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Humanoid Hand Moment by Using Threading and Screwing Mechanism

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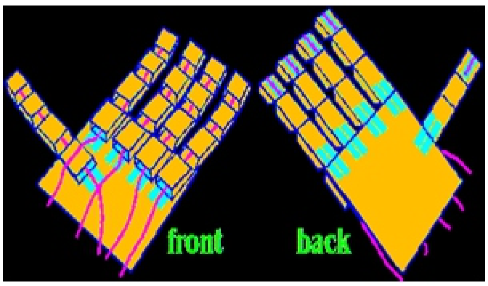
Aim:

By using link mechanisms moment creation in humanoid hand fingers, for future space robots.

Abstract:

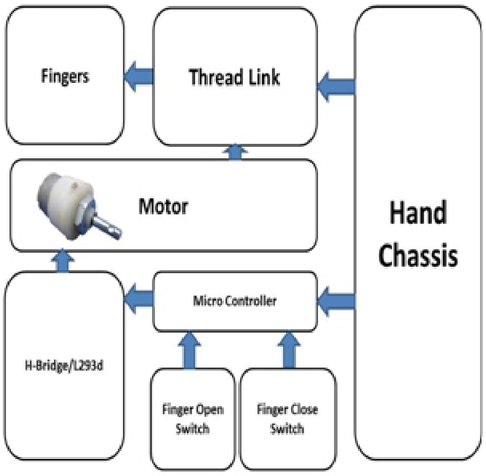
Space robots are an effective resource for astronauts working in a dangerous space environment. This paper proposes and implements a system to validate the performance of robot hand movement creation in space. A humanoid robot was designed with a vision-based self-calibration and navigation system. In addition, a hand moment by using link mechanism method was proposed to minimize joint torque. Simple gravity-compensation equipment with active and passive mechanisms was proposed.

However, the flexible connection required for free movement between the robot and the gravity-compensation equipment meant that the space robot was likely to vibrate when moving. In order to address this challenge, a new hybrid force-position controller with joint torque feed forward was proposed. This controller was based on the system dynamics model with a particular focus on joint dynamics. Experimental test results validated the system design and methodology, showing that the humanoid space robot could move sufficiently using simple gravity-compensation equipment.



BLOCK DIAGRAM:

REGULATED POWER SUPPLY:



Project Main features:

•Link Mechanisms.
•Thread mechanism

Using Modules:

•Link coupling
•Motor
•L293D IC(H-Bridge)
•Thread
•Microcontroller
•Switches
•Fingers
•Hand chassis
•Regulated power supply

How finger move by using thread:

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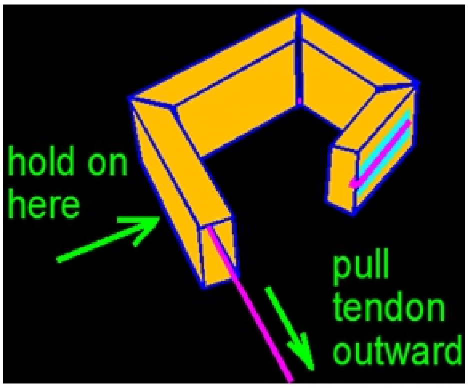
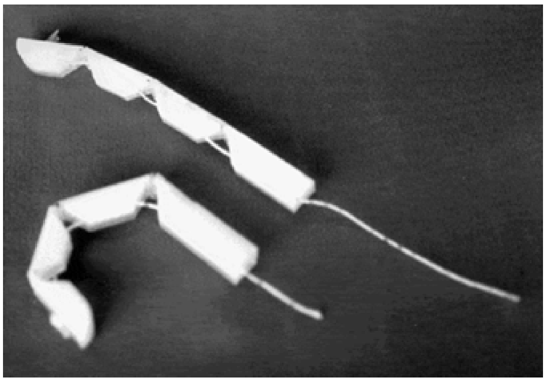


Software / IDE Using:

•IDE AVR-v4 Compiler for Embedded C Programming.
•Prog ISP-7 programmer for dumping code into Microcontroller.
•Proteus-7 for Hardware simulation / circuit designing.
Microcontroller using:-
We are using AURDINO (ATMEGA family, AVR)
•Because "Arduino is an open-source
• Electronics prototyping platform based on flexible, easy-to-use hardware and software.
•It's intended for artists, designers, hobbyists, and anyone interested in creating interactive objects or environments.
•"Arduino can sense the environment by receiving input from a variety of sensors and can affect its surroundings by controlling lights, motors, and other actuators.



You can try out your finger so far. Simply hold the base, pull on the string and watch it curl like a real finger. Doctors call this "flexion", and the mechanism that does it is very much like a real finger.

Screw (simple machine)

A screw is a mechanism that converts rotational motion to linear motion, and a torque (rotational force) to a linear force.[1] It is one of the six classical simple machines.

Advantages:

1.The mechanism is intuitive so a driver needs to spend very little time to create moment if such mechanism is implemented in a hand.
2.This mechanism addresses all the drawbacks of gripping.

RESULTS:

Force in the flexing tendon is maximal at the start of flexion, and decreases as the angle of joint flexion increases. A relationship was observed between finger length and the magnitude of the force exerted on the tendon: the longer the finger, the greater the force exherted upon the tendon. Force is greater at all the measured angles.

CONCLUSIONS:

We conclude that it is possible to measure the force of flexion transmitted by flexor tendons by means of a dynamic splint connected to a motor he flexing force can be effectively measured at all flexing angles, that it correlates with a number of different anthropometric parameters, and that such data are likely to open the way for future studies. Finally, we conclude that there is a correlation between gender, stature, arm span, and finger length and the force transmitted by flexor tendons.

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