DEVELOPMENT OF HUMANIOD ROBOT

M. Bhaskar[1] K. Sunitha[2] A. Ranjith[3]

[1,2,3]*Assistant Professor, Department of Mechanical Engineering, St.Martin's Engineering College, Secunderabad, India*

Abstract

The development of humanoid robots has been a prominent area of research and innovation, aimed at creating machines that can mimic human capabilities and interact seamlessly with the human world. This abstract provides an overview of the multifaceted journey in the development of humanoid robots, highlighting key aspects of their design, challenges faced, and potential applications Humanoid robots are anthropomorphic machines designed to resemble the human form, possessing the ability to perform tasks that humans can do, such as walking, talking, and manipulating objects. These robots combine advances in mechanical engineering, artificial intelligence, and human-computer interaction to achieve their human-like functionalities Furthermore, safety and ethics are paramount considerations. Ensuring that humanoid robots operate safely in human environments and adhere to ethical guidelines is an ongoing challenge. Striking the right balance between autonomy and control is essential to prevent unintended consequences. The development of humanoid robots has vast potential applications, including healthcare assistance for the elderly and disabled, enhancing industrial productivity, and supporting education and entertainment. The evolving landscape of robotics continues to reshape industries and human-machine interactions, making humanoid robots a promising avenue for the future. In conclusion, the development of humanoid robots represents a remarkable fusion of technology and human aspiration. This abstract offers a glimpse into the ongoing efforts to create robots that not only resemble humans in form but also in function, opening doors to a wide range of applications that stand to benefit society.

Keywords: including healthcare assistance , autonomy and control,detection of the target.

INTRODUCTION:

A robot is a machine—especially one programmable by a computer—capable of carrying out a complex series of actions automatically. Robots can be guided by an external control device or the control may be embedded within. Robots may be constructed to take on human form but most robots are machines designed to perform a task with no regard to how they look.

Robots can be autonomous or semi-autonomous and range from humanoids such as Honda's Advanced Step in Innovative Mobility (ASIMO) and TOSY's TOSY Ping Pong Playing Robot (TOPIO) to industrial robots, medical operating robots, patent assist robots, dog therapy robots, collectively programmed swarm robots, UAV drones such as General Atomic MQ-1 Predator, and even microscopic NANO robots. By mimicking a lifelike appearance or automating movements, a robot may convey a sense of intelligence or thought of its own.

Robots have replaced humans in performing repetitive and dangerous tasks which humans prefer not to do, or are unable to do because of size limitations, or which take place in extreme environments such as outer space or the bottom of the sea.

There are concerns about the increasing use of robots and their role in society. Robots are blamed for rising unemployment as they replace workers in increasing numbers of functions. The use of robots in military combat raises ethical concerns. The possibilities of robot autonomy and potential repercussions have been addressed in fiction and may be a realistic concern in the future.

The word robot can refer to both physical robots and virtual software agents, but the latter are usually referred to as bots. There is no consensus on which machines qualify as robots but there is general agreement among experts, and the

public, that robots tend to possess some or all of the following abilities and functions: accept electronic programming, process data or physical perceptions electronically, operate autonomously to some degree, move around, operate physical parts of itself or physical processes, sense and manipulate their environment, and exhibit intelligent behavior — especially behavior which mimics humans or other animals. Closely related to the concept of a robot is the field of Synthetic Biology, which studies entities whose nature is more comparable to beings than to machines.

OBJECTIVES: OBJECTIVES:

Assistance and Support: To assist humans in various tasks, such as household chores, caregiving, and customer service.

Research and Exploration: To explore environments that are hazardous or inaccessible to humans, such as disaster zones or outer space.

Companionship: To provide companionship and emotional support to humans, particularly in situations where social interaction is limited.

Medical and Healthcare: To assist healthcare professionals in patient care, rehabilitation, and therapy.

Education and Entertainment: To enhance education and entertainment experiences for humans, such as interactive learning or entertainment robots.

Technological Advancement: To push the boundaries of robotics and artificial intelligence, driving technological innovation and progress.

Physical Human Likeness: Humanoid robots should resemble humans in terms of body proportions, limb articulation, and overall appearance. This likeness helps in facilitating human-robot interactions and acceptance.

Mobility and Locomotion: Humanoids should be able to move in a manner similar to humans. This includes walking, running, climbing stairs, and navigating through various environments.

- **Enhanced Sensory Perception:** Integrating advanced sensors such as cameras, microphones, and tactile sensors will enable humanoid robots to perceive and interact with their environment more effectively, enhancing their capabilities in various tasks.
- **Improved Mobility and Dexterity**: Research into new materials, actuators, and control algorithms will enhance the mobility and dexterity of humanoid robots, allowing them to navigate complex environments and manipulate objects with greater precision.
- **Human-Robot Collaboration**: Developments in human-robot collaboration will enable humanoid
- robots to work alongside humans more seamlessly, whether in industrial settings, healthcare, or everyday life.

LITERATURE SURVY:

Taheri, Meghdari: “Human-Robot Interaction in Autism Treatment”Humanoid robot interaction in autism treatment refers to the utilization of humanoid robots, which are robots designed to resemble and interact with humans in a human-like manner, as a means of intervention and support for individuals with autism spectrum disorder (ASD). These robots have a human-like appearance and often incorporate advanced artificial intelligence (AI) and natural language processing capabilities.

METHODOLOGY :

It seems like you're describing a humanoid robot controlled by voice commands through a remote control, where

the input is processed by an Arduino UNO microcontroller using C++ programming language. The robot's actions, powered by a 6-volt power supply, are executed based on matching inputs programmed into the Arduino UNO's motherboard. The robot mimics human movements, including leg movements such as bending and extension at the hip, knee, and ankle joints, driven by rotary actuators. The Arduino UNO, equipped with 14 digital input/output pins and 6 analog input pins, serves as the central controller for the robot's actions. Additionally, voice recognition capabilities enable interaction with the robot, making it accessible to users who may have limited mobility or difficulty with traditional input methods.

The next phase involves conceptual design and prototyping, where the insights gleaned from the literature review inform the development of initial design concepts. This stage encompasses the structural design of the robot, including considerations for its physical appearance, dimensions, and mechanical components such as joints and actuators. Simultaneously, the integration of AI algorithms and sensor technologies is explored to enable perception, decision-making, and interaction capabilities. Prototyping allows for iterative refinement of the design and functionalities based on feasibility assessments and user feedback.

Following conceptualization, the hardware and software components are developed in tandem. This entails selecting and integrating appropriate sensors, actuators, microcontrollers, and computational units to realize the envisioned capabilities of the humanoid robot. Concurrently, AI algorithms for vision, speech recognition, natural language processing, and motion planning are implemented and optimized to facilitate intelligent behavior and human-robot interaction.

Once the hardware and software components are integrated, rigorous testing and validation are conducted to assess the performance, reliability, and safety of the humanoid robot. This includes functional testing of individual subsystems, as well as comprehensive system-level testing to evaluate the robot's overall functionality and adherence to design specifications. User testing and feedback are also solicited to ensure alignment with user expectations and requirements.

Finally, deployment and ongoing maintenance encompass the deployment of the humanoid robot in real-world settings, continuous monitoring of its performance, and iterative improvements based on user feedback and technological advancements. This iterative approach to development ensures that the humanoid robot remains adaptable, responsive, and relevant in evolving environments and use cases.

PROPOSED SYSTEM :

Developing a humanoid robot is a complex endeavor that necessitates a convergence of expertise from various fields, including robotics, artificial intelligence, biomechanics, and more. The following methodological framework outlines the key steps involved in the holistic development of a humanoid robot.At the outset, it is imperative to clearly define the objectives and use cases for the humanoid robot. Articulating its purpose, intended tasks, and roles helps establish a foundational understanding of the project. Identifying potential use cases and scenarios further refines the robot's intended functionalities and applications.

A comprehensive literature review forms the cornerstone of informed development. Delving into existing works on humanoid robotics offers insights into contemporary technologies, prevailing challenges, and established best practices. This critical examination of the literature landscape also aids in identifying relevant methodologies and techniques previously applied in similar projects.

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The proposed humanoid robot development system encompasses a modular architecture that integrates essential hardware and software components. Utilizing the Robot Operating System (ROS) facilitates seamless communication, managing sensors, and controlling movements. The system prioritizes a robust perception framework, incorporating computer vision, depth sensing, and tactile feedback.

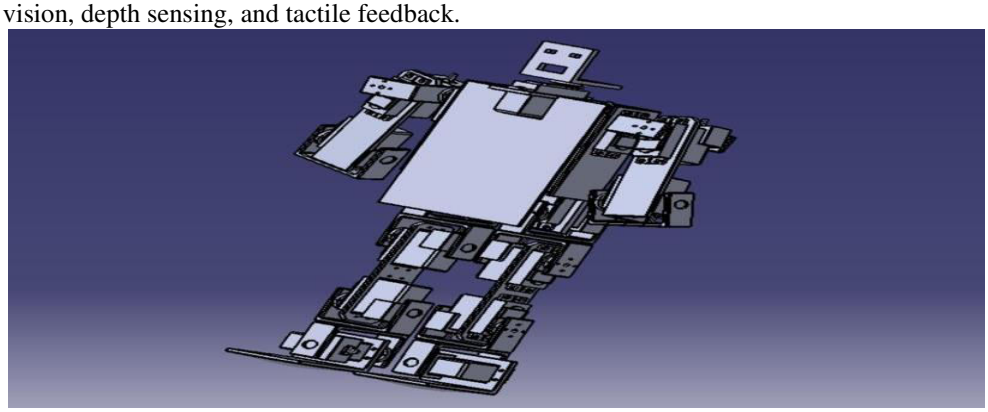

FIG 4.2.1 PROPOSED DESIGN

To enhance the activity of a robot by making it to do the things which a normal human being can do, to display a simplest way to develop a humanoid robot with out any complex structures, to achieve a system which can be affordable to make the robot by a simple minded

person Motion control involves precise joint and actuator management using Inverse Kinematics and PID controllers. Human-robot interaction focuses on intuitive communication through natural language processing, facial and gesture recognition, and touch-sensitive feedback. A learning and adaptation system employs reinforcement learning and continuous model updating.

Safety measures, including collision detection and emergency stop protocols, address ethical considerations. A simulation environment aids testing, employing a physics engine and virtual reality integration. Documentation emphasizes comprehensive technical details, encouraging knowledge sharing.

BODY :

FIG 1.1 BODY

FINAL OUTPUT:

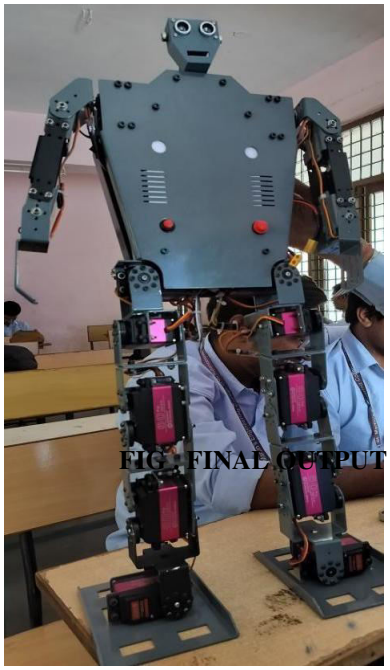

FIG 1.2 FINAL OUTPUT

CONCLUSION:

In conclusion, the development of humanoid robots represents a significant technological achievement with wide-ranging implications for various aspects of society. These robots have evolved from simple mechanical devices to sophisticated machines capable of mimicking human movements, understanding speech, and making decisions. They offer numerous advantages, including versatility, human-like interaction, and the ability to complement human abilities in various tasks and industries.