaneous and direct associations that people have about the concept of AI. The interview questions were selected from a pool of different areas e.g., e-commerce, finance, transportation, healthcare. Thus, a wide variety of potential associations could be covered and is presented in this paper.

In contrast to its strengths there are some limitations to this approach. The current study only presents explorative and descriptive findings which might not be generalizable to the wider public. Furthermore, the interview guideline was semi-structured which resulted in some variations in the interviews. Also, the sample included more people in the age range of 20-30 and only some above 70. This led to the skewed average towards a mean age of 43. Another sample-related limitation is the nature of the sampling method. The sample was conveniently chosen from the social circle of the researcher. This might have led to some biased answers with regard to interest in the topic, or the willingness to participate. Future studies should use a random and varied sample and to increase the variety and balance individual interests in this topic.

4.6. Summary & Future Research

In conclusion the study has shown existing and basic knowledge about AI and personal deliberation about important societal, ethical issues, and technological. Participants showed a good grasp of the concept of AI and were generally excited to learn about the topic. There is a lot of potential in interviewing the general public about AI. Future studies should focus on eliciting the reasons why people think that AI is *threatening*, *uncontrollable*, or a *guardian angel*. Additional quantitative studies could aim at generalising findings about the existing knowledge level regarding AI and AI-based technologies.

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