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Simulation and Design of Hexapod using Labview

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Abstract: ***A hexapod is a mechanical robot that strolls on six legs. Even the robot can withstand with three legs due to its adaptability nature it can move. In the event that legs become impaired, in any case the robot have the capacity to walk. Moreover, not all the robot's legs are required to withstand, the other legs of robot are used to achieve new arrangements of foot or to control a payload.***

In this paper we have discussed about different parts of the hexapod: the relief of burden cell consistence, non-gathered control, usage of the controller on an ongoing stage.

I. INTRODUCTION

The human body is intended to transmit six level of opportunity (DOF) powers and minutes through the musculoskeletal framework amid velocity and exercises of day by day life. While the musculoskeletal framework can proficiently transmit these 6DOF powers and minutes over numerous years, mechanical mileage of joints may happen as osteoarthritis, delicate tissue damage and degeneration. Biomechanical testing was made to consider the kinematics and mechanical properties of human joints with an extreme goal to even more quickly comprehend joint mischief and degeneration.

The hexapod robot is an exhibited structure in the parallel controller arrangement for 6-DOF position and development control, and was at first proposed in 1965as a pilot training program instrument. Contrasted and the modern sequential robots, the hexapod robot is altogether stiffer, has a more prominent burden conveying limit, costs less (for proportional limit), and is increasingly reduced in size. Consequently, the utilization of a hexapod robot might be favored over a mechanical sequential robot for biomechanical testing applications, where high burden conveying limit, quick powerful execution and exact situating are of principal significance.A couple of gatherings have utilized the hexapod robot for spine joint testing. Nonetheless, these early frameworks experienced numerous issues, and thus the mechanical structure and control arrangement of these automated test frameworks should have been additionally improved to accomplish better execution for 6-DOF biomechanical testing.

II. PROPESED WORK

In light of our straight candidates, we have created parallel-kinematic frameworks for controlling joints in each of the six degrees of opportunity (three linear axes and threerotating axes),called hexapod. The hexapod is extensively more reduced than basic sequential kinematics. It has numerous focal points, for example, higher unbending nature, low moving mass subsequently improved dynamical reaction and a client quantifiable virtual rotate point.

Because of the particular plan of the hexapod, its size and quality can be adjusted to evolving necessities, coming to from a couple of centimeters to right around a meter of movement with nanometer goals.

2.1 Block Diagram:

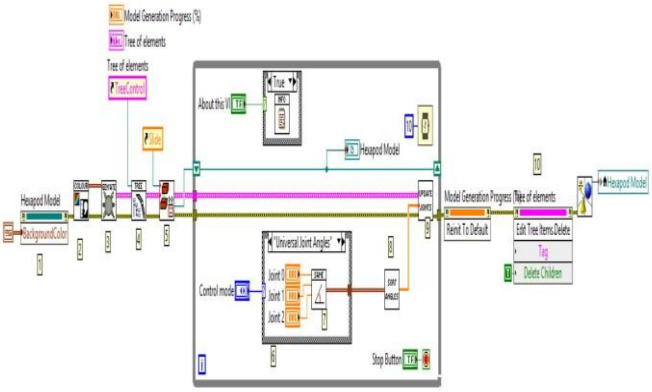

Fig: 1 Block Diagram

1. Set the background color of the 3D picture control to white.
2. Display a dialogue box, helping the user to select the colors of the hexapod.
3. Generate the set of clusters, that holds the parameters for the hexapod model.
4. Generate the 3D representation of the model.
5. Basically we can build the robot in the 3D picture,using set of clusters.
6. Based upon the state of the tab,the angles will either be controlled universally or seperately.
7. This VI holds the three joint angles to all respective joints.

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8. This VI scales the angles so that they are consistent with what the joints on the model expect.
9. Entering this VI in the loop allows the joints to be updated with any new joint angle positions.

III. CONTROL METHODS

The created control application was made in the LabVIEW program.The input parameters for thedescribed application are the trademark purposes of thehexapod,with which is portrayed the underlying position (impartial) of the hexapod. By nonpartisan position of the hexapod is seen such position in which its everything drives achieve the relocation esteem equivalent to half of the maximal expansion of the drive screw. Based on the nonpartisan position is resolved the length between the comparing trademark focuses speaking to the straight components of the hexapod legs in the given position.

For every leg there are three joints, which we have inventively named joint 1, joint 2, and joint 3. All the joints are controlledby using this VI or separately individual joint can also be controlled. It can take 20 seconds or more to produce the 3D output..

Notwithstanding, when the model is created, moving the joints is practically moment. here it is dealing with an expansion to this VI, in which the backwards kinematics is utilized in the recreation, taking into account increasingly 'genuine' developments.

we have incorporated all the STL documents for the CAD show in the joined file,the VIs will look in a particular organizer inside the undertaking envelope, to discover these records.

IV. EXPERIMENTAL RESULTS

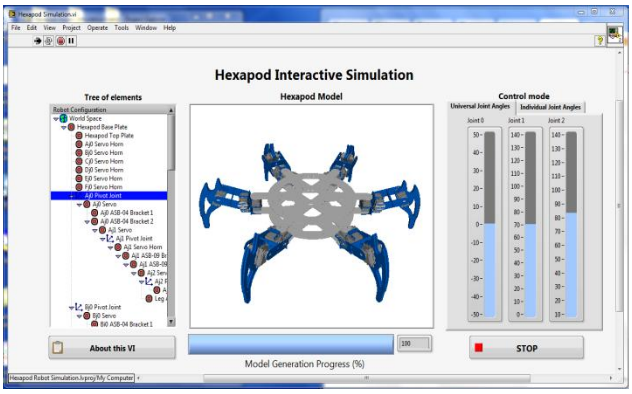

Fig 3: Experimental result

This VI shows how an interactive robotic model is built in LabVIEW. This design sends the real angles for design of 3D figure using 8 different CAD tools , utilizing VIs from the apply autonomy toolbox and utilizing straightforward 3D picture control VI's. The situation of the joints was made sense of by experimentation, and we have ensured that everything is in the right position.

Joints are included at every incitation point and utilizing more 3D picture control VIs the joints can be turned. For every leg there are three joints namely joint 1, joint 2, and joint 3. All the joints are controlledby using this VI or separately individual joint can also be controlled. It can take 20 seconds or more to produce the 3D output.This is typical, it turns out there's a lot to import, so the program takes now is the ideal time. Be that as it may, when the model is produced, moving the joints is practically moment. here it is taking a shot at an expansion to this VI, in which the inverse kinematics is utilized in the reproduction, taking into account increasingly 'genuine' developments. we have incorporated all the STL records for the CAD show in the connected file,the VIs will look in a particular envelope inside the undertaking organizer, to discover these documents.

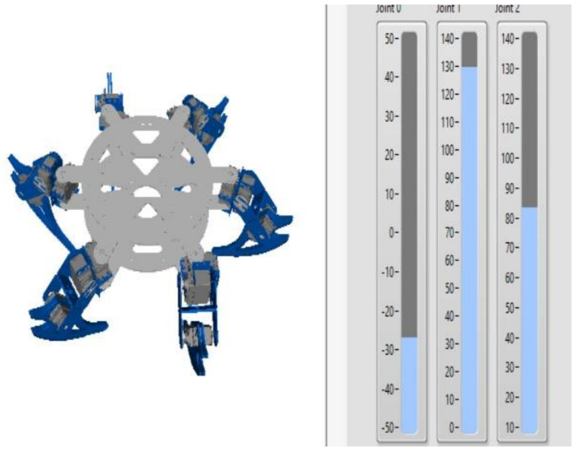

Fig 4

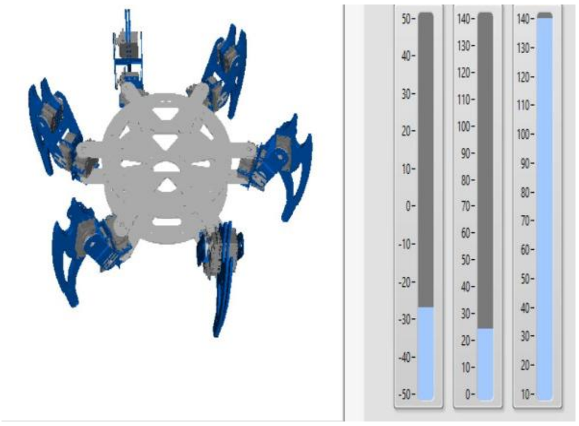

Fig 5:

V. CONCLUSION

In this paper, hexapod is designed using lab view. Here RT processor sends the real angles for running the 3D simulation of hexapod. The VIs running on the RT Processor are controlled through Front Panel Communication, effectively for controlling hundreds of operations calculations are needed and to save the millions of operating cycles for the RT processor.

REFERENCES

1. T.M. Moore, M.H. Meyeres, and J.P. Harvey, “Collateral ligment laxity of the knee. Long-term comparison between plateau fracture and normal,” *J. Bone Joint Surg.*, vol. 58, pp. 594-593, 1976.
2. R.L. Piziali, and J.C. Rastegar, “Measurement of the nonlinear coupled stiffness characteristics of the human knee,” *J. Biomech.*, vol. 10 , pp. 45-51, 1977.
3. M. Frey, R. Burgkart, F. Regenfelder, and R. Riener, “Optimisedrobotbased system for the exploration of elastic joint properties,” *Med. Bio. Eng. Comput.*, vol. 42, pp. 674-678, 2004.
4. H. Fujie, G.A. Livesay, M. Fujita, and S.L. Woo, “Forces and moments in six-dof at the human knee joint: mathematical description for control,” *J. Biomech.*, vol. 29, pp. 1577-1585, 1996.
5. S.L. Woo, R.E. Debski, E.K. Wong, M. Yagi, and D. Tarinelli, “Use of robotic technology for diathrodial joint research,” *J. Sci. Med. Sport*, vol. 2, pp. 283-297, 1998.
6. J.-P. Merlet, Parallel Robots, 2nd ed., Dordrecht, Netherlands: Springer, 2006.

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