IJRRECS/January 2017/Volume-5/Issue-1/6831-6835 **ISSN 2321-5461**

INTERNATIONAL JOURNAL OF REVIEWS ON RECENT ELECTRONICS AND COMPUTER SCIENCE

A TWOFOLD MARKED DISTRIBUTED ARCHITECTURE MANUFACTURING TELE-ROBOT

Vaddeman Arunkumar[1], K.Guru Prasad[2]

[1]M.Tech Student, Dept of ECE, Avanthi Institute of Engineering & Technology, Hyderabad, T.S, India

[2]Assistant Professor, Dept of ECE, Avanthi Institute of Engineering & Technology, Hyderabad, T.S, India

ABSTRACT:

Industrial robots allow limited feedback from sensors, for example vision or pressure/torque sensors, through command trajectory modification. When multiple arms jointly hold a lot, additionally towards the motion from the load, the interior pressure inside the load must be controlled for stable grasping while staying away from damaging the part. Our approach is sensor-based, allowing versatility in task specs and execution. We consider robots with multiple kinematically redundant arms. Such robots can tackle a much wider selection of tasks than the usual single arm, but simultaneously incur elevated complexity when it comes to potential collision in addition to pressure of interaction in collaborative tasks. The primary aspects of the machine include vision-led motion control, redundancy resolution, collision avoidance, squeeze pressure control, load compensation, and human gestural interface. We used a commercial robot controller, and despite its significant time delay, we could achieve robust performance for complex motion and pressure objectives. We exploit kinematic redundancy within our system to prevent collision and enhance manipulability and grasp stability by using potential fields. Using the Lyapunov function, you can easily reveal that the positioning and orientation error will converge when we ignore feedback delay. We decide RR over other distributed automatic middleware systems for example ROS Industrial because of its multiplatform compatibility. We make use of the well-known integral pressure control, having a pressure-dependent gain to boost

sturdiness and show closed loop stability for any compliant object. Motivated by fabric layups in composites manufacturing, we're also investigating an alternative around the earlier discussed complementarily pressure control condition in which, rather of applying a squeeze pressure on the rigid body, the robot must conserve a prescribed tension inside a flexible object during motion.

Keywords: Force control, human interface, dual-arm manipulation, visual servoing, tele-robotics, industrial robot, kinematic redundancy.

1. INTRODUCTION:

A planning-based approach could be general and guarantee locating a solution if a person exists, however the solution could be computationally intensive and wish detailed geometric along with other model information from the system and it is atmosphere. Rather, we decide a sensor-driven reactive method of allow simple but robust solutions. The machine is to locate relatively large object inside the robot workspace, grasp it at two designated, near-parallel contact points, after which manipulate the item based on a reference signal provided through either teleportation from the human operator or perhaps a predefined sequence of poses. The pressure control function instructions the 2 finish effectors to use a squeezing pressure for any sufficiently secure grasp, both in a stationary pose and through manipulation [1]. When put on multi-arm systems, the arms are often treated individually however, our bodies includes a movable waist that couples the motion of these two arms. To impose the twin-arm constraint, we relate the possibility field in the affected arm towards the arm that's inside a comfortable joint space. Many of the essential in installments of large transient error for example switching between different control modes or large accelerations within the commanded signal. After choosing the object, positioning the finish effectors, and safely grasping the item, the robot moves the item towards the specified home position [2]. The tagged object is identified and selected up through the robot. An operator steps while watching Kinect and takes control while using start gesture. The operator then demonstrates the preferred trajectory for that object utilizing their relative hands positions, coordinated instantly using the current pose from the object. Probably the most challenging situation involves non-planar contact surfaces inside a tilted orientation not even close to the first robot pose. For that no planar contact, the ALVAR tags have slightly different orientations with respect to the curvature from the surface, however the majority poll approach remains robust. Industrial robots are usually restricted to the lengthy delay between command and action, however with careful tuning; we reveal that these sensor-based methods continue to be achievable despite off-the-shelf sensors [3].

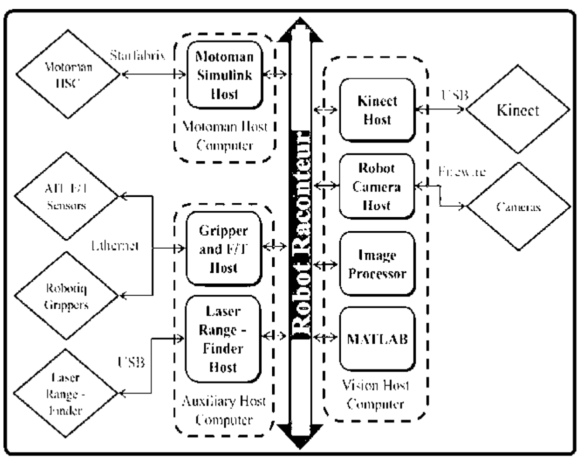

Fig.1.System control diagram

2. METHODOLOGY:

Within this paper, we present a singular tele-automatic framework for human-directed dual-arm manipulation. The commercial robot, composed of the rotating torso and 2 seven degree-of-freedom arms, performs autonomous vision-based target alignment of both of your arms using fiducially markers, two-handed grasping and pressure control, and powerful object manipulation inside a tele-automatic framework [4]. We use planar tagging schemes coded in the substitute reality community, particularly the VTT ALVAR tags, to discover the item and see appropriate grasp locations. Within our implementation, the operator provides input while using Kinect this type of non-contact gesture-based interface is especially attractive because the user is unfettered by mechanical constraints. ATI pressure/torque sensor, cameras, image processing, and Kinect interface, residing on three separate computers linked together inside a LAN The robot includes a built-in joint controller and enables exterior interface through Motoman's High-speed Controller. The HSC interface provides joint position read and incremental commanded joint position write in a 2 ms rate, having a significant delay because of internal trajectory generation. The normal solutions are through hybrid position/pressure control, in which the position and pressure control loops are decoupled and treated individually, or through impedance control, that has the overall objective of acquiring a preferred dynamic interaction between your robot and object or atmosphere. The constituents from the overall system are coordinated using the house-grown distributed control system, known as Robot Raconteur. Being an additional stability measure, the job space error is restricted with a saturation function to avoid excessive jerk and possible instabilities. Many of the essential in installments of large transient error for example switching between different control modes or large accelerations within the commanded signal. We construct virtual walls in the boundary of all these regions, based on their centerpiece and inward normal [5]. The ALVAR library determines the pose of every tag by mapping the homograph between your known positions of points within the tag frame towards the measured pixels within the image frame. It's simple to make use of the believed homograph to recuperate the homogeneous transform given a picture of the planar tag. Out of the box typical in networked control systems, the sampling delay is non-uniform. You are able to that as lengthy because the spurious lengthy delays don't occur frequently, the closed-loop system designed in line with the shorter average sampling time will stay stable. The pressure responses show noticeable variations between different objects [6]. Motivated by fabric layups in composites manufacturing, we're also investigating an alternative around the earlier discussed complementarily pressure control condition in which, rather of applying a squeeze pressure on the rigid body, the robot must conserve a prescribed tension inside a flexible object during motion.

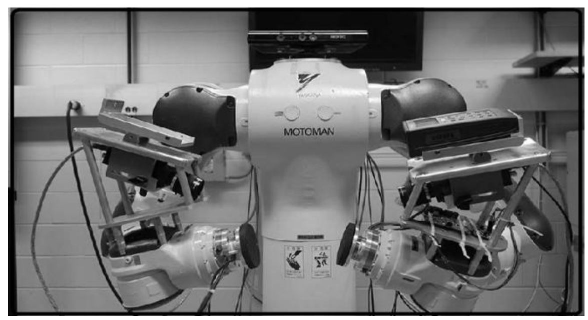

Fig.2.An Industrial robot

3. CONCLUSION:

Our goal isn't to develop a complete autonomous solution but to help a person's operator to locate an achievable solution. To safely contain the object using the robot arms, the robot must use a squeeze to lead to enough friction to avoid the item from sliding from grasp. With tight low-level motor servo loops, we are able to disregard the dynamics and fairly approximate the robot response having a first-order plusdead-time plant. Typical industrial controllers have closed proprietary torque-level control and just allow modification from the joint trajectory in a slower rate. Because we are curious about the job space motion, we make use of the damped least-squares formula to change the joint-level motion according to task space motion needs. Using the Lyapunov function, you can easily reveal that the positioning and orientation error will converge when we ignore feedback delay. Once there's a believed position and orientation from the target, we are able to make use of the task space controller they are driving the finish effectors towards the corresponding targets. We demonstrate the potency of our approach using a number of common objects with various sizes, shapes, weights, and surface compliances. We tested our control schemes using a number of different objects with different characteristics for example rigidity, mass, and planarity of contact surfaces.

REFERENCES:

[1] C. W. Wampler, “Manipulator inverse kinematic solutions based on vector formulations and damped least-squares methods,” IEEE Trans. Syst. Man, Cybern., vol. 16, no. 1, pp. 93–101, Jan. 1986.

[2] J.-S. Pang and J. C. Trinkle, “Complementarity formulations and existence of solutions of dynamic multi-rigid-body contact problems with Coulomb friction,” Math. Program. vol. 73, no. 2, pp. 199–226, 1996.

[3] J.-S. You, D.-H. Kim, S.-J. Lim, S.-P. Kang, J. Y. Lee, and C.-S. Han, “Development of manipulation planning algorithm for a dual-arm robot assembly task,” in Proc. IEEE Int. Conf. Autom. Sci. Eng. (CASE), 2012.

[4] A. Dietrich, T. Wimbock, and A. Albu-Schaffer, “Dynamic whole body mobile manipulation with a torque controlled humanoid robot via impedance control laws,” in Proc. IEEE/RSJ Int. Conf. Intel. Robot. Syst. (IROS), Sep. 2011, pp. 3199–3206.

[5] J.Wason and J.Wen, “Robot raconteur: A communication architecture and library for robotic and automation systems,” in Proc. IEEE Int. Conf. Robot. Autom. (ICRA), Trieste, Italy, Aug. 2011.

[6] B. Shimano, C. Geschke, and C. Spalding III, “VAL-II: A new robot control system for automatic manufacturing,” in Proc. IEEE Int. Conf. Robot. Autom. (ICRA), 1984, pp. 278–292.