



Social Robotics 2023

Industry report





Introduction

Social robotics emerged in the late 20th century as a field focused on creating robots capable of engaging in social interactions with humans. Cynthia Breazeal's Kismet in the late 1990s was a pioneering example, designed to recognize and respond to human emotions. Since then, social robots have advanced significantly, with notable examples like ASIMO, Pepper, and Sophia.

Social robots at work

Designed to emulate human-like interactions, today social robots find demand in healthcare in the settings where emotional support and companionship are crucial. Beyond healthcare, social robots are applied in education, especially Special Education (SPED), and Human-Robot Interaction (HRI) research.

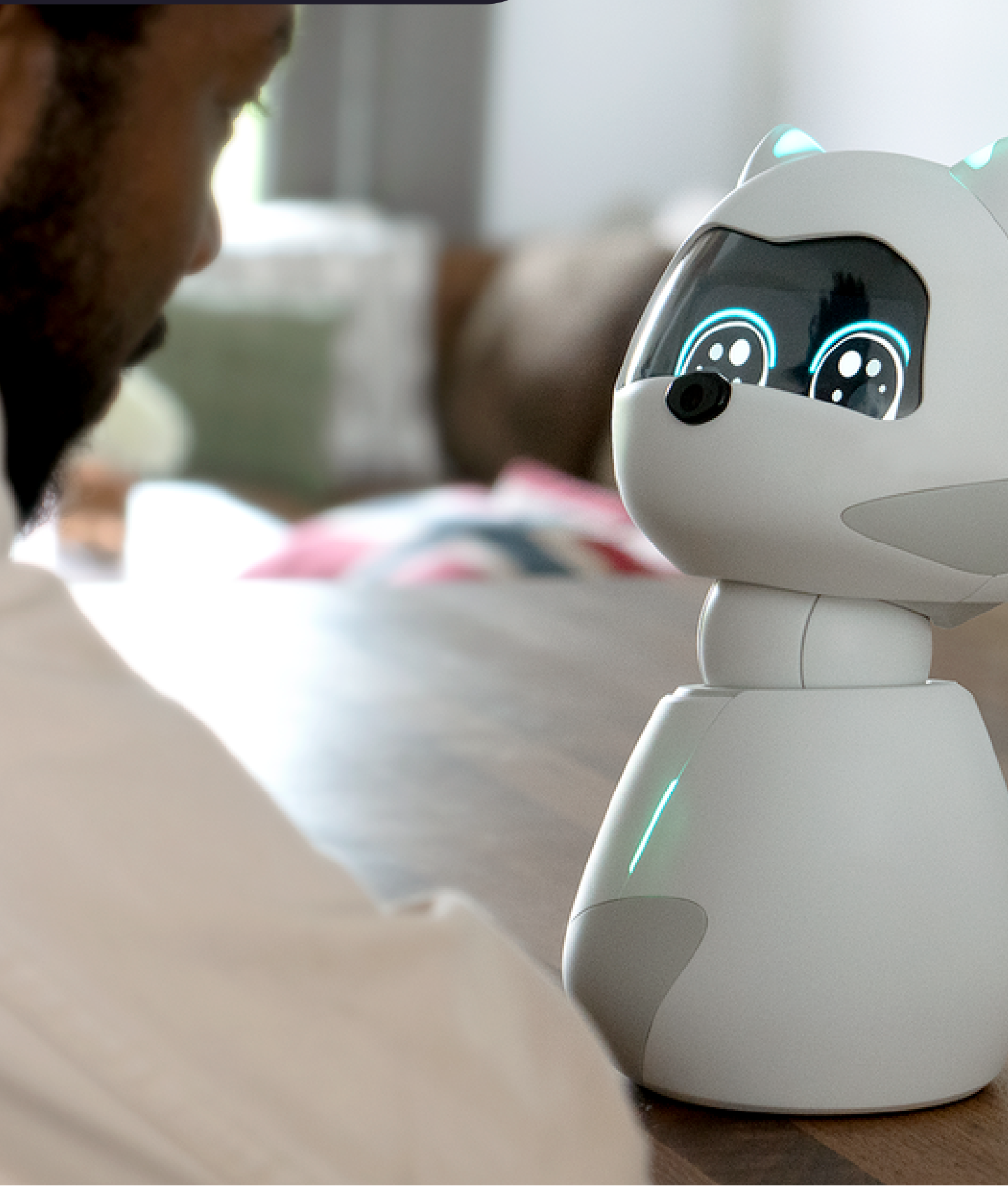
Conversations with robots get a boost

The evolution of the field of social robotics is supported by the recent success with Large Language Models and Generative AI.

The results of the Furhat Robotics research of the current state of social robotics reveal a consistent expansion of the industry.



Adoption, impact and growth



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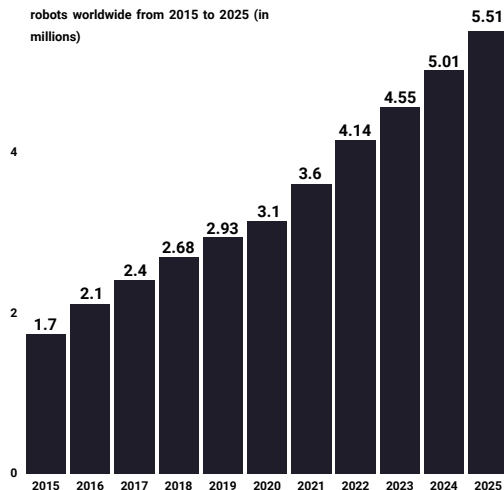
It's fair to say that robots have only recently been commercialised for use in daily life. However, the market for robotics is growing, and social robotics is no exception.

Millions of social robots are among us

By the end of 2023, the number of social and entertainment robots operating worldwide will have reached **20+ million units**. However, social robotics represent but a small fraction of global robotics.

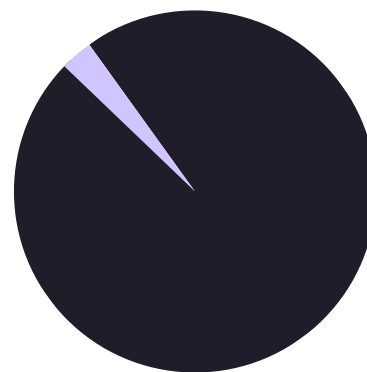
The field can include socially assistive robots for elderly care, special education, language learning, among others.

6 Unit sales of social and entertainment robots worldwide from 2015 to 2025 (in millions)



<https://www.statista.com/statistics/755677/social-and-entertainment-robot-sales-worldwide/>

Robotics Social Robotics



Robots vs. social robots

Robots come in different forms and can have a broad number of use cases. Social robots interact directly with people through conversations.

In our definition social robots are the next major user interface, and are typically designed based on the oldest user interface we as humans know - the face. Conversational capabilities of robots allow to exchange information, while a robot's emotive face makes conversations with technology intuitive and feel human-like.

200+ companies work on creating social robots in 2023.

Applications in key sectors and regions

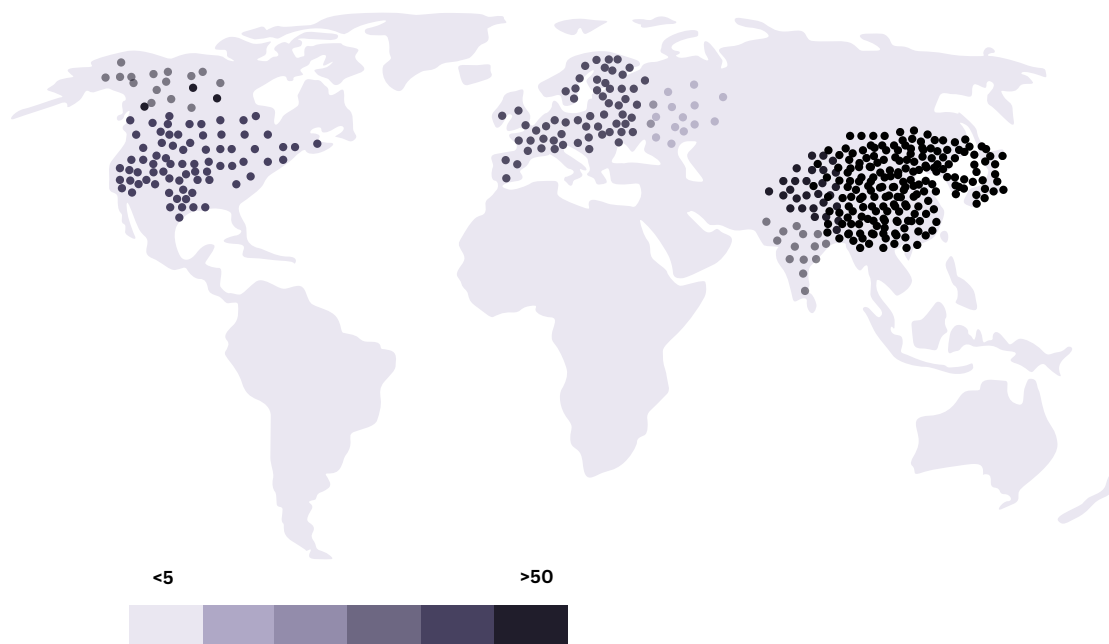


Applications in key sectors and regions

To date, the main players in social robotics have come from North America, Europe, and East Asia where the robots are developed for education, healthcare and research.

The robot nation

Japan being called the Robot Nation has been the leader of applied social robotics since the 2000s. Social robots are deployed in nursing homes and long-term care facilities to assist with tasks such as medication reminders, fall detection, and companionship for elderly residents.



Social Robotics companies operating by region

The field is expanding in other parts of the world as the technology continues to evolve and mature. North America and Western Europe are using social robots for education and research, and introducing more social robotics to smart healthcare.

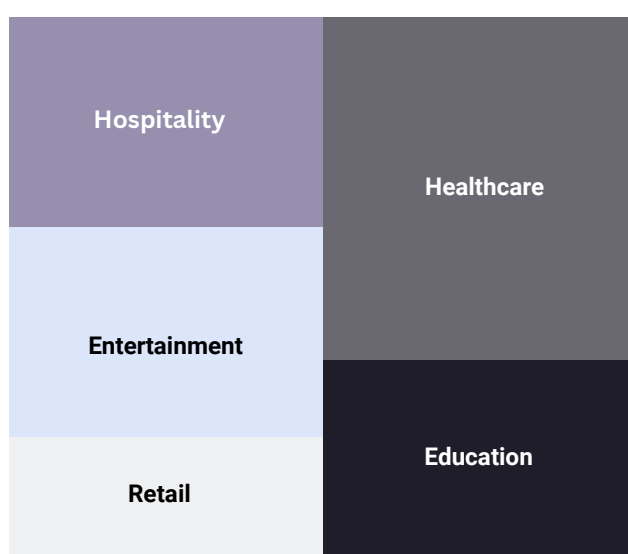
Key takeaway: social robotics came to be around the same time in Asia as in the West. Besides the technology itself, East Asian dominance might have to do with more positive societal attitude towards robots present in countries such as Japan.

Beyond HRI labs and closer to people

Robotics companies worldwide are increasing their presence in medical and domestic services sectors going beyond HRI research labs.

Robots for humans

In 2023, medical and domestic sectors combined make up 41% of the global robotics' revenues. We trust robots to take care of our health and daily life, which not only indicates the societal readiness for robots, but also a demand for assistance from the machines to improve the quality of care, education and life in general.



Despite being a small niche in the robotics industry, social robotics may follow a similar trend of becoming a part of our daily life. Exhibiting social skills, social robots find demand in sectors that require empathy and connection, such as healthcare, education and hospitality. Alongside those sectors, social robots are applied in entertainment and retail.

Upstaffing with robots

Contrary to the common belief, robots are not here to snatch human jobs. Social robots may help in cases where human workforce is not enough.

Employee burnout costs the global economy **US\$ 1 trillion** each year. Healthcare staff experiences the highest rates of burnout. Social robots hold a promise of relieving the financial burden of the high healthcare burnout rate by assisting the residents and the staff round-the-clock both in facilities and in homes.

In special education social robots play the role of patient teaching assistants. The number of SPED students has increased to make up 15% of the K-12 student population across the U.S. Studies show the benefit of interactions between children with ASD and social robots in therapy, which factors in the growth of the social robotics industry.

Key takeaway: social robots hold a promise of helping face some of the challenges present in developed societies

Trends in Social Robotics



Trends in Social Robotics

Social robots are enabled by number of other technologies, both in hardware and software. The field of Social Robotics takes great advantage of the technological revolution which we are witnessing these days. We are reaching the next level of democratization of robotics.

Artificial Intelligence is booming

A notable progress in the field of Artificial Intelligence (specifically with Large Language Models) significantly enhances the quality of the interaction between robots and humans. Advancements made with LLMs such as ChatGPT makes robotics accessible to many. Today, describing a task at hand is enough to have a robot such as Furhat instantly take on an assigned role, be it a receptionist, a field expert, a teaching assistant, or a friendly companion. With improved accessibility, more people can deploy a robot without having technical expertise, which creates new opportunities for commercial applications for social robots.

Developments in the semiconductor industry continue to empower social robots

Improvements are made with robot perception, cognitive abilities, and real-time exchange with humans, and together with the quickly expanding software industry, keeps on making interactions with social robots more human-like.



Image: Somcare <https://som-care.com/en/misty/>

Human-robot interaction design is becoming user-centric

The users of social robotics continue to be primarily the elderly and the young, and HRI researchers today instead of assuming, aim to identify the actual needs of the end users by engaging target groups in user research.

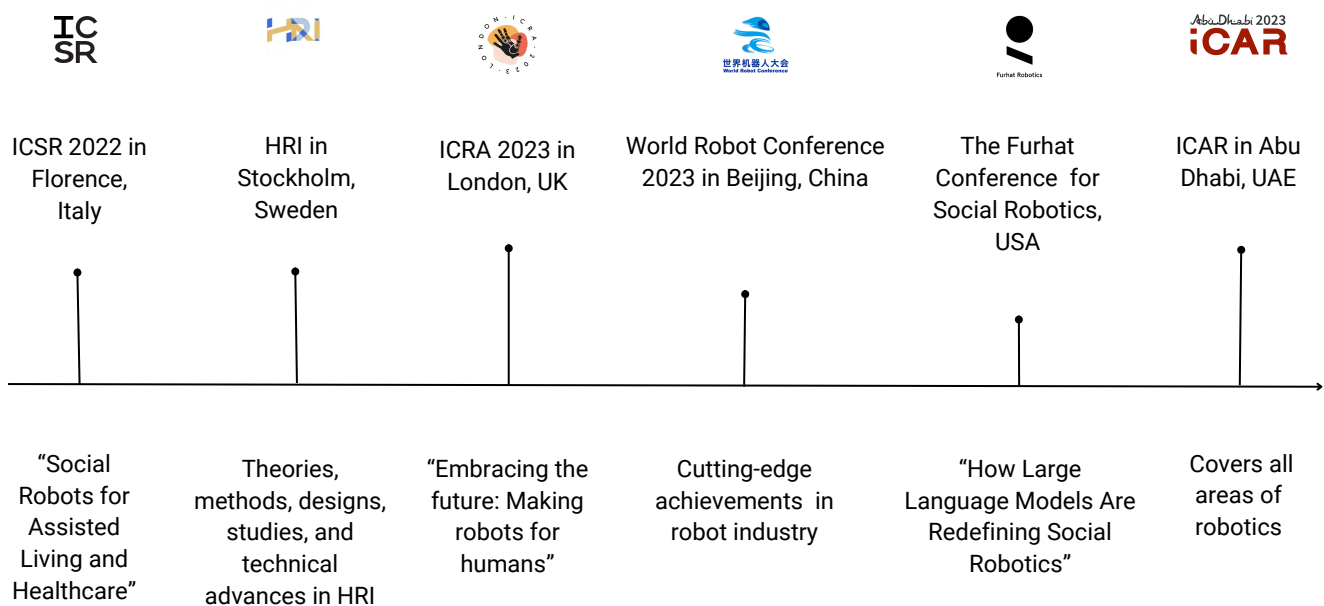
It turns out that seniors appreciate the companionship provided by robots, and their family feels more secure knowing that a robot is keeping an eye on their elders.

According to AARP "Home and Community Preferences Survey" 77% of adults 50 and older want to remain in their homes for the long term – a number that has been consistent for more than a decade. Studies show a wish from the respondents that a certain age threshold would trigger an invitation to get welfare technology implemented to support the safety of their ageing loved ones.

When it comes to the young, the results of user research with children using social robots in educational settings demonstrated that the children experienced peace of mind and were less stressed. They accepted the robot as a class member and, further, showed concern for improving their friendships and class time. The robot's presence in the classroom could help make the class interactive and increase communication among the children. Research also shows that applying social robots in education proves to help the students better their social skills.

Robotics conferences 2023

There are a number of robotics conferences that take place around the world each year. The leaders in applied robotics gather to showcase the latest achievements in robotics and to discuss the future of the industry.



The future of social robotics

Inspiring use cases spark the imagination of people whether they dream or fear robotic autonomy. In the meantime, the industry continues to do the heavy lifting to overcome design limitations to deliver on the vision where robots exist side by side with humans.

The future is near

Artificial Intelligence revolutionises social robotics at an unbelievable speed. In this revolution a robot's design is the limit – besides being powered by a robust LLM, a conversational robot should be able to hear, see and speak well to supply interactions of high quality. One thing is sure – LLMs integrations will activate much greater versatility of tasks and use cases for social robots spanning from casual interactions to professional ones.

Multifaceted robot assistants

A robot capable of conversing to anyone in any language is just a basic example of what's done today, but there are so many more paths to discover. Social robots powered by advanced language models won't need to have one preprogrammed personality suited for a single use case. Instead, the character of a social robot will be prompted by the user themselves and according to their personal needs (or the requirements of their business). A single robot will be able to perform tasks of a personal assistant, a research associate, a receptionist, or customer support and would activate those functions just by hearing "Act as a hospitable receptionist and help our guests with check-in and finding their way around". It means that one robot will be able to wear many hats, and swapping those will not be a matter of weeks of reprogramming, but a single voice command from the user to tell the robot what role to play.

I think, therefore I am?

While being a controversial topic, a machine's ability to reason (or mimic reasoning) might someday contribute to humanity's evolution on a very personal level. Open AI tested the performance of GPT4 in the settings where the model was asked to perform a role of a couples therapist, and the results were astounding (p. 57). The model's assessment of the situation was unbiased and exhibited a deep insight into complex human relationships.

While the social robotics industry is propelled by AI, making robots smarter than ever, there are still limitations to be overcome in terms of robotic mobility and perception, among others. Continuous efforts are made in design to give robots the necessary robustness to make the dream of robotic autonomy become a reality.

Resources

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