Journal of Advances and Scholarly Researches in Allied Education

Vol. VIII, Issue No. XVI, Oct-2014, ISSN 2230-7540

A ROBOT CONTROL SYSTEM: AN EFFECTIVE ANALYSIS ON ROBOTICS AND ARTIFICIAL INTELLIGENCE APPROACH

AN INTERNATIONALLY INDEXED PEER REVIEWED & REFEREED JOURNAL

www.ignited.in

Journal of Advances and Scholarly Researches in Allied Education
Vol. VIII, Issue No. XVI, October-2014, ISSN 2230-7540

A Robot Control System: An Effective Analysis on Robotics and Artificial Intelligence Approach

Patil Varsha Indas[1]* Dr. Sugumar R.[2]

[1]Student

[2]Asst. Prof.

Abstract – A robot is an upright of a mechatronic system. Most robots coordinate software, gadgets, and automation outlines in a synergistic way (implying that the different parts act together such that the consolidated impact is more grounded than the aggregate of the different impacts of every last one of the segments). Different cases of mechatronics are the advanced indoor regulator and the automated stopping device system. Both were initially planned as automation systems and have been enhanced later by their reconciliation with electronic controls and computerized figuring components.

Robotics is viewed as a subset of mechatronics, since all robots are mechatronic yet not all mechatronic systems are robots. Many classes on mechatronics in college educational module incorporate the outline and development of robots or automated components as illustrations (see for instance here and here). Some mechatronics programs and mechatronics courses are basically about automation advance development.

Keywords: Autonomy, Intelligent Robotics, Robot Motion Planning

----------X----------

1. INTRODUCTION

"Artificial intelligence" (AI) is a general term that suggests the utilization of a PC to show or potentially imitate shrewd conduct. Research in AI concentrates on the improvement and examination of techniques that learn or potentially perform shrewd conduct with negligible human intercession. These systems have been and keep on being connected to an expansive scope of issues that emerge in apply autonomy, web based business, medicinal determination, gaming, arithmetic, and military arranging and coordination's, to give some examples. A few research bunches fall under the general umbrella of AI in the division, however are teaches in their own particular right, including: mechanical technology, regular dialect handling (NLP), PC vision, computational science, and internet business. In particular, look into is being directed in estimation hypothesis, portability systems, multi-specialist arrangement, common dialect interfaces, machine learning, dynamic PC vision, probabilistic dialect models for use in talked dialect interfaces, and the demonstrating and coordination of visual, haptic, sound-related and engine information/data.

The expression "robot" for the most part means some (human-like) appearance; consider robot "arms" for welding. The propensity to consider robots having a human-like appearance may come from the beginnings of the expression "robot." "robot" came into the prevalent cognizance on January 25, 1921, in Prague with the primary show of Karel Capek's play, R.U.R. (Rossum's Universal Robots). 37 In R.U.R., a concealed designer, Rossum, has made a race of laborers produced using a vat of natural parts, sufficiently shrewd to supplant a human in any activity (henceforth "general"). Capek portrayed the specialists as robots, a term got from the Czech word "robota" which is inexactly interpreted as humble worker. Robot specialists inferred that the manufactured animals were entirely intended to be hirelings to free "genuine" individuals from a work, however were too humble to justify regard. This state of mind towards robots has grievous outcomes, and the lesson of the fairly communist story is that work characterizes a man. The move from robots as human-like workers developed from organic parts to human-like hirelings made up of robotization parts was presumably because of sci-fi. Three great movies, Metropolis (1926), The Day the Earth Stood Still (1951), and Forbidden Planet (1956), established the implication that robots were robotization in cause, disregarding the natural starting points in Capek's play. In the meantime, PCs were getting to be noticeably typical in industry and bookkeeping, picking up an impression of being exacting disapproved. Designing mechanization affirmed this

doubt as robot arms were introduced which would make a cursory effort of assembling parts, regardless of whether there were no parts. In the end, the term robot went up against subtleties of production line robotization: thoughtlessness and great just for very much characterized monotonous kinds of work. The thought of human, computerization, and strict disapproved of robots supplemented the perspective taken in a considerable lot of the short stories in Isaac Asimov's perpetual most loved gathering, I, Robot. 15 Many (yet not all) of these stories include either a "rob psychologist," Dr. Susan Calvin, or two recent inconvenience shooters, Powell and Donovan, diagnosing robots who carried on coherently however did the wrong thing. The move from human-like robotization animals to whatever shape takes care of business is because of reality. While robots are computerization, they don't need to be human or even creature like. Consider robot vacuum cleaners; they look like vacuum cleaners, not janitors. Furthermore, the HelpMate Robotics, Inc., robot which conveys healing center suppers to patients to allow nurture additional time with patients resembles a truck, not a medical caretaker. It ought to be evident that appearance does not frame a valuable meaning of a robot.

A savvy robot is a mechanization animal which can work self-rulingly. "Keen" suggests that the robot does not get things done in a careless, dreary manner; it is the inverse of the undertone from processing plant mechanization. The "mechanization animal" bit of the definition is an affirmation of the way that our logical propel improvement utilizes computerization building pieces, not natural segments (in spite of the fact that with late advances in cloning, this may change). It likewise accentuates that a robot isn't the same as a PC. A robot may utilize a PC as a building square, identical to a sensory system or mind, however the robot can collaborate with its reality: move around, transform it, and so on. A PC doesn't move around under its own particular power. "Capacity independently" shows that the robot can work, independent, under every sensible condition without expecting response to a human administrator. Self-governance implies that a robot can adjust to changes in its condition (the lights get killed) or itself (a section breaks) and keep on reaching its objective. Maybe the best case of a smart computerization animal which can work self-governingly is the Terminator from the 1984 film of a similar name. Indeed, even in the wake of losing one camera (eye) and having every single outer covering (skin, tissue) consumed off, it kept on pursueing its objective (Sarah Connor). Outrageous flexibility and independence in a to a great degree startling robot! A more reasonable (and genuine) case is Marvin, the mail truck robot, for the Baltimore FBI office, portrayed in a Nov. 9, 1996, article in the Denver Post. Marvin can achieve its objective of halting and conveying mail while adjusting to individuals getting in its way at erratic circumstances and areas.

2. REVIEW OF LITERATURE:

Robot development is driven by two particular necessities. The initially, and what is frequently viewed as the essential use for robots, is expanding efficiency, regardless of whether on a car creation line or for robotized organic product picking. The second basis for utilizing robots is security. Robots can perform undertakings that would somehow or another be excessively dangerous for people, for instance in the space, atomic or subsea areas. It is this last reason has given the inspiration to the work in this postulation. For the most part, robots utilized for expanding efficiency display almost no knowledge. They are educated precisely how to play out an undertaking and rehash that succession of orders a settled number of times. In this way, in manufacturing, automated work cells are intended to be organized to take out the event of sudden occasions which the robot can't adapt to. On the other hand, robots that work in perilous conditions can't be pre-modified as the workspace is regularly unstructured and subject to changes. Thus, the robot must have the capacity to respond securely to any eccentric episodes.

R. Mohamad proposed well-ordered rules for benefit recognizable proof. At that point a keen home contextual analysis was connected to confirm the rules. Nitty gritty examination gives depictions to distinguish administrations to conveyed inserted constant frameworks. Administrations were classified into three kinds to make benefit distinguishing proof simpler:

(i) Application administrations,

(ii) Functional administrations and

(iii) Control administrations.

The Application benefit speaks to the application rationale gave or got from an innovation stage. The Functional administration gives the useful rationale and was additionally separated into two kinds: Task administrations and Device administrations. The Control Service characterizes and controls the procedure of execution of administration.

Ambrecht J. et al. portrayed another disseminated organized design for keen robot. Two difficulties for Internet iLAN based robot framework: how to use the arranged assets of observation and calculation, how to understand a dynamic organized and updateable mechanical frameworks were tended to. A non-specific circulated mechanical system advanced from mixture automated engineering was proposed. The system coordinates independent robot into disseminated arrange structure.

C. Lin et al. proposed an operator based robot control (ARC) engineering. Curve is adaptable and a constant control framework. It is appropriate for multi-robot helpful undertakings. A test investigation of ARC was

finished. A helpful investigation utilizing two portable robots was illustrated. One robot was investigating nature by searching for a shading coded target and the other had duty regarding errand execution at the objective position.

Fumio O. et al. depicted an activity system for robots. The structure settle an asked for summon into a grouping of activities of robots. The structure depends on a general summon translator and a protest situated programming condition that backings conveyed programming advancement of robots.

Steward Z. et al. proposed a conveyed self-reconfiguring robot framework with unit-compressible modules called the 'Precious stone Robot'. The framework portrayed a suite of appropriated control algorithm for Crystal Robots and related tests for every calculation. Some of the algorithm proposed is instantiations of nonexclusive circulated algorithm for self-reconfiguring robots.

Y. Chen et al. depicted a knowledge about the utilization of Service Oriented Computing (SOC) for apply autonomy and occasion driven worldview for outlining mechanical frameworks. SOC is winding up progressively essential. In any case; the applications and research of SOC is constrained to WSs and undertaking frameworks. The utilization of SOC in Embedded frameworks and apply autonomy applications is exceptionally later. The creators portrayed the significance of SOC in mechanical technology.

J. Davis et al. depicted an adjustment to the intuitive programming condition. The creators demonstrated the utilization of protest based programming to outline the robots.

A. Cowley et al. portrayed the utilization of coordination in actualizing the simultaneousness in swarm robots. Programming a swarm of robots proposes various highlights discovered infrequently in customary programming applications. Simultaneousness implies the synchronous execution of different program components. Simultaneousness is a crucial element of swarms. Swarms of robots requires a computational stage, which works more than tens or several sensible processors, instead of the two or four centers found in run of the mill customer items.

H. Hautop et al. portrayed the idea of a disseminated instructive framework. The creators proposed a device for intuitive parallel and dispersed programming. The apparatus is the establishment for disseminated apply autonomy and human-robot communication improvement. The proposed device is profitable for taking care of countless into training framework. The issues recognized by the creators are correspondence conventions, ace reliance, parallel programming, appropriation, topology, criticism, and client communication.

T. Arai et al. distinguished seven essential research subjects inside multi-robot frameworks - restriction, correspondence, designs, organic motivations, movement coordination, protest transport and control, and reconfigurable robots.

M. W. Spong et al. portrayed the connection amongst apply autonomy and control hypothesis .The creators depicted that how control hypothesis has empowered answers for key issues in mechanical technology. The creators likewise depicted the issues in mechanical technology that have roused the advancement of new control hypothesis. Robot control frameworks are exceedingly exceptional with incorporated power and vision frameworks.

L. wang et al. portrayed the significance of Orchestrator in registering mists. The mists give a total arrangement of administrations on request. The mists could be created by administrations. The mists naturally coordinate administrations from various sources. They shape distinctive sorts of administration stream or work process. They do it straightforwardly and powerfully for clients [69].

Wei Liu depicted a design that empowers the computerized organization and administration of the virtual framework and programming of administrations conveyed in the cloud. A format depiction of an administration is required to the engineering. The administration portrayal epitomizes necessities, alternatives, and additionally conducts for a gathering of assets. The engineering at that point arranges the provisioning of this administration into a recently made arrangement of virtual assets. The organization layer coordinates the means associated with the mechanized provisioning of cloud administrations.

R. Ranjan et al. built up another framework called Media Wise Cloud Content Orchestrator (MCCO). MCCO extends the extent of existing substance conveyance systems with new cloud arrangement. It permits content personalization and coordinated effort capacities. It encourages look, administration, do-it-without anyone else's help creation, and utilization of interactive media content.

C. Durelli et al. portrayed an Orchestrator engineering for asset administration in mists. The engineering chooses at runtime the execution of assignment on the appropriate assets, in light of the present prerequisites.

Z. Juan et al. proposed a use of NCS in flame control frameworks.

Lee M. et al. proposed a NCS for portable robot route. It is a progressive, decentralized NCS that comprises of an abnormal state route control module and a remote low-level shut circle movement control module.

Noguero, A. et al. proposed a middleware design FTT-CORBA for synchronizing the undertaking of conveyed frameworks.

Kyoung-Dae et al. proposed an ongoing middleware for NCSs.

H. Kopetz et al. proposed a precise component definition and an appropriate composition framework to deal synchronization between NCS and networking protocols.

3. ROBOT CONTROL SYSTEM

A robot must have a *control system* to operate its drive system, which is used to move the arm, wrist, and body of a robot at multiple paths. When different engineering robots are compared with their control system, they can be divided into four major types [1]. They are:

- Limited Sequence Robots
- Playback Robots with Point – Point Control
- Playback Robots with Continuous Path Control
- Intelligent Robots

Limited Sequence Robots:

The limited sequence robots are incorporated with the *automation stops* and *limit switches* for determining the finishing points of its joints. These robots do not require any sort of programming, and just uses the *manipulator* to perform the operation. As a result, every joint can only travel to the intense limits. It is considered as the smallest level of controlling, and it will be best for simple operations like pick & place process. This type of robots is generally equipped with the *pneumatic* drive system.

Playback Robots:

The playback robots are capable of performing a task by *teaching* the position. These positions are stored in the memory, and done frequently by the robot. Generally, these playback robots are employed with a *complicated* control system. It can be divided into two important types, namely:

- Point to Point control robots
- Continuous Path control robots

Playback Robots with Point to Point Control:

The point to point robots are shortly called as *PTP*. It has got the capability to travel from one position to another. The desired paths are taught and stored in the control unit memory. These robots do not move from the desired location for controlling its path. It can be moved in a *small distance* only with the help of programming. This type of robots can be used for spot welding, loading & unloading, and drilling operations.

Playback Robots with Continuous Path Control:

The continuous path control is also known as *CP* control. This type of robots can control the path, and can end on any specified position. These robots commonly move in the *straight line*. The initial and final point is first described by the programmer, and the control unit defines the individual joints. This helps the robot to travel in a straight line. Likewise, it can also move in a *curved path* by moving its arm at the desired points. In these robots, the microprocessor is used as a controller. Some of the applications are arc welding, spray painting, and gluing operations.

Intelligent Robots:

The intelligent robots can play back the defined motion, and can also work according to their environment. It uses *computer based computer* as a controller. The sensor is incorporated in these robots for receiving the data/information during the process. The programming language will be based on *high level language*. This kind of robots is capable of communicating with the programmers in the work volume. It will be best for arc welding, and assembly purposes.

How Can a Machine Be Intelligent?

The science of making machines act intelligently is usually referred to as “artificial intelligence” or AI for short. “artificial intelligence” has no commonly accepted definitions. One of the first textstudys on AI defined it as “the study of ideas that enable computers to be intelligent,”143 which seemed to beg the question. A later text study was more specific, “AI is the attempt to get the computer to do things that, for the moment, people are better at.”120 This definition is interesting because it implies that once a task is performed successfully by a computer, then the technique that made it possible is no longer AI, but something mundane. That definition is fairly important to a person researching AI methods for robots, because it explains why certain topics suddenly seem to disappear from the AI literature: it was perceived as being solved! Perhaps the most amusing of all AI definitions was the slogan for the now defunct computer company, Thinking Machines, Inc., “... making machines that will be proud of us.”

The term AI is controversial, and has sparked ongoing philosophical debates on whether a machine can ever

be intelligent. As Roger Penrose notes in his study, The Emperor's New Mind: "Nevertheless, it would be fair to say that, although many clever things have indeed been done, the simulation of anything that could pass for genuine intelligence is yet a long way off."115 Engineers often dismiss AI as wild speculation. As a result of such vehement criticisms, many researchers often label their work as "intelligent systems" or "knowledge-based systems" in an attempt to avoid the controversy surrounding the term "AI." A single, precise definition of AI is not necessary to study AI robotics. AI robotics is the application of AI techniques to robots. More specifically, AI robotics is the consideration of issues traditional covered by AI for application to robotics: learning, planning, reasoning, problem solving, knowledge representation, and computer vision. An article in the May 5, 1997 issue of Newsweek, "Actually, Chess is Easy," discusses why robot applications are more demanding for AI than playing chess. Indeed, the concepts of the reactive research methodology, covered in Study 4, influenced major advances in traditional, non-robotic areas of AI, especially planning. So by studying AI robotics, a reader interested in AI is getting exposure to the general issues in AI.

4. ROBOTICS AND THE AI APPROACH

While the ascent of designing controllers and the framework way to deal with mechanical autonomy can in some measure be followed to the atomic weapons contest, the ascent of the AI approach can be said to begin with the space race. On May 25, 1961, prodded by the achievement of the Soviet Union's Sputnik space programs, President John F. Kennedy declared that United States would put a man on the moon by 1970. Strolling on the moon was only one part of room investigation. There were worries about the Soviets setting up army installations on the Moon and Mars and financial misuse of planetary assets. Plainly there would have been a period slack of very nearly 10 years before people from the USA would go to the Moon. What's more, that being said, it would in all probability be with trial shuttle, representing a hazard to the human space explorers. Indeed, even without the hazard to people, the main part of spacesuits would make even inconsequential undertakings troublesome for space explorers to perform.

It is alluring to have a robot that was self-ruling. One alternative is have portable robots arrive on a planetary lead preparatory investigations, direct tests, and so forth. and radio back the outcomes. These mechanized planetary wanderers would in a perfect world have a high level of self-governance, much like a prepared puppy. The robot would get charges from Earth to investigate a specific area. It would explore around rocks and not fall into gorge, and navigate soak slants without moving over. The robot may even be sufficiently keen to control its own particular vitality supply, for instance, by ensuring it was protected amid the planetary evenings and to stop what it was doing and position itself for energizing its sun powered batteries. A human may even have the capacity to address it typically to give it orders. Getting a portable robot to the level of a prepared puppy instantly introduced new issues. Just by moving around, a portable robot could change the worldfor example, by causing a stone slide. Fig. 1.5b shows space explorer Jim Irwin saving the lunar meanderer amid an additional vehicular movement (EVA) on Apollo 15 as it slides downhill. Consider that if a space traveler experiences issues finding a sheltered parking space on the moon, the amount all the more difficult it would be for a self-governing wanderer. Moreover, a self-ruling wanderer would have nobody to safeguard it, should it commit an error. Think about the effect of indeterminate or fragmented information/data on a meanderer that didn't have knowledge. On the off chance that the robot was moving in view of a guide taken from a telescope or an overhead summon module, the guide could at present contain blunders or at the wrong determination to see certain threats. Keeping in mind the end goal to explore effectively, the robot needs to figure its way with the new information or hazard slamming into a stone or falling into an opening.

What if the robot did something broke totally unexpected or all the assumptions about the planet were wrong? In theory, the robot should be able to diagnose the problem and attempt to continue to make progress on its task. What seemed at first like an interim solution to putting humans in space quickly became more complicated. Clearly, developing a planetary rover and other robots for space was going to require a concentrated, long-term effort. Agencies in the USA such as NASA Jet Propulsion Laboratory (JPL) in Pasadena, California, were given the task of developing the robotic advance development that would be needed to prepare the way for astronauts in space. They were in a position to take advantage of the outcome of the Dartmouth Conference. The Dartmouth Conference was a gathering hosted by the Defense Advanced Research Projects Agency (DARPA) in 1955 of prominent scientists working with computers or on the theory for computers. DARPA was interested in hearing what the potential uses for computers were. One outcome of the conference was the term ""artificial intelligence""; the attending scientists believed that computers might become powerful enough to understand human speech and duplicate human reasoning. This in turn suggested that computers might mimic the capabilities of animals and humans sufficiently for a planetary rover to survive for long periods with only simple instructions from Earth. As an indirect result of the need for robotics converging with the possibility of "artificial intelligence", the space program became one of the earliest proponents of developing AI for robotics. NASA also introduce the notion that AI

robots would of course be mobile, rather than impoverished to a factory flooring, and would have to incorporate all forms of AI (understanding speech, planning, reasoning, representing the world, learning) into one plan—a daunting task which has not thus far been reached.

CONCLUSION:

Robotics and Control is the field of building and is the numerical displaying of dynamic systems and the plan of controllers that reason the dynamic system to act in a coveted way. Control designing is being connected to permit progresses in many fields including car, customer items, process control, and atomic reactors, control systems, robotics, manufacturing and safeguard. Furthermore, control designing addresses new difficulties from the boondocks of science and innovation, for example, data innovation, biomedical innovation, and nano innovation. Control building ranges in the Electrical and Computer System Department incorporate nonlinear control hypothesis, control of keen materials, control of automated systems, control of nanomanipuation systems, and control of car systems, a versatile ideal control and estimation.

REFERENCES:

Ambrecht, J., Chemnitz, M., Kruger, J. (2011). “Control layer for multi-vendor industrial robot interaction providing integration of supervisory process control and multifunctional control units,” IEEE Conference on Technologies for Practical Robot Applications (TePRA) , pp.115-120.

Anthony Cowley, C.J. Taylor (2007). “Orchestrating Concurrency in Robot Swarms,” IEEE/RSJ International Conference on Intelligent Robots and Systems, IROS 2007, pp.945-950, Oct. 29 2007-Nov. 2 2007

Butler, Z., Fitch, R., Rus, D. (2002). “Distributed control for unit-compressible robots: goal-recognition, locomotion, and splitting,” IEEE/ASME Transactions on Mechatronics , Vol.7,No.4, pp.418-430.

Chia-How Lin, Kai-Tai Song, Anderson, G.T. (2005). “Agent-based robot control design for multi-robot cooperation,” IEEE International Conference on Systems, Man and Cybernetics, pp.542-547, pp. 10-12.

Cisco Cloud Computing -Data Center Strategy, Architecture, and Solutions Point of View , White Paper for U.S. Public Sector by Cisco Systems,2009.

Dellarocas, C. and M. Klein (2000). “A knowledge-based approach for handling exceptions in business processes,” Journal on Information Technology and Management , Vol. 1 No. 3, pp. 155-169.

Fumio, O., Jun'ichiro, O., Kunikatsu, T. (2008). “An Action Framework for Robots based on Distributed Knowledge Base,” IEEE/SICE International Symposium on System Integration, pp.77-82.

Gianluca C. Durelli, Marcello Pogliani, Antonio Miele, Antonios Motakis, Christian Plessl, Heinrich Riebler, Marco D. Santambrogio, Gavin Vaz, Cristiana Bolchini (2014). “Runtime Resource Management in Heterogeneous System Architectures: The Save Approach,” The 12th IEEE International Symposium on Parallel and Distributed Processing With Applications, pp. 142-149, 26-28 Aug. 2014.

H. Kopetz, G. Bauer (2003). “The time-triggered architecture” Proc. of the IEEE, Vol. 91, No. 1, pp. 112–126.

Henrik Hautop Lund, Luigi Pagliarini (2011). “Distributed Robotics Education,” Journal of Robotics and Mechatronics, Vol.23, No.5 pp. 859-870.

James Davis, Briana Lowe Wellman, Monica Anderson, Michael Raines (2009). “Providing robotic experiences through object-based programming (PREOP)” Proceedings of the ALICE '09 Alice Symposium.

Kirschnick, Johannes, Calero, Jose M Alcaraz; Wilcock, Lawrence; Edwards, Nigel (2010). “Toward an architecture for the automated provisioning of cloud services” IEEE Communication Magazine, Vol.48, No.:12, 2010, pp. 124-131.

Kyoung-Dae Kim, Kumar, P.R. (2013). "Real-Time Middleware for Networked Control Systems and Application to an Unstable System," IEEE Transactions on Control Systems Technology, Vol.21, No.5, pp.1898-1906, Sept. 2013

Lee, M.-F.R., Chiu, F.H.S. (2013). “A networked intelligent control system for the mobile robot navigation," IEEE/SICE International Symposium on System Integration (SII), pp.42-47, 15-17 Dec. 2013.

Lizhe wang, Gregor von laszewski “Cloud Computing: a Perspective Study” at Service oriented Cyber infrastruture Lab.

Mark W. Spong, Masayuki Fujita (2011). “Control in Robotics,” Available at www.ieeecss.org, 2011.

Noguero, A.; Calvo, I. (2012). “A time-triggered data distribution service for FTTCORBA,” IEEE

17th Conference on Emerging Technologies & Factory Automation (ETFA), pp. 1-8, 17-21 Sept. 2012.

R. Mohamad M.W. Aziz D.N.A. Jawawi M. Ghazali M.Z. Arbaie N. Ibrahim (2012). "Service identification guideline for developing distributed embedded real-time systems," Software, IET , Vol. 6, No. 1, pp. 74-82.

Rajiv Ranjan, Karan Mitra and Dimitrios Georgakopoulos (2013). "MediaWise cloud content orchestrator" Journal of Internet Services and Applications, Vol. 4, No. 2, 2013.

Tamio Arai, Enrico Pagello, Lynne E. Parker (2002). "Editorial: Advances in MultiRobot Systems," IEEE Transactions on Robotics and Automation, Vol. 18, No. 5, pp. 655-661, OCTOBER 2002.

Vouk, M.A. (2008). "Cloud computing — Issues, research and implementations," 30th International Conference on Information Technology Interfaces ITI 2008, pp.31-40, 23-26 June 2008.

Wang, Fei-Yue, Liu, Derong (Eds.) (2008). "Networked Control Systems Theory and Applications" Springer publication, 2008.

Yinong Chen, Sabnis, A., Garcia-Acosta (2009). "Design and Performance Evaluation of a Service-Oriented Robotics Application," 29th IEEE International Conference on Distributed Computing Systems, pp. 292-299.

Zhang Juan, Chen, Chen Jie (2007). "Networked Control System and its Application in Fire Control System," Control Conference, CC 2007. Pp.561- 564, July 26-June 31 2007.

Corresponding Author

Patil Varsha Indas*

Student

E-Mail – labsacademy@gmail.com