“Futuristic trends in Artificial Intelligence”

Social Robots:Emotions and the subtle nature of human psyche: collectivism and culture.

Bhavana. S

Assistant professor and H.O.D

Department of Psychology

Surana College

Ph.No- 9739543698

Gmail- psychology.surana@gmail.com

Ananya Srinivas

Assistant professor

Department of Psychology

Surana College

Ph.No-6363565717

Gmail- ananyasrinivas97@gmail.com

ABSTRACT

The potential to provide machines emotional intelligence in order to improve the intuitiveness, authenticity, and naturalness of the connection between humans and robots is an exciting problem in the field of human-robot interaction. A key component in doing this is the robot's capacity to deduce and comprehend human emotions. In the more general domains of human-machine interaction and affective computing, emotion recognition has received extensive research. Here, we discuss current developments in emotion recognition with a focus on the setting of human-robot interaction. Reviewing the state-of-the-art of the currently used emotional models, interaction modalities, and classification algorithms is our goal. We also want to share our perspective on important concerns and potential future advances. Can artificial emotions replace the need for a real, breathing human being if socially intelligent robots can offer the friendship, loyalty, and trust that people seek? In order to comprehend the compensating process of endowing computers with emotions, giving them human characteristics and a personality, and their satisfying functions as companions, the research article delves into the depths of the human psyche. A systematic review of the literature was used to conduct the research, with books and papers on artificial intelligence and robot psychology serving as support.

INTRODUCTION

The use of artificial intelligence, especially the Socially Assistive Robots or SARs in customer service and experience has been one of the most fascinating but disruptive strategies to date. Given the current global health challenges, it is indisputable that service automation is shifting the paradigm from high-touch to high-tech. Retail, transportation, hotels, restaurants, and airports, and these days, mental health services and social companionship (Imane Guemghar, Paula Pires de Oliveira Padilhaet al). These are just a few of the sectors where robotics is becoming more and more prevalent. Based on their appearance, robots utilized in service contexts can be broadly characterized as either utilitarian, comical, or mixed robots. With an emphasis on how well humanoid robots may anthropomorphize human behaviour, recent study has looked at how customers are affected by the speech appearance, voice, and facial expressions of humanoid robots during service interactions.

Since they amplify and deepen verbal communication, these nonverbal cues are truly of highest value in every face-to-face encounter. Among other nonverbal clues, facial expressions act as a universal language by conveying emotional states and feelings. Humans may express a wide range of emotions by constricting and contracting their facial muscles, including anger, disgust, fear, happiness, sadness, and surprise. Notably, emotions are contagious and can transfer to other people (Stephanie Hui-Wen Chuah et al, 2021). One tends to unintentionally mimic the other person's or the interlocutor's facial expression during such a discourse. Since it emphasizes in-person contact between customers and service employees, this is particularly crucial in customer experiences. However, are robotic emotions which merely mimic human emotions going to suffice the entirety of human satisfaction? Can robots flawlessly comprehend the subtle difference intonation and modulations that human beings produce?

The first humanoid robot, Sophia, was developed more recently by a Hong Kong-based company and is capable of displaying more than 60 different emotions. Robotization in the general service sector is being driven by the COVID-19 epidemic, which has been envisioned by businesses as a tool to help streamline operations during this new era of "normality"

Due to the pandemic's increased need for companionship and social interaction, there is also an increase in people's preference for social robots. Robots can respond to human social demands by being programmed with human emotions. But can artificial beings actually take over the functions of another human being? Would a man become aware of this artificiality once his need for friendship wanes? Man has always been an emotional and social creature. The robots' continued usefulness must be taken into account if the right behaviors and emotions are instilled in them. However, service industry workers are also concerned about potential job replacements. While some studies contend that consumers choose humanoid robots over other types, other study has revealed the exact opposite.

Therefore, the purpose of this study is to investigate whether social robots can fulfill the role of human emotionality and sentiments and whether emotionally and socially intelligent robots can substitute man’s role of companionship and need for affiliation. Robotic psychology has its own set of ethical guidelines and principles. The ethical principles talk about the right amount of emotions to be added in a robot and also the robot’s ability to identify and reciprocate the subtlety and also the hidden aspects of a person’s emotion (VNitsch, M Popp 2014).

Literature Review:

Laura Corti, ,Nicola Di Stefano & Marta Bertolaso ***International Journal of Social Robotics*** **(2022)** conducted a study to see at how artificial emotions are implemented in artificial systems poses fascinating ethical questions. They suggest that there can never be a true relationship between humans and machines, just a lopsided one.

A Fiske, P Henningsen and A Buyx studied the effiency and credibility of artificial intelligence in psychotherapy and their role as virtual pscyotherapists. The results showed that although the use of artificial intelligence may be employed in the mental health facility as the companions of the patients, their credibility decreases in the long term.

Susel Góngora Alonso, Sofiane Hamrioui, Isabel de la Torre Díez conducted a systematic literature review on the role of social robots with the elderly patients. The findings indicate that elderly individuals view social robots favorably because they provide companionship, assistance with daily tasks, and stress relief the dementia, Alzheimer's and other cognitive disorders.

Lihui Pu, MSN, Wendy Moyle, et al, conducted a study to see how social robots would affect psychological, physiological, quality of life, and pharmaceuticals. They also discovered that social robots had a high degree of acceptability since they improved interactions and decreased stress and loneliness.

Isabel Pedersen,Samantha Reid,Kristen Aspevig carried out a methodical literature analysis to investigate how social robots can serve as companions, caretakers, and aides in various healthcare and medical settings. The outcomes demonstrate that social robots are essential for the elderly population since they fulfil their assigned responsibilities well.

Carlos A. Cifuentes, Maria J. Pinto, Nathalia Céspedes & Marcela Múnera carried out a systematic study on the role of social robots I the filed of healthcare in children and elderly patients and summarized that these social robots have many roles to play such as a caretaker, a monitor, a companions etc and also proposed that further research is indeed required in the field.

Sharkey and Sharkey carried out a systematic research on the impact of social robots for the mental health and welfare of the elderly. Their studies proved that although such robots are helpful

for monitoring their short term health and keeping company, in the long run, the presence of social robots would lead to materialism and also loss of social contact,loss of privacy as well as personal liberty as the presence of these social robots would cause a drastic change in their lifestyle.

Joost Broekens, Marcel Heerink, Henk Rosendal carried out a systematic literature review in studying the effects of social robots in the elderly care. The results showed little positive results in the assistance of social robots for the elderly however, they suggest further research and the correct methodology to be employed.

Ellen van Oost, Darren Reed gave a sociological study of social robots as companions. Researchers discussed the moral and ethical imitations in employment the social robots as companions and argued about the suitedness of contextual and networking settings**.**

Kerstin Dautenhahn, Sarah Woods, Christina Kaouri, Michael L Walters, Kheng Lee Koay, Iain Werry conducted a thorough analysis of the use of social robots in the home, such as a butler or housekeeper, and discovered that many western families liked to have a robot for domestic support, but they wished for a more human-like quality in these social robots.

Sara Cooper, Alessandro Di Fava, Carlos Vivas, Luca Marchionni, Francesco Ferro He carried out a study to comprehend the function of ARIs and SAR in the care of the elderly, particularly those who are bedridden and affected by infectious disorders. Through the provision of emotional support, these robots, with their human-like movements and appearances, will serve to improve the mental health and elevate their loneliness.

Wendy Moyle, Marie Cooke, Elizabeth Beattie, Cindy Jones, Barbara Klein, Glenda Cook, Chrystal Gray to comprehend the function of SARs as companion robots for persons with mild to severe dementia, he conducted a pilot study with a randomised crossover design. The findings demonstrated that these companion robots' interactions with these emotionally open robots had a beneficial effect and high enjoyment levels.

M Norskov, in his book, "Social Robots:boundaries, potentials and challenges"He examines the theory behind giving robots emotions and argues that these social robots lack the intimacy that humans crave, cannot ever make satisfying spouses, and have ethical dilemmas, calling into question what it is to be a human in the first place.

Paul Formosa gave a methodical review of the most crucial and pertinent ethical considerations by highlighting both potential positive and negative ramifications,. Due to their physical presence and social capabilities, social robots have the potential to both enhance and undermine human autonomy in many ways. This serves as a helpful theoretical foundation for additional research looking at the consequences of social robots and AI in general for human autonomy.

Melinda A. Mende, Martin H. Fischer & Katharina Kühne conducted a methodical investigation to examine the uncanny valley phenomena, a kind of unease and strangeness that will manifest in encounters between humans and robots and also dove deeper into the ethical considerations of employing such social robots for autism spectrum disorders.

Joanna K. Malinowska conducted a systematic study to study about the feeling of empathy towards social robots and implied that humans can influence human cognitive and social competences and put into practise the ideals we think are crucial for our society by developing relationships with the robot and taking use of its educational features.

Yuefang Zhou & Martin H. Fischer raised the question of whether social robots can be used for intimacy and whether people are ready to accept artificial beings as their romantic partners in the present period in order to highlight the importance of a transdisciplinary, scientific approach to the study of human sexuality.

Sutherland and **Broadbendt** conducted methodical research to examine the advantages of social robots in pediatric care and discovered that although there had been a lot of positive interactions and acceptance, more research remained to be done.

Papakostas, Sidiropoulos, G. K., Papadopoulou, et al conducted a systematic review of the use of social robots in special education and discovered that, despite the widespread use of social robots like Zeno, Alice, and Cosmo for children with special needs, the sample size was small and excluded girls, making it impossible to draw general conclusions.

Logan, D. E., Breazeal, C., Goodwin, M. S., Jeong, et al, conducted research on the use and efficiency and likability of social robots for hospitalized children. Compared to children who received a plush animal, those who were exposed to the SR expressed greater positive feelings. More delight and agreement were present after SR exchanges than during comparator

interventions. stakeholders who work in child life acknowledged various advantages of SR technology in the pediatric setting.

Laura Aymerich-Franch, Iliana Ferrer conducted research on the social robots' abilities to play the liaison role to reduce direct human contact, safeguard role to assure contagion risk-free surroundings, and well-being coach role to safeguard mental and physical health. This research is essential to understanding adoption in this context. The study's findings provide a thorough summary of how social robots were used in actual settings throughout the pandemic.

Henkel, aić, Blaurock, Okan conducted research on social robotics and transformative service research by creating a typology of social robots to serve as a framework for evaluating the state of transformative robotic service and advancing a research agenda for RTSR in the future and focuses on the eudaimonic well-being of the client.

Methodology:

Operational definitions:

1. **SARs**: Socially Assistive Robots which are of two types, namely, Service robots and social companion robots. They can be in the form of pets, and companions and provide social interaction.
2. **Emotion**: Everyone has a cognitive awareness of the six universal emotions. However, some feelings are difficult to identify and categorize. A keen eye is needed to distinguish between, for instance, irritation and anger on a basic level.
3. **Robotic psychology:** It applies the ideas of differential psychology, which examines how people behave differently from one another, to comprehend the many interactions between humans and robots.
4. **HRI**- Human-robot interaction discusses how to build and test robots to give people the greatest possible service.

Objective of the study:

The aim of the study is to investigate how much human sentimentality and friendship can be replaced by SARs, as well as their short- and long-term benefits and drawbacks for addressing man's social requirements.

Methods of Study:

An empirical study based on thematic literature search and established principles of human psyche and emotions was conducted using a number of books and articles,and digital libraries such as Google Scholar as well as the response that was made available through social media platforms like WhatsApp and Instagram. Also used to gather the material for the investigation were secondary reviews and books on artificial intelligence.

Overview:

Man has always been an emotional and social being. His fundamental needs are for love, kinship, and belonging. Man has the understanding and capacity to own such an artificial entity as a friend in the present progressive cultural society where having socially supportive robots as both carers and companions is typical. The robots are used to play the roles of partners, friends, caregivers, and companions in order to fill the void left by loneliness and a lack of social support.

Robots are capable of developing feelings and personalities. These socially assistive robots or social bots are capable of possessing lifelike human emotions and are enhanced with life and energy, but they are programmed, none the less. They can be programmed to spontaneously respond as much as humanly possible to various human emotions, once detected (HO Seok Ahn, Jim Young Choi).

Social robots like Eleonide and Hanson (Android PKD) have successfully demonstrated the ability to display facial emotions in accordance with the body language and attitude appropriate for the given emotion, according to research. R. Stock Homburg Robots are trained to understand a variety of human emotions and the minute differences in human responses, and to act accordingly and intelligently.

Humans form strong, unique bonds with social robots as a result of their autonomy and spontaneity during interaction (Maartje De Graaf, 2016) According to De Graaf, social robots change people's daily routines and lifestyles by making them much easier. This implies that social robots inculcate a new feeling of responsibility in people. but when things become too simple.

It's conceivable that just being exposed to something repeatedly could make it more likeable (Zajnoc). What could initially be perceived as fake and lifeless can eventually be admired and liked. However, what is not real will eventually lead to an eerie feeling and sense of strangeness due to their artificiality(Mende, Fischer and Kuhne) . Robots can now have feelings and a personality thanks to advances in technology, but can they also have consciousness? In the truest meaning of the word, consciousness is what gives life to humans. It is what gives a man his feeling of self and identity. The social robot lacks this feature that gives man his awareness of their artificiality. They are artificial and lack awareness.However, when something is utilised repeatedly, man eventually loses the incentive value of it. This is where the uniqueness of robots that have been programmed and developed is born.

A social robot that is programmed to solely provide peaceful and joyful sentiments would make people feel decieted and saturated. Something programmable cannot satisfy the emptiness and loneliness of man. Regardless of whether he is sociable or not, this is true. The yearning for variety and spontaneity is a sign of the complexity of the human psyche. The link formed with a social robot is one of dishonesty and phoney because it craves life and the fullness of emotional bondage.

When the emotions are something that, despite being extremely human and natural, cannot replace the sincere love and affection that another human being can provide, this truth of being is compensated. The human mind is a higher order cognitive component that is able to comprehend the truth of the artificiality hiding behind a social robot's emotional programming.

Social robots for the elderly: The purpose of social robots is to give older people a great sense of security and human-like company. These Carebots are capable of acting as a buddy and carer because of their high levels of responsiveness and interaction. They work as companions, health monitors, and elder care assistants. Researchers said that the elderly would become more isolated as a result of their employment and would receive fake and dishonest companionship. A high and ideal level of life satisfaction can be found in old age, a time when the fullness of existence is integrated. The only yearning is the intense desire to impart one's lifetime of experience to the following generation.This passing on has a sense of responsibility and a message. As they believe that they will also continue to exist in the memories and traditions that they have passed down, the elderly also place a strong emphasis on having someone to share their comprehensive experiences with and provide the generations that follow them a sense of continuity.however, these findings are limited to only collectivistic societies of India, Japan, China and others. It cannot be generalized to western culture and countries. It's also said that too much robotic meddling results in objectification and a loss of social touch. The isolation and loneliness that older people experience, which can result in dementia, depression, and other age-related diseases, is considerably worse than this illusory dependence (Sharkey and Sharkey, 2012)

Social robots as sexual partners: In collectivistic civilizations, childbearing is always necessary rather than only for sexual gratification. Modern civilizations, however, even in non-traditional communities, forbid this and childbearing due to the negative impacts of remarriage and early marital breakdown (Arland Thornton). However, many collectivistic civilizations yearn for romantic relationships and a mate. Thornton claimed that if a robot is not regarded as a person,

according to his definition of a person as someone with ethical rights and humane treatment, then having sex with a robot is merely self-fulfillment. Sex robots may offer the necessary physical gratification, however these social robots still lack the human touch of desiring that sexual intercourse seeks for thus, limiting them to mere pleasure tools (Norskov M) Contrary to the west, sexual activity in the eastern countries fosters more psychological bonds than just physical ones. The bonding and affectionate traits that appear as a form of dependency in the West are those that are ingrained in eastern culture and traditions. In contrast to how sex is conceptualized in the west, multiple sexual partners are discouraged in the east. As a result, using social robots as sexual partners will simply serve to objectify humans and not satisfy their desires. Some segments of society, such as the physically challenged, homosexual men and women, people with disabilities, and/or those who are unwell, may benefit from the use of sex robots. Sex robots, however, are unable to satisfy a man's need for a real person to bond with and respond to them psychologically and emotionally. Sexual interaction with a social robot or sex bot poses the risk of further objectification and enslavement.(JK Smith).

Social robots as caregivers and friends to sick patients: socially assistive robots such as PARO have been extensively used to take care of the elderly and sick patients during the pandemic and also as social companions who are capable of responding to the emotions and attitudes of the patients.(CS González-González, V Violant-Holz**)** they are capable of responding quickly to the needs of the patient as they are programmed well to respond to emergencies an can monitor the timely need for medications and physical help. These socially helpful robots help the patient' family by also replacing the long hours of fatigue and tiredness that they face. With pediatric care, these social robots can connect easily with a child and respond well without getting agitated or bored. Social robots can also be involved a toys controlled by humans being and their actions will evoke positive communications from the children suffering from various disorders, such as autism(JJ Cabibihan, H Javed, M Ang, SM Aljunied)

Conclusion: In the subject of robotics, human-robot interactions are crucial, particularly in situations where robots and people collaborate, operate independently, or both. To prevent disputes, the norms of engagement between humans and robots must be clearly stated. Additionally, robots must be designed to act humanely, particularly in dire circumstances. Artificial intelligence and emotions could result in useful robotic setups in this field. The study includes an overview of

previous work in the field, key concepts for application in various social contexts, and performance evaluation techniques.

To comprehend the prerequisites for a cohesive training robot and human subjects, the current paper analyses the HRM field. The training component is understood in terms of both cooperative actions and individual subject instruction. In many areas, thorough study is necessary to identify key elements that cause friction with other fields of artificial intelligence framework. A robot can now have an artificial personality in addition to its physical look, which is believed to be important in all fields. Future research topics are also discussed in this framework, including the anthropomorphic classification of robots, common measuring metrics, artificial emotions, and lovotics(study of human robot relationships).

The outcomes highlight our knowledge's gaps. One of the main issues is that engineers and psychologists both lack a basic understanding of engineering and psychology. To create meaningful technology, it is advised that teams of engineers and psychologists collaborate. The problem has both psychological and technological components, which influence one another in a feedback cycle. In the field of HRM, a new generation of individuals with training in both fields will be essential. The discussions in this article can now serve as a guide for creating technical specifications so that the proposed concepts' actual implementation in practice can be simulated. Self-aware robots discussing HRM with human subjects and starting to contribute to the field are still far off in the near future.

References:

1) Li H, Cabibihan JJ, Tan YK (2011) Towards an effective design of social robots. Int J Soc Robot 3(4):333–335

2) Cabibihan, J. J., Javed, H., Ang, M., & Aljunied, S. M. (2013). Why robots? A survey on the roles and benefits of social robots in the therapy of children with autism. *International journal of social robotics*, *5*(4), 593-618.

3) Rodogno, R. (2016). Social robots, fiction, and sentimentality. *Ethics and information technology*, *18*(4), 257-268.

4) Nørskov, M. (2017). *Social robots: boundaries, potential, challenges*. Taylor & Francis.

5) Pedersen, I., Reid, S., & Aspevig, K. (2018). Developing social robots for aging populations: A literature review of recent academic sources. *Sociology Compass*, *12*(6), e12585.

6) Ghafurian, M., Hoey, J., & Dautenhahn, K. (2021). Social robots for the care of persons with dementia: A systematic review. *ACM Transactions on Human-Robot Interaction (THRI)*, *10*(4), 1-31.

7) Góngora Alonso, S., Hamrioui, S., de la Torre Díez, I., Motta Cruz, E., López-Coronado, M., & Franco, M. (2019). Social robots for people with aging and dementia: a systematic review of literature. *Telemedicine and e-Health*, *25*(7), 533-540.

8) Dautenhahn, K. (2014, December). Social Robots As Companions: Challenges and Opportunities. In *Robophilosophy* (pp. 9-10).

9) Cifuentes, C. A., Pinto, M. J., Céspedes, N., & Múnera, M. (2020). Social robots in therapy and care. *Current Robotics Reports*, *1*(3), 59-74.

10) Marchesi, S., Roselli, C., & Wykowska, A. (2021, November). Cultural values, but not nationality, predict social inclusion of robots. In *International Conference on Social Robotics* (pp. 48-57). Springer, Cham.

11) Nitsch, V., & Popp, M. (2014). Emotions in robot psychology. *Biological cybernetics*, *108*(5), 621-629.

12) Fiske, A., Henningsen, P., & Buyx, A. (2019). Your robot therapist will see you now: ethical implications of embodied artificial intelligence in psychiatry, psychology, and psychotherapy. *Journal of medical Internet research*, *21*(5), e13216.

13) Niculescu, A., van Dijk, B., Nijholt, A., Li, H., & See, S. L. (2013). Making social robots more attractive: the effects of voice pitch, humor and empathy. *International journal of social robotics*, *5*(2), 171-191.

14) Lim, V., Rooksby, M., & Cross, E. S. (2021). Social robots on a global stage: establishing a role for culture during human–robot interaction. *International Journal of Social Robotics*, *13*(6), 1307-1333.

15) Shahid, S., Krahmer, E., & Swerts, M. (2014). Child–robot interaction across cultures: How does playing a game with a social robot compare to playing a game alone or with a friend?. *Computers in Human Behavior*, *40*, 86-100.

16) Jones, R. A. (2013). Relationalism through social robotics. *Journal for the Theory of Social Behaviour*, *43*(4), 405-424.

17) Eck, D., & Levine, A. (2017). Prioritizing otherness: The line between vacuous individuality and hollow collectivism. In *Sociality and normativity for robots* (pp. 67-87). Springer, Cham.

18) Moerman, C. J., van der Heide, L., & Heerink, M. (2019). Social robots to support children's well-being under medical treatment: A systematic state-of-the-art review. *Journal of Child Health Care*, *23*(4), 596-612.

19) Heerink, M., Vanderborght, B., Broekens, J., & Albó-Canals, J. (2016). New friends: social robots in therapy and education. *International Journal of Social Robotics*, *8*(4), 443-444.

20) Jeong, S., Logan, D. E., Goodwin, M. S., Graca, S., O'Connell, B., Goodenough, H., ... & Weinstock, P. (2015, March). A social robot to mitigate stress, anxiety, and pain in hospital pediatric care. In *Proceedings of the Tenth Annual ACM/IEEE International Conference on Human-Robot Interaction Extended Abstracts* (pp. 103-104).

21) Cifuentes, C. A., Pinto, M. J., Céspedes, N., & Múnera, M. (2020). Social robots in therapy and care. *Current Robotics Reports*, *1*(3), 59-74.

22) Cabibihan, J. J., Javed, H., Ang, M., & Aljunied, S. M. (2013). Why robots? A survey on the roles and benefits of social robots in the therapy of children with autism. *International journal of social robotics*, *5*(4), 593-618.

23) Kamide, H., Eyssel, F., & Arai, T. (2013, October). Psychological anthropomorphism of robots. In *International conference on social robotics* (pp. 199-208). Springer, Cham.

24) Migotti, M., & Wyatt, N. (2017). On the very idea of sex with robots. *Robot sex: Social and ethical implications*, 15-27.

25) Nørskov, M. (2017). *Social robots: boundaries, potential, challenges*. Taylor & Francis.

26) Malinowska, J. K. (2022). Can I feel your pain? The biological and socio-cognitive factors shaping people's empathy with social robots. *International Journal of Social Robotics*, *14*(2), 341-355.

27) Zhou, Y., & Fischer, M. H. (2019). Intimate relationships with humanoid robots: exploring human sexuality in the twenty-first century. In *AI Love You* (pp. 177-184). Springer, Cham.

28) Dawe, J., Sutherland, C., Barco, A., & Broadbent, E. (2019). Can social robots help children in healthcare contexts? A scoping review. *BMJ paediatrics open*, *3*(1).

29) Papakostas, G. A., Sidiropoulos, G. K., Papadopoulou, C. I., Vrochidou, E., Kaburlasos, V. G., Papadopoulou, M. T., ... & Dalivigkas, N. (2021). Social Robots in Special Education: A Systematic Review. *Electronics*, *10*(12), 1398.

30) Logan, D. E., Breazeal, C., Goodwin, M. S., Jeong, S., O'Connell, B., Smith-Freedman, D., ... & Weinstock, P. (2019). Social robots for hospitalized children. *Pediatrics*, *144*(1).

31) Aymerich-Franch, L., & Ferrer, I. (2020). The implementation of social robots during the COVID-19 pandemic. *arXiv preprint arXiv:2007.03941*.

32) Aymerich-Franch, L. (2020). Why it is time to stop ostracizing social robots. *Nature Machine Intelligence*, *2*(7), 364-364.

.