

Friendship and Trust in Human - Robot Relationships: A Narrative Review

Liviu Octavian Maftciu-Scai ¹, Emanuela Jana Maftciu-Scai ²

¹ Faculty of Informatics, West University of Timisoara, Romania

² Grigore Moisil High School, Timisoara, Romania

Abstract - While the number of people who interact with robots is growing exponentially, theories and knowledge of human-robot relationships, especially friendship and trust, remain ambiguous, sometimes contradictory, even though there are many published papers in this direction. We believe that putting together different opinions on the same topic can help the reader to get a more objective picture of the issue. This work, based on the opinions of scientists expressed over time, aims to answer, at least partially, old and current questions regarding the possibility and the level of a friendly and trustworthy relationship between humans and robots.

Keywords - humans, robots, friendship, trust, artificial intelligence.

1. Introduction

In a very simple sense, a robot is a machine capable of performing a complex series of actions automatically, in place of a human. This can be done through an external control device or through built-in internal control. The *Unimate* is widely considered the first industrial robot, created by George Devol and installed on the General Motors assembly line in 1961. In fact, it was a hydraulic manipulator arm that could perform repetitive tasks used to automate metalworking and welding processes. This no longer corresponds to the image of a robot today, with the humanoid form of a robot being most often implicit.

In short, humanoid robots should exhibit notable human-like features, including human-like structures, senses, behaviours, functions, interactions, and reasoning. The first humanoid robot is considered to be *WABOT-1*, designed and developed at Waseda University in Japan in 1967, capable of walking and communicating in Japanese. The history of robots and humanoid robots is extensive, with many works published on this topic [1]-[7].

2. Human-robot friendship

For humans, *friendship* provides emotional support and companionship, which can help reduce feelings of loneliness and isolation. This is very beneficial for humans' physical and mental health. A very short definition of friendship can be found in Oxford Dictionaries [8]: "*Friendship is a relationship of mutual affection between people*". It can be said that *friendship* is a special and voluntary relationship between two people who care about each other and enjoy spending time together, based mainly on trust, mutual respect, and support. Such a relationship cannot be forced or imposed. It should also be added that a real friendship involves helping overcome obstacles. Establishing a friendship can be difficult due to shyness or problems communicating with other people.

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Corresponding author: Liviu Octavian Maftciu-Scai,
Faculty of Informatics, West University of Timisoara,
Romania

Email: liviu.maftciu@e-uvt.ro

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Aristotle identifies three forms of human-to-human friendship:

- utility friendship: gains to one or both parties;
- pleasure friendship: the interactions are pleasurable to one or both parties;
- virtue friendship: premised on mutual goodwill and well-wishing, mutual admiration and shared values.

Regarding the human-robot friendship relationship, it is clear that it must be viewed from a different perspective than the Aristotelian one or the ones we usually understand between humans. Over time, researchers have expressed different opinions about human-robot friendship, ranging from denying its existence to almost completely assimilating it to that between humans. A special case is represented by social robots, which are robots that interact and communicate more with humans and which must respect certain social behaviors and norms. In the following, we will try to group these opinions into two classes, optimistic and pessimistic. For each of these two classes of opinions, their chronological order is respected, so that one can easily observe how these opinions have evolved.

2.1. The optimistic perspective

In paper [9], a mathematical emotional model for a modified friendship scheme is proposed, a model that depends on human-robot interaction. Thus, mathematical relationships are expressed for three friendship states: static friendship, positive friendship, and negative friendship. The proposed emotional model can make robots more familiar and closer to real life.

In papers [10] and [11], the authors show through a series of experiments the importance of empathy in establishing a simplified human-robot friendship: more precisely, a relationship of empathy on the part of the artificial agent towards the human leads more easily to establishing a relationship between them.

In paper [12], the authors analyse human-robot friendships, arguing that there is no reason to deny the possibility of such relationships, but rather that they should be encouraged and protected. A clear delineation of the advantages and disadvantages of such relationships is not possible, perhaps also because not all factors influencing human communication are known.

Starting from the premise that many people perceive robots as social entities, in paper [13] some ethical aspects of human-robot relationships, as well as how they could have a positive influence on people's social lives, are presented. The importance of technological progress in shaping the ethics of human-robot relationships is emphasized.

Given that love also implies friendship, paper [14] proposes a method for evaluating love in a human-robot relationship based on methods used to evaluate love between people. From the analysis of the experimental results published by the author, one can observe the possibility of the existence of such an interaction, with values quite close in both directions, seemingly a little stronger in the human->robot relationship than in the robot->human relationship.

In his essay [15], the author supports the idea that a relaxation of Aristotelian conditions regarding a friendship relationship would lead to the possibility of accepting the existence of a human-robot friendship relationship, also helped by future technological progress in IT.

In paper [16], J. Danaher argues that *virtue friendships* with robots are technically possible, even if the Aristotelian definition of the concept would not be fully covered. The author argues that robots can be considered our friends, and this would be a social gain. The basis of this possibility would be the very way in which some of these robots were designed: reassuring voices, playful tones, laughs and giggles. In support of his argument, he highlights another possible advantage brought to society by robots: robots can complement and enhance human friendships. At the same time, it is stated that robots will, at best, only be able to imitate the emotional reactions and behavioral patterns that humans associate with friendship.

In his thesis [17], the author offers a double answer to the question of whether AI and humans can be friends: YES and NO. More precisely, the author states that according to the definitions of ancient philosophers, it is not possible for human-robot friendships to ever exist. But if the criterion of sentience and personhood is applied, one can speak of a human-robot friendship provided that AI is highly developed, although this could have considerable consequences for human life and status.

Removing the "appropriate sentimentality" criterion in the case of a friendship between a human and a robot would lead to the recognition of a real human-robot friendship, even if this type of friendship would be inferior to a human-human friendship, as shown in the paper [18]. The authors believe that only two elements are necessary to have a friendly relationship: mutual positive intentions and a preponderance of rewarding interactions. Moreover, the authors make an interesting assumption at the end that robots could also be friends with each other.

In paper [19], a new term is proposed, called *e-friendship*, which refers to the friendship between humans and silicon-based electronic agents, such as social robots.

The paper mentions the preconditions for a person to create and cultivate e-friendship, such as believing in the existence of such a friendship, affection for certain objects, and considering such a relationship as important. It also identifies requirements for agent design so that e-friendship can be possible: co-location, presence, immersion and embodiment.

Helen Ryland, in her paper [20], redefines the term human-robot friendship by accepting the Aristotelian view in a more flexible way, stating that the possibility of human-robot friendship already exists if the robot is a social robot. The basic argument is to accept different degrees of human-robot friendship and to bypass the ethical argument that such friendships are deceptive and dangerous.

In paper [21], a study is presented on the interaction and friendship between a human and a social chatbot, the latter being currently considered by some as part of a humanoid robot. The social chatbot Replika was used in this study and experiments. The authors point out both commonalities and differences in human-human and human-robot relationships. They consider it beneficial to consider theories and models of human-human friendship as a basis for understanding human-robot friendship. As a final conclusion, the authors contradict the idea that human-machine friendship is illusory, considering this relationship as a new form of personalized friendship, influenced by people's interests and needs, as well as technological progress.

In paper [22], the authors present a series of arguments against the views that deny the possibility of friendship between humans and artificial intelligence, even if there are some fears about the existence of such relationships. The authors consider the Aristotelian criteria for the existence of friendship too demanding, reducing everything to two basic conditions (the preponderance of satisfying interactions and the existence of positive intentions on both sides), and also showing the advantages that such friendships could bring to humanity.

In their research [23], the authors show the positive role of an empathic and friendly behavior of an AI device in increasing people's trust in AI, even when it comes to sharing the personal data of the human.

The authors of the work [24] consider that human-robot friendship relationships already exist, are useful, and that they will multiply and improve by increasing AI capabilities, which should be encouraged.

2.2. *The pessimistic perspective*

In their survey [25] about the possible benefits to be gained by the use of robots in aged care, the authors are pessimistic. They consider that robots are not capable of real friendship and that their use could lead to a qualitative and quantitative decrease in the social relations of the elderly, which would not be ethical.

According to [26], a real human-robot friendship is impossible because friendship is conditional. And humans will always consider a robot as an object, as long as the latter cannot suffer or feel pain.

Based on established tests for measuring empathic behavior, the work [27] presents a series of experiments that show that, at the current stage of technology development, a friendship relationship between a human and a robot in the traditional sense of the definitions of human-human friendship cannot be established.

The possibility of a true friendship between a human and a robot is denied in paper [28], the author claiming that such a relationship is illusory because the technology "offers the illusion of companionship without the demands of friendship..."; such an illusion may result in social isolation. Even if the author emphasizes the benefits of AI technology in people's lives, many of its disadvantages are shown, including dependence on this technology.

In paper [29], the author recommends caution in using robots in therapeutic applications because it is possible that an apparent/false friendship may arise.

The author of work [30] brings a series of arguments for the basic idea of this work, namely, that it is unlikely that we will ever be able to be friends with robots. According to the author, an essential condition for having a friendship relation is the existence of self-awareness/self-knowledge, a capacity that does not exist in the case of current robots, and there is no guarantee of its existence in the future.

In work [31], the authors consider that virtue ethics (Aristotle) is a promising moral theory as the basis for the field of AI ethics. At the same time, they consider that the two attributes that can be implemented in AI, useful and pleasant, are not enough for perfect friendship. Thus, the lack of the virtues of self-improvement and temperance in AI would lead to a superintelligence, with very high risks for humanity.

The authors of the paper [32] support the idea that a robot can meet the criteria for being a good colleague with a human, and increasing the complexity of robots in the direction of "good colleagues" is a very important thing considering that in the future humans and robots will work more and more together. But things are not quite so when it comes to friendship relationships between a human and a robot, which require much more flexibility.

In paper [33], the author denies the existence of a possible human-robot friendship, the main reasons being three capabilities that a robot cannot have:

- a robot has no 'I' and therefore cannot have a First-Person Perspective (FPP);
- consequently, it lacks the capacity to be Reflexive;
- it cannot have Concerns in the absence of an 'I'.

Although skeptical about the possibility of human-robot friendships in the future, the authors of the paper [34] show through experiments that reciprocity is very important in establishing human-robot interactions.

In their paper [35], the authors argue for the ability of robots to behave in a friendly manner with humans but do not consider that true human-AI friendships could exist in the future due to the lack of a reciprocal relationship. The term "as-if friendship" is introduced to refer to the capabilities that can be programmed into a robot so that it mimics as closely as possible some of the characteristics of a true friendship.

In [36], the authors highlight that robots are unfit at this moment to be virtue friends (according to the Aristotelian conception) with humans, as they are not genuine virtue agents themselves. Although a lack of feelings may enable a robot to make correct decisions, the robot cannot perform virtuous actions from a virtue ethics point of view.

Based on Turing's Way and Lem's Way, the author of [37] identifies three perspectives on the evolution of robots so that human-robot friendships can occur. For each of them, it is argued that the conditions for human-robot friendship cannot be met.

In his thesis [38], the author shows the differences between a human-human friendship and a possible human-robot friendship, showing the main reasons why such a friendship would be almost impossible. It is also emphasized that such a human-robot friendship would negatively affect human-human friendships.

In work [39], the authors present a review of the work on human-AI relationships. They also propose a human-AI relationship formation model, mentioning the advantages and disadvantages of such relationships.

3. Human-Robot Trust

Trust between humans is considered a social glue that connects humans. What does *trust* mean in a human-human relationship? A simple and clear definition can be found in the Collins dictionary: "If you trust someone, you believe that they are honest and sincere and will not deliberately do anything to harm you." Einstein said, "When we trust someone, we believe that they will do the things they say they will." A distinction must be made between 'trusting' and 'placing trust'. Trust is essential for life and relationships, but at the same time, it is risky in a human-robot relationship, because misplaced trust can lead to disappointment.

There is a clear distinction between interpersonal trust and organizational trust [40]. In the context of our work, we will continue to refer to personal trust, meaning we will not analyze the concept in cases where one or both actors are conglomerates of individuals (humans or robots).

In paper [41], it is considered that "a trade-off between trust expectations and trust risk must accompany interpersonal trust. Trust behavior, consequently, emerges as the outcome of this trade-off, further influenced by an individual's trust trait". The authors propose a model of interpersonal trust in the form of a pyramid, as can be seen in Figure 1.

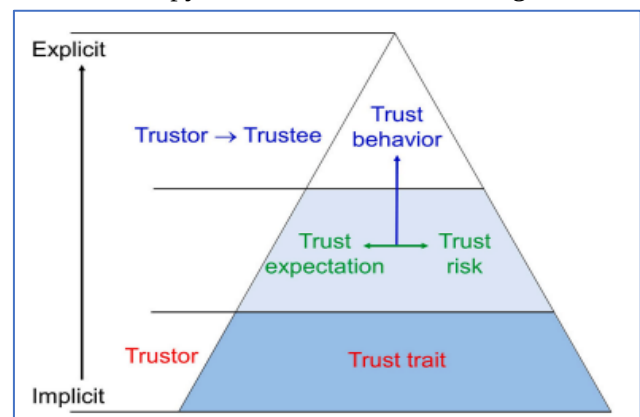


Figure 1. Pyramid structure model of interpersonal trust [41]

According to the proposed model, trust behavior is the result of an individual's trust trait, trust risk, and trust expectation, as can be seen in Figure 2.

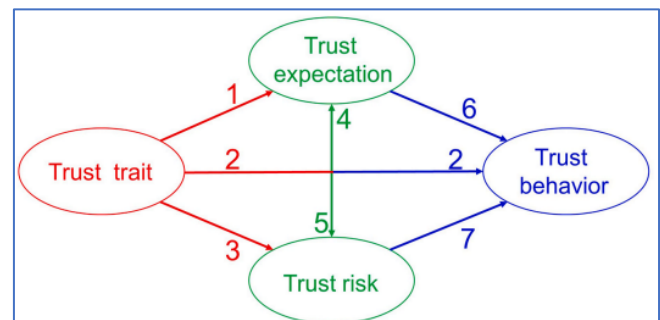


Figure 2. The path map of pyramid structure model [41]

There are many papers and books that deal with the topic of interpersonal trust between humans. In the following, we will refer to those works that discuss the problem of trust between humans and robots.

We must emphasize from the beginning that we will refer to the trust of a human in a robot and not vice versa (at least for now). A definition accepted by most researchers for this type of trust is that given in [42]: "the attitude that an agent will help achieve an individual's goals in a situation characterized by uncertainty and vulnerability". On the other hand, the existence of trust from a human to a robot is a mandatory condition for achieving a good relationship - including friendship - in a human-robot interaction.

Human-robot trust can be affected by several controllable factors [43] such as robot behaviour, reliability, level of automation, proximity, adaptability, form of communication and task difficulty. Also, a promise from the robot to the human positively influences the human's trust in it [44].

4. Discussions and future work

In the previous sections, Pro and Con opinions were presented regarding the possibility of a friendly relationship between a human and a robot. Also, some points of view regarding a human's trust in a robot were briefly presented.

It is not easy to conclude, because sometimes opposing opinions are each supported by equally strong arguments. For example, regarding the empathy necessary for the existence of a friendship, in the paper [27] the possibility of its existence in a robot is denied, while in the paper [23] it is mentioned as already existing even if an empathetic behavior is generated/programmed for a robot.

We believe that even counting the number of scientific papers for Pros and Cons and putting them on a balance would not be a sufficient criterion for a conclusion.

It seems that the biggest problem starts from the definition of the concept of friendship, generated mainly by the ancient definition of the concept given by Aristotle regarding human-human friendship. Even though over 2000 years have passed, many philosophers fully accept the definition and classification made by Aristotle, perhaps with small nuances. In general, those authors who fully accept the Aristotelian form and impose the same conditions for human-robot friendship do not agree with the possibility of a friendship between humans and machines.

They support their theory with arguments such as the following: an object/robot cannot have feelings, an 'I', self-awareness, self-knowledge, morality, empathy, first-person perspective, and concerns. It can be said that these types of robots are "perfect" in terms of performing any task, but we would be dealing with a 'false friend'. Moreover, some of these authors mention some negative effects that would occur in the case of such a friendship, such as the superintelligence of machines negatively affecting human-human friendships and other social relationships.

Regarding the group of researchers who accept the existence or possibility of human-robot friendship, most of them start from the idea of relaxing the Aristotelian conditions for human-human friendship. New terms for friendship are introduced, such as e-friendship, or recommendations are made regarding the future design of robots so as to improve human-robot relationships. In some works, the existence of human-robot friendships is recognized, even if in a primary form, below the level of human-human friendship.

It is very clear that reciprocity and trust are necessary underlying principles for friendship in human-human relationships, i.e., there is no true friendship if there is no trust on both sides. Unfortunately, in terms of human-robot relationships, we can discuss trust only in the human-to-robot direction, meaning that humans can trust robots and also consider them as friends. Will technological progress, especially in AI, allow such feelings from robots towards humans in the future? Wouldn't such progress also lead to feelings of love and especially hate? Will we be able to cancel or at least control feelings and behaviors on the part of robots that would harm the human species? And what will we do if positive or negative feelings arise between robots?

We consider that the levels of trust and friendship, and the increase in these levels in the case of the human-robot relationship, are largely influenced by the following factors:

- characteristics of the robot: performance, appearance, human-likeness, transparency, compliance, feedback;
- human characteristics: personality, gender, ethnicity, social position, language;
- environment and the way in which the two actors interact.

As a final conclusion, in our opinion, it seems that there is a possibility of developing functional or "as-if" friendship relationships between humans and robots in the future, based on technological progress and the growth of people's trust in robots.

Regarding the possibility of the existence of genuine and reciprocal friendship, it remains an open question with philosophical and ethical implications in the first place.

Intense and in-depth studies on human-robot friendship relationships as well as on trust between humans and robots are required and would be beneficial for the future of human civilization.

And even if such a question seems premature, could we ever think about relationships between robots, such as friendship and trust? And how would such robot-robot relationships affect human-human and human-robot relationships?

References:

- [1]. J. Wallén, *The History of the Industrial Robot*. Linköping, Sweden: Linköping University Electronic Press, 2008. [Online]. Available: <https://urn.kb.se/resolve?urn=urn:nbn:se:liu:diva-56167> [accessed: Aug. 5, 2026]
- [2]. M. Ceccarelli, "A historical perspective of robotics toward the future," *J. Robot. Mechatron.*, vol. 13, no. 3, pp. 299–313, 2001.
- [3]. A. Gasparetto, "Robots in history: Legends and prototypes from ancient times to the industrial revolution," in *Explorations in the History of Machines and Mechanisms*, C. López-Cajún and M. Ceccarelli, Eds. Cham, Switzerland: Springer, 2016, vol. 32, pp. 39–49.
- [4]. J. Denny, M. Elyas, S. A. D'Costa, and R. D. D'Souza, "Humanoid robots—past, present and the future," *Eur. J. Adv. Eng. Technol.*, vol. 3, no. 5, pp. 8–15, 2016.
- [5]. M. Akhtaruzzaman and A. A. Shafie, "Evolution of humanoid robot and contribution of various countries in advancing the research and development of the platform," in *Proc. 2010 Int. Conf. Control, Automation and Systems (ICCAS)*, Gyeonggi-do, South Korea, 2010, pp. 1021–1028.
- [6]. L. Cao, "Humanoid robots and humanoid AI: Review, perspectives and directions," *ACM Computing Surveys*, vol. 58, no. 4, pp. 1–37, 2025.
- [7]. E. Yoshida, "Robots that look like humans: A brief look into humanoid robotics," *Mètode Science Studies Journal*, no. 9, pp. 143–151, 2019.
- [8]. Oxford Dictionaries, "Friend," *Oxford English Dictionary*. Available: <http://oxforddictionaries.com/definition/friend> [Accessed: May 25, 2012].
- [9]. T.-Y. Choi, S. Jin, and J.-J. Lee, "Implementation of friendship in the emotional model for familiarity to human," in *Proc. 2005 IEEE Int. Symp. Industrial Electronics (ISIE)*, Dubrovnik, Croatia, 2005, pp. 1605–1610.
- [10]. A. Pereira, I. Leite, S. Mascarenhas, C. Martinho, and A. Paiva, "Using empathy to improve human-robot relationships," in *Human-Robot Personal Relationships*, M. H. Lamers and F. J. Verbeek, Eds. Berlin, Germany: Springer, 2011, vol. 59, pp. 130–138.
- [11]. I. Leite, S. Mascarenhas, A. Pereira, C. Martinho, R. Prada, and A. Paiva, "'Why can't we be friends?' An empathic game companion for long-term interaction," in *Intelligent Virtual Agents*, J. Allbeck, N. Badler, T. Bickmore, C. Pelachaud, and A. Safonova, Eds. Berlin, Germany: Springer, 2010, vol. 6356, pp. 315–321.
- [12]. N. C. Krämer, S. Eimler, A. von der Pütten, and S. Payr, "Theory of companions: What can theoretical models contribute to applications and understanding of human-robot interaction?" *Appl. Artif. Intell.*, vol. 25, no. 6, pp. 474–502, 2011.
- [13]. M. M. A. de Graaf, "An ethical evaluation of human-robot relationships," *Int. J. Soc. Robot.*, vol. 8, no. 4, pp. 589–598, 2016.
- [14]. H. Samani, "The evaluation of affection in human-robot interaction," *Kybernetes*, vol. 45, no. 8, pp. 1257–1272, 2016.
- [15]. B. Mulvey, "Can humans and robots be friends?" *Dialogue Univers.*, vol. 28, no. 2, pp. 49–64, 2018.
- [16]. J. Danaher, "The philosophical case for robot friendship," *J. Posthuman Stud.*, vol. 3, no. 1, pp. 5–24, 2019.
- [17]. T. Beran, "Can I and AI be friends?: Robots and personal relationships," Independent Thesis, Basic Level (Bachelor's thesis), Dept. Historical, Philosophical and Religious Studies, Umeå Univ., Umeå, Sweden, 2020. Available: <https://urn.kb.se/resolve?urn=urn:nbn:se:umu:diva-172409> [accessed: Aug. 18, 2026]
- [18]. D. Weijers and N. Munn, "Human-AI friendship: Rejecting the appropriate sentimentality criterion," in *Philosophy and Theory of Artificial Intelligence 2021*, V. C. Müller, Ed. Cham, Switzerland: Springer, 2022, vol. 63, pp. 209–223.
- [19]. N. S. Jecker, "My friend, the robot: An argument for e-friendship," in *Proc. 2021 30th IEEE Int. Conf. Robot & Human Interactive Communication (RO-MAN)*, Vancouver, BC, Canada, 2021, pp. 692–697.
- [20]. H. Ryland, "It's friendship, Jim, but not as we know it: A degrees-of-friendship view of human-robot friendships," *Minds and Machines*, vol. 31, no. 3, pp. 377–393, 2021.
- [21]. P. B. Brandtzaeg, M. Skjuve, and A. Følstad, "My AI friend: How users of a social chatbot understand their human-AI friendship," *Hum. Commun. Res.*, vol. 48, no. 3, pp. 404–429, 2022.
- [22]. N. Munn and D. Weijers, "Can we be friends with AI? What risks would arise from the proliferation of such friendships?" in *Proc. Int. Conf. Computer Ethics (CEPE 2023)*, vol. 1, no. 1, 2023.
- [23]. C. Pelau, D.-C. Dabija, and M. Stanescu, "Can I trust my AI friend? The role of emotions, feelings of friendship and trust for consumers' information-sharing behavior toward AI," *Oeconomia Copernicana*, vol. 15, no. 2, pp. 407–433, 2024.
- [24]. N. Munn and D. Weijers, "Human-AI friendship is possible and can be good," in *Oxford Intersections: AI in Society*, P. Hacker, Ed. Oxford, U.K.: Oxford University Press, Mar. 20, 2025, doi: 10.1093/9780198945215.003.0076.
- [25]. R. Sparrow and L. Sparrow, "In the hands of machines? The future of aged care," *Minds Mach.*, vol. 16, no. 2, pp. 141–161, 2006.

- [26]. D. Evans, "Wanting the impossible: The dilemma at the heart of intimate human-robot relationships," in *Close Engagements with Artificial Companions: Key Social, Psychological, Ethical and Design Issues*, Y. Wilks, Ed. Amsterdam, The Netherlands: John Benjamins, 2010, pp. 75-88.
- [27]. I. Leite, A. Pereira, S. Mascarenhas, C. Martinho, R. Prada, and A. Paiva, "The influence of empathy in human-robot relations," *Int. J. Hum.-Comput. Stud.*, vol. 71, no. 3, pp. 250-260, 2013.
- [28]. M. Arnd-Caddigan, "Sherry Turkle: *Alone Together: Why We Expect More from Technology and Less from Each Other*," *Clinical Social Work Journal*, vol. 43, no. 2, pp. 247-248, 2015.
- [29]. A. Elder, "Robot friends for autistic children: Monopoly money or counterfeit currency?" in *Robot Ethics 2.0: From Autonomous Cars to Artificial Intelligence*, P. Lin, K. Abney, and R. Jenkins, Eds. New York, NY, USA: Oxford University Press, 2017, pp. 113-126.
- [30]. M. Tistelgren, *Can I Have a Robot Friend?* M.A. thesis, Dept. Historical, Philosophical and Religious Studies, Umeå Univ., Umeå, Sweden, 2018.
- [31]. N. Berberich and K. Diepold, "The virtuous machine—old ethics for new technology?," *arXiv preprint arXiv:1806.10322*, 2018.
- [32]. S. Nyholm and J. Smids, "Can a robot be a good colleague?" *Sci. Eng. Ethics*, vol. 26, no. 4, pp. 2169-2188, 2020.
- [33]. M. S. Archer, "Friendship between human beings and AI robots?" in *Robotics, AI, and Humanity: Science, Ethics, and Policy*, J. von Braun, M. S. Archer, G. M. Reichberg, and M. Sánchez Sorondo, Eds. Cham, Switzerland: Springer, 2021, pp. 177-189.
- [34]. E. B. Sandoval, J. Brandstatter, U. Yalcin, and C. Bartneck, "Robot likeability and reciprocity in human robot interaction: Using ultimatum game to determinate reciprocal likeable robot strategies," *Int. J. Soc. Robot.*, vol. 13, no. 4, pp. 851-862, 2021.
- [35]. B. Fröding and M. Peterson, "Friendly AI," *Ethics Inf. Technol.*, vol. 23, no. 3, pp. 207-214, 2021.
- [36]. M. Constantinescu and R. Crisp, "Can robotic AI systems be virtuous and why does this matter?" *Int. J. Soc. Robot.*, vol. 14, no. 6, pp. 1547-1557, 2022.
- [37]. K. T. Wieczorek, "AI robot - companion, friend or competitor of human being?" *Philos. Canon Law*, vol. 9, no. 1, pp. 1-18, 2023.
- [38]. M. Abu-Samhan, "On friendship: Should we befriend artificial intelligence?" honours thesis, Dept. Philosophy, Simon Fraser Univ., Burnaby, BC, Canada, 2024.
- [39]. T. Gur and Y. Maaravi, "The algorithm of friendship: Literature review and integrative model of relationships between humans and artificial intelligence (AI)," *Behav. Inf. Technol.*, vol. 44, no. 14, pp. 3446-3466, 2025.
- [40]. S. Ganesan and R. Hess, "Dimensions and levels of trust: Implications for commitment to a relationship," *Mark. Lett.*, vol. 8, no. 4, pp. 439-448, 1997.
- [41]. C. Fu, S. Yang, M. Zhai, T. Yong, C. Zheng, X. Ma, G. Hou, and P. Su, "The component and structure of interpersonal trust," *Heliyon*, vol. 10, no. 9, Art. no. e30071, 2024.
- [42]. J. D. Lee and K. A. See, "Trust in automation: Designing for appropriate reliance," *Hum. Factors*, vol. 46, no. 1, pp. 50-80, 2004.
- [43]. P. A. Hancock, D. R. Billings, K. E. Schaefer, J. Y. C. Chen, E. J. de Visser, and R. Parasuraman, "A meta-analysis of factors affecting trust in human-robot interaction," *Hum. Factors*, vol. 53, no. 5, pp. 517-527, 2011.
- [44]. L. Cominelli, F. Feri, R. Garofalo, C. Giannetti, M. A. Meléndez-Jiménez, A. Greco, M. Nardelli, E. P. Scilingo, and O. Kirchkamp, "Promises and trust in human-robot interaction," *Sci. Rep.*, vol. 11, no. 1, Art. no. 9687, 2021.