ISSN: 0474-9030

Our Heritage

Vol-68-Issue-15

January-2020

UGC Care Listed Journal

"Intelligent Homes: Robotics andAI revolution in social life"

[1]Prof. Ravikant Kale [2]Prof. Manoj Sawanand [2]Prof. Varada Inamdar

Abstract:

Robotics and Artificial intelligence are no longer separated from social life of today's mankind. Along with the industrial revolution, they have equally brought social revolution. Robotics being the field worried with the connection of awareness to action, the connection is to be intelligent when Artificial Intelligence must have a central role in Robotics. Artificial Intelligence addresses the critical questions like what knowledge is required in any part of thinking; how should that knowledge be characterized; and how should that knowledge be used. Robotics challenges AI by compelling it to deal with real stuffs in the real world. Methodsand representations developed for purely intellectual problems, often in toy domains, do not necessarily extend to meet the challenge. "Robots combine mechanical effector, sensors, and computers. AI has made significant contributions to each component."[1].

In the Industrial age that humankind has entered long time ago with steam series has produced to originalcomputerization in production. With the development of internet and mobile technologies, electronics, Nano technology, advances in medicine, health and digital applications and so on speed up mechatronics studies nowadays.[2]"Many items and headlines such as jobless ratio, Philips Curve, performance, management, CRM Analytics, customer relationship management, sales, strategic planning, mass production, Purchasing Power Parity, GDP, increase, money, Central Banks, Banking System, coaching, training, accounting, taxes etc. regarding to business and economics will face serious dangers, hits, change, experiences as well as opportunities and gains with the improvements in Artificial Intelligence and Robotics."[3]

The Robotics and Artificial Intelligence although addressing in similar problems. The two pitchesinterminglecommercially in the space of constructing intelligent agents; this inter action has caused in essential developments in the area of vision and phased action. Currentdevelopments of technologies, with computation, robotics, machine learning, and shrinking technologies, brings us closer to pioneering visions of apprehensive intelligent devices. The missingcomponent is a basic understanding of how to relate human functions (physiological, physical, and intellectual) to the design of intellectual devices and systems that support and interact with individuals. "Robotics is the branch of technology that deals with the design, structure, operation and application of robots and computer systems for their control sensual feedback, and information processing.This conceptual and hypothetical paper is aiming to address and discusses the future of robots, mechatronics and artificial intelligence in different perspectives."[4]

Current research paper is intended to explore the rise of the use of Robotics in intelligent homes along with its impact for the sustainable development of citizens. In this paper researchershave investigatedresidential inferences of robotics on the people and how residential sector would implement it. At the start of this paper researchershave analyzed how Robotics is used for sustainable development in intelligent homes. Next to that researcher focused on impact of Robotics and its applications in every field. In continuation with the study researchershave provided analysis made by data collected through the respondents.

Keywords: Robotics, Artificial Intelligence, Intelligent Homes, Effector

ISSN: 0474-9030

Our Heritage

Vol-68-Issue-15

January-2020

UGC Care Listed Journal

Introduction:

The finalobjective of scheming and building intelligent agent that perceivethe reason about, and act upon, our everyday world is shared by artificial intelligence (AI) and robotics. Researchers have discussedadditional advances those are vital for subsequent success in this area.

“Roboticists are nowhere near achieving this level of artificial Intelligence but they have made a lot of progress with more limited AI.”[5]Control systems are established for broadlyincompatible styles of movement, including robots on rolls or with one or more legs, as well robots that swim and fly. Robotics is a branch of AI, which is collected of Electrical Engineering and Computer Science for designing, construction, and application of robots.

Today's AI machines can reproduce some explicit elements of in intellectual capability.

Robots are in different variety in the size, shape and jobs. Some robots are used day after day in factories, while others are highly experimental and use artificial intelligence to behave more and more like living individuals, able to act independently in changing environments.” [5]

Definitions:

- **Artificial Intelligent:**

“Artificial Intelligence is a branch of Science, which deals with helping machines find solutions to complex problems in a more human-like fashion.” [7] This usuallyincludesdistressing characteristics from human intelligence, and applying them inform of algorithms in a computer friendly way. Other than Computer Science, AI has various important links with other fields such as Mathematics, Psychology, Cognition, Biology and Philosophy, among many others. There are endless applications of Artificial intelligence. They spread from the army services for self-sufficient control and target identification, to the entertainment industry for computer games and robotic pets.

- **Robotics:**

A robot is a device or machinewhichcollects information about its environment (senses) and practices that information (thinks) to follow commands and to do work (acts). A robot is an electro-mechanical or biomechanical machine or group of devices that can execute repetitive or pre-programed tasks. A robot May perform under the direct control of a human, such as the arm on a space shuttle, or in the control of a programmed computer. Robots are designed to doaccurate surgery, explore space, the ocean, and other dangerous areas.

- **Intelligent Agent:**

Intelligent agent (IA) observesthrough sensors and acts upon asituation using actuators (i.e. it is an agent) and directs its activity towards achieving objectives.

Intelligent agents also use Knowledge to complete their goals. They may be very simple or very complex in nature. Intelligent agents similar to a computer program which often described schematically as an abstract functional system.

“A rational agent is one that does the right thing. This is better than doing the wrong thing. As a first approximation, consider that the right action is the one that will cause the agent to be most successful.”[8]

ISSN: 0474-9030

Our Heritage

Vol-68-Issue-15

January-2020

UGC Care Listed Journal

An agent is anything that can be viewed as observing its environment through sensors and acting upon that environment through effectors. A human agent has different body parts like eyes, ears and other organs for sensors, and hands, legs, mouth, and other body parts for effectors.

A robotic agent replacements cameras and infrared range finders for the sensors and various motors for the effectors. A software agent has encoded bit strings as its precepts and actions ofIntelligence. “This is an important block that is used in many Mechatronics and Robotics projects. Intelligence often can be considered as an independent block. The intelligence blocks process information that is picked up by sensors or received from other external sources.” [9] The intelligence block can be as simple as a basic neural network for example, senses ambient light and determines, the robot distance from the light source or a wall.

“Two forms of artificial intelligence are suitable for applications in robotics and mechatronics:” [10]

1) **Software intelligence** is provided by a computer, microprocessor or microcontroller in which any intelligent software runs. Hardware offers the data which the processor needs to take decisions and converse with the control block. “The decisions are programmed in a basic structure and in some cases can be changed according to the incoming data. In such a case , the program can "learn" with experience, which is co-considered to be a basic Software intelligence can be located inside the own robot or mechatronic machine when microprocessor and microcontrollers are used. The Basic Stamp chip provides a simple way to some degree of intelligence.” [11]
2) **Hardware intelligence**. Alternative way to enhance intelligence to machine is by using circuits. The basic idea is to imitate the way living begins process the information they receive via senses, e.g. using the nervous system.

Applications of Robots:

Some of the important applications are as follows.

A. Outer Space

It is are used to control the arms that are used to unload the reducing bark of space transports to launch satellites or to construct a space station.

B. Military Robots

These are used for surveillance. In the future automated aircraft and vehicles could be used to carry fuel and bullets or clear minefields.

C. The Intelligent Home

Using them one can automate the home security systems to monitor security, energy usage and environmental conditions. Windows and doors can be opened automatically and switching on or off of lighting everywhere and air conditioning can be preprogrammed to activate. This assists tenants regardless of their state of mobility.

ISSN: 0474-9030

Our Heritage

Vol-68-Issue-15

January-2020

UGC Care Listed Journal

Impact of Robots at Intelligent Homes:

Figure: A Robot in every Home

Consuming a home robot seems to be luxurious and exciting technological advancement known to mankind in this current century for the intelligent home. However with any household decision, there are both positives and negatives impacts when integrating automated robotics systems into home.

The advantages of buying a robot in domestic are their ability of multitasking. Companies nowadays are trying to create a robot that can do multiple purposes quicker with more attention to detail with minimum amount of sound. "An example is a robot grass mower that cleans the lawn by itself silently. From that kind of intelligent technology, it is making life increasingly easier and effortless for families. They can finally relax after a long day at work while their robot is doing chores at home or giving parents an opportunity to spend more time with their kids."

Robots are even now able to perform functions to help move disabled people or serve as companions to the elderly. The final advantage of having an automated robot in the home is to provide personal security. Many probably assume that all robots have a metal body that have a certain command, but they could also be simpler as an automatic camera. "Since technology has become more advanced, an automatic camera is becoming more affordable to install in the home to look for intruders". [13]

By understanding both the positive and negatives impacts; having a domestic robot is really beneficial when people do not have that much time or if they are unable to do certain amities such as being disabled. However with certain benefits, there are problems such as whether or not people are able to familiarize to using the device if they are technologically challenged. Also if understand the factors and are willing to consider the idea, people should get one for their home. They are very beneficial if people use it in control.

What can robots deliver for intelligent homes?

- **Robotic Cooking**: The different types of programmable robots are to be there which can cook food according to people's choice. They just have to set the quantity of the ingredients of the food. The rest will be done by the robot. Some types of the robots are introduced which can copy a person. All you need is just do the cooking in front of the robot. The camera is ready to record your movements. From

then, the robot will copy the person's actions to make that food for you. This kind of robotic cooking assistants is introduced in many hotels and intelligent homes also someof the company's manufacture this kind of robots.

Home Maintenance: For the personal uses Robots are now being made available. People can have these types of robots to help with household tasks. Some example of home maintaining robots:

Home robots are used to look after pet animals even if people are not at home.

- Home robots monitor a person every day. It knows when a person take bath, meal, and other things. It makes them ready for them before a person need.
- If people are not in a home, no tension, the robot is there for looking after thehome. It alerts you if there is any disturbance observed near your home.
- Robots can help with laundry, do preliminary work for cooking meals, clean kitchen and toilets.
- Many robots can pick up different things like toys, clothes, newspapers. It can help you by doing that.
- Some robots can assemble furniture and help with moving heavy objects.
- Now, many robots can answer phone call and are capable of continuing formal conversation.
- **As a servant**: Robotic engineers are working hard to make the robot as a servant. So that it can help all almost in all matters. Now-a-days:
- Cooker robots are there to make meals as like as you want.
- Laundry robots are there to make ready used clothes.
- Surveillance robots look after a home when you are away from home.
- Some robots can look after the pets too.
- Many robots can fetch things for you whatever you want.
- They can play with the kids
- They can work remotely and always be ready for that all-staff meeting
- Maintain the garden with them
- Turning the lights on/off
- Order the food people want to eat
- Maintain the house or pool
- People can do groceries with robots
- Robots can keep a good company
- Robots can track person's health.

Below are some of the major advantages of Robotics for intelligent homes:

- They are helpful for elder people- serve as companions(Handicap maneuver)
- Those who don't have time ex. Mothers doing chores then they can take care of children.
- They makes life increasingly effortless for families.
- They are available for emergencies and personal security ex. Automated camera.
- They are faster and more accurate
- They can do multiple things at a time.
- They are less noisy.

Some of the disadvantages of Robotics for intelligent homes:

- Laziness – one could lose the bond with the parents since robots are doing it.
- Any person don't want to do anything as robots are doing everything at home.

- They are expensive.
- Need some expert's decision that is intelligent homes adapt to using a robot?
- Sometimes no guaranty to do things correctly.
- Difficulty to identify the quality of the product.
- Safety issues – Dangerous to leaving them alone.
- Difficult to build

Research Methodology:

This paper describes the sample survey data collection, and data analysis procedures of the complete study. The persistence of this segment of the paper is to present the philosophical assumptions sustaining this research, as well as to familiarize the research strategy and the pragmatic techniques applied. It delineates the scope and limitations of the research design, and lays the research amongst existing research traditions in Artificial Intelligence and Robotics and its applications.

In this paper the theoretical and philosophical assumptions underlying the research methodology of Artificial Intelligence and Robotics were reviewed. This paper provides insight on what is Artificial Intelligence, how it helps in Robotics and its applications. The current paper is basically designed to give general introduction about Artificial Intelligence, Robotics and assessing the applications view about Robotics applicationsadoption and implementation in intelligent homes from various respondents.

For this paper researchers have used primary and secondary data. Primary data of the study is collected through survey method. The secondary data related to the proposed study is collected through various local and international journals, articles, web sites and published and unpublished thesis, reports, blogs, articles etc.

STATEMENT OF THE PROBLEM:

In current paper researcher has focused on main domains like Artificial Intelligence, use of Robotics and the applications of Robotics. Researcher has also enlightened on various aspects of Artificial Intelligence like howArtificial Intelligence and Robotics have changed the technology everywhere along with advantages and benefits of Robotics. In continuation of this researcher has also highlighted some of the types of robotics which are to be used in various fields.

In second and most important part of the research paperresearchers have collected the data from intelligent homes to know their view about Robotics.

OBJECTIVES OF RESEARCH:

The main objectives of this paper were:

1. To study Artificial Intelligence and Robotics with its applications.
2. To identify benefits of Robotics in intelligent homes.
3. To asses residents approach towards Robotics to implement and development in intelligent homes.

HYPOTHESES OF RESEARCH:

1. H1: Robotics is better option for residents.

2. H2: Adaption of Roboticsin homes is low.

3. H3: People are willingly ready to adopt Roboticsas solution for residential work.

SCOPE OF RESEARCH:

For this paper researchers have designed closed ended questionnaire to collect the data from respondents. Scope of the paper is limited to respondents from Pune city only. At the same time researchers have provided information only on few aspects of Artificial Intelligence and Robotics. I.e. Artificial Intelligence and Robotics, discussed about various applications of Robotics. Due to the limited time period it was not possible to collect the data from all the applications of Robotics. So, for the current paper focus is on the use of robots at intelligent homes.

Basically, the researchers have divided the scope of the study in following ways:

- To know about what artificial intelligence is and how AI is used in Robotics.
- To study what are the different applications offered by Robotics.
- What are the advantages of Robotics in any fields?
- To assess residents approach towards Robotics to implement and development in intelligent homes.

Basically, to accomplish first two objectives of the study secondary data from innumerable sources has been collected however the third and fourth objective of the study is accomplished by primary data collection method. To collect the data from the respondents researchers haveplannedwell-structured questionnaire.

GEOGRAPHICAL SCOPE:

The geographical scope of this research is to accumulate the data from people who are living in intelligent homes in Pune City. To accumulate corresponding data researcher has used uncountable data collection techniques like interview, formal and informal discussions, observations and questionnaire.

CONTENT VALIDITY:

In this study the content validity of the survey instrument ensured by:

- Printed and digital books
- Extensive Literature Review
- Data collection through questionnaire

Though the content are ensured by various ways mentioned above all the content from this paper are own contribution of the researcher.

DATA COLLECTION AND ANALYSIS:

For the current study researchers have analyzed the data and made it easier to understand. To collect the data from the respondents researchers have designed questionnaire which consists of 10 questions. Questionnaire was made available online to the respondents through Google form. Further questionnaire was made accessible to the intelligent home in Pune city for lawful data filling. The details of data collection and analysis done are as described in lower section of the paper.

ISSN: 0474-9030

Our Heritage

Vol-68-Issue-15

January-2020

UGC Care Listed Journal

COLLECTION OF THE DATA:

This research is based on the primary and secondary data. Primary data is obtained with the questionnaire and the secondary data has been collected from different types of sources as local and international journals, articles, web sites and published and unpublished thesis, reports, blogs, articles etc.

Primary data has been collected from people from intelligent homes in Pune City. For the current study researchers have considered people from residents from Pune City.

The secondary data is also collected via the secondary source. The data is collected and reviewed by literature review for understandable form.

'Literature' in the context of this paper refers to the written or printed word -documents and files of public institutions, media publications, books, etc., The researchers have gathered relevant documents printed and handwritten form for review. The similarities and differences in their views or findings, etc., are identified. By the literature review researchers discussedsome of the opinions, findings, etc. of those who had worked in similar areas in the past. This literature review served a number of purposes: it provided a theoretical basis for the work and offered the researcher an insight into the best methods, instruments for data gathering and the statistical tools for analyzing the data gathered, which previous researchers had used.

DATA ANALYSIS:

Researchers have done a survey on resident peoples' view on Roboticsadoption, so as to understand actual scenario in these intelligent homes and Robotics implications. The survey samples of the study were selected from the Pune City. People from intelligent homes from Pune city were the respondents. Questionnaire was made up of 10 questions which were focused on the aim, objectives and hypotheses of study. The discussion of this survey and the division of the responses are done in this paper. While forming the questionnaire focus was on following aspects:

- People from intelligent homes from Pune city are selected as samples
- Questions formed to get a view of preferences of the respondents.

Questions were formed to know:

- Awareness of Robotics and itsapplications available for each and every field.
- People believe on Artificial Intelligence to bring advancement in Roboticsand Artificial Intelligence to deliver better options for homes.
- To know adoption portion of Robotics everywhere at intelligent homes.
- To know Robotics and its applications used at any place and adaptability of Robotics in their daily life.
- To know about peoples view on Roboticsimplementation in their smart and intelligent homes.

HYPOTHESES TESTING:

Researchers have done analysis of collected data through SPSS. The conclusions based on the analysis and hypothesis tested are as discussed below:

ISSN: 0474-9030

Our Heritage

Vol-68-Issue-15

January-2020

UGC Care Listed Journal

H1: Robotics is better option for residents.

Table No. 1: Robotics is better option for residents.

Test Statistics	
	Better Options
Chi-Square	20.127[a]
df	1
Asymp. Sig.	.000

Source: Compiled by researcher through SPSS

The above statistical table reveals that the chi square value is 20.127[a]
The p value is .000
If $p < 0.05$ then, accept the hypothesis i.e. "Robotics is better option for residents."

H2: Adaption portion of Roboticsin homes is low.

Table No. 2: Roboticsadaption ratio

Test Statistics	
	Adaption portion
Chi-Square	23.435[a]
Df	1
Asymp. Sig.	.000

Compiled by researcher through SPSS

The above statistical table reveals that the chi square value is 23.435[a]
The p value is .000
If $p < 0.05$ then, accept the hypothesis i.e. "Adaption portion of Robotics in homes is low."

H3:People are willingly ready to adopt Robotics as solution for residential work.

Table No. 3: Peoples willingness towards Robotics implementation

Test Statistics	
	Willingness
Chi-Square	18.173[a]
Df	1
Asymp. Sig.	.000

Compiled by researcher through SPSS

The above statistical table reveals that the chi square value is 18.173[a]
The p value is .000
If $p < 0.05$ then, accept the hypothesis i.e. "People are willingly ready to adopt Robotics as solution for residential work"

Researchers are very pleased to share that the hypotheses considered for the current study are accepted. In the continuation of the analysis researchers have also come out with following results of the study:

- Almost all respondents mentioned that they are aware about Artificial Intelligence and Robotics applications available for smart and intelligent homes.
- Many of the respondents i.e. People are agree that Roboticscan deliver better options for intelligent homes.
- At the same time it has been observed that, maximum numbers of people with their smart homes are not using any of the Robotics application at their home.
- People are willing ready for Robotics adoption and implementation in their home.
- Many of the respondents are agree that, Artificial Intelligence and Roboticsis a better and innovative technology for enhancement and sustainable evolution in their intelligent home.

CONCLUSION:

Robots are the world's future. Now that robots are booming in our huge world, the challenge has been presented for companies trying to create robots that are even more helpful to the human. Robots are becoming just like humans and in the future, they could be just like us, even more useful. If robots didn't have creators or masters then they could communicate freely with us and other robots. So, they would be able to share ideas and control themselves. In the future anyone will find that robots make a brighter future for everyone, others, and the environment

This paperenlarges on Robotics and Artificial Intelligence for intelligent homes, and benefits/advantages of Roboticsfor homes along with available Robotics applications in same area. In continuation to this researchers have also elaborated on research philosophy, statement of the problem, objectives of the study, the hypothesis of the study along with hypothesis test result and observations from received responses.From the various process acquired for the current study researchers have come to the conclusion that many of the people are aware about Artificial Intelligence and Robotics benefits for the various fields but still usage portion of the same in this sector is very less. There are many reasons behind less adaption of the Roboticsin some of the smart homes. Some of them are Less Awareness, current Infrastructure, Cost associated with the types of robots, applications and no emotions. Researchers also conclude that many people are now willing and are ready for Roboticsadoption and implementation in their smart homes; as they believes that, Roboticsis a better and innovative technology for enhancement and sustainable evolution in their intelligent homes as well as workplace also.

LIMITATIONS:

The present paper was focused analysing the impact of Robotics w.r.t. the social revolution in the form of an intelligent home. AI is not only a better and innovative technology but also brings enhancement and sustainable evolution in residents. Though the paper discusses too many applications of robotics but focused on only one aspect that how robotics applications are implemented in intelligent homes.

There were a few limitations confronted by researchers while conducting this research. These are listed below:

- Like any research, the data has been collected for a few samples and is not a comprehensive list.

- The respondents considered for the study were only some people from intelligent homes. It was not possible to study all the entities from the same sector due to insufficient time period.
- The method used for this is only on the basis of the questionnaire considering the time available for the research.
- The data is analyzed with single tool only.

TOPICS FOR FURTHER RESEARCH:

Despite of the enormous opportunities that Robotics and its applicationsmight afford to support everywhere now, new ethical implications and risks come in with the development of Robotics applications in some another fields. In spite of many transformations there are number of challenges in Robotics.During the study researchers come to know many of the aspects of the respective topic. Due to focus on main aim of the study, objectives defined and hypotheses considered researchers were unable to describe other area related to study. Here, researchers would like to suggest some topics which can be considered for future research.

- Challenges ofHome security and investigation robots at smart homes.
- Survey of Robotics in intelligent home with respect to all applications.
- Comparison of Intelligent home robots after adaption and emotions.

Bibliography:

[1] https://link.springer.com/chapter/10.1007/978-3-642-82153-0_2

[2]https://www.researchgate.net/publication/324594574_Evaluation_of_the_extent_of_integration_of_Humanoids_in_tackling_Social-economic_challenges_confronting_the_Africa_continent

[3] www.modir.ir/Articles/101852.aspx

[4] www.semanticscholar.org/paper/Personal-Mobility-and-Manipulation-Using-Robotics%2C-Cooper-Ding/22186d4c23dc3e908e37de27347094f699e6fe26

[5] https://science.howstuffworks.com/robot6.htm

[6] https://studyres.com/doc/926696/artificial-intelligence-and-robotics

[7] http://www.neturja.com/artificial-intelligence/

[8] https://elibrary.ru/item.asp?id=21949707

[9] https://medium.com/the-ai-guys/about-greedy-agents-37d346db34f4

[10] https://studyres.com/doc/926696/artificial-intelligence-and-robotics

[11] https://pdfs.semanticscholar.org/450c/dd4d7650e457544454996f47d677fe45f28a.pdf

[12]https://www.scribd.com/document/145026248/Project-on-automated-Robot-Put-to-Security-Measures

[13] https://www.scribd.com/document/413515646/Application-and-Types-of-Robots

[14]https://www.sites.google.com/site/smartrobotsathome/advantage-and-disadvantage-of-robotics-in-household

[15]"Artificial Intelligence and Robotics" by Javier Andreu Perez, Fani Deligianni, Daniele Ravi and Guang-Zhong Yang

[16] Artificial Intelligence in Robotics published by International Federation of Robotics Frankfurt, Germany May 2018

[17] The International Journal of Robotics Research, A policy blending formalism for shared control by Anca D Dragan and Siddhartha S Srinivasa, The International Journal of Robotics Research 2013 32: 790, DOI:10.1177/0278364913490324

[18] Artificial Intelligence and Robotics by Michael Brady, Part of the NATO ASI Series book series (volume 11)

[19] Robots and Their Applications by Mordechai Ben-Ari & Francesco Mondada, 27 October 2017

[20] "A Robot in every Home", www.siam.com, the leader of the PC revolution predicts that the next hot field will be robotics