One Webcam, Multiple Robots: Controlling Experiments Through A Network

Dilruba Akther

Amanda Hersh

Rogaite Shafi

Professor Vikram Kapila

Polytechnic University

Background

- Teleoperation-the control of a robot via the internet
- Webcam- A camera designed to take digital photographs and transmit them over the Internet or other network
- DC motor-motor which rotates certain angles
- Potentiometer-calculates the angle that the DC motors turned
- Micro dual serial motor controller-controls the DC motors
- Board of education-circuit board that consists of a breadboard for the circuitry and a basic stamp or *microcontroller* and is connected to the internet

Goal of Project

- A webcam will rotate to face a robot from a series of robots, which can be activated by a user on his/her personal computer, and set it in motion to perform its specified task

Methodology

- Build rotating platform for the webcam
  - Used a DC motor for the base of the bottom platform to rotate it and used a potentiometer to turn it a certain degree
  - Connected a shaft to the top two platforms
  - Used a hinge to join the top two platforms
  - Used a DC motor to tilt the topmost platform and a potentiometer to tilt it at a certain degree
  - Used a Micro Dual Serial Motor Controller to control the two DC Motors
  - All programming was done in PBASIC

- Web Design
  - Connected the Ethernet board to the board of education, which was connected to the rotating platform to send commands to the webcam
  - All programming was done in Java

Methodology (Continued)

The base where the webcam will be mounted on
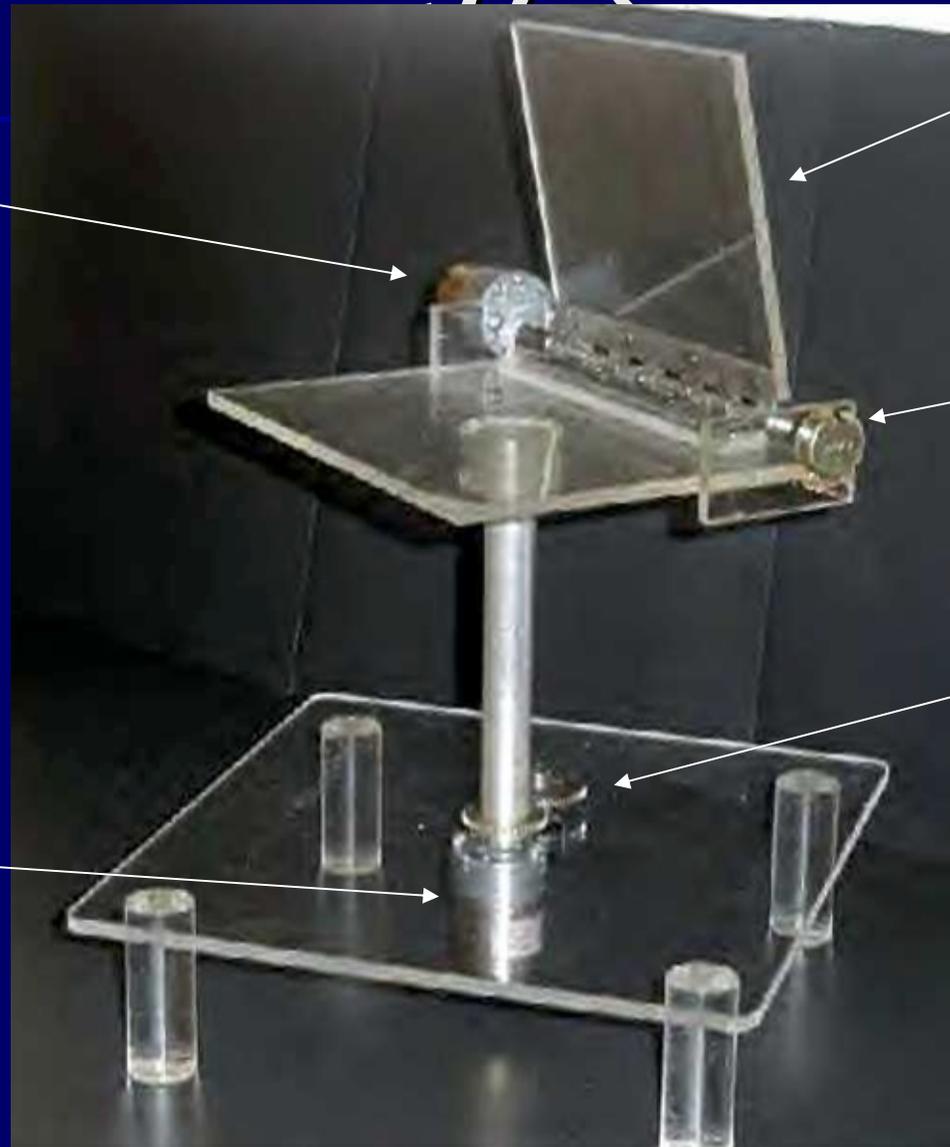
DC motor- used to tilt the platform

Potentiometer- used to tilt the platform at the desired degree

Potentiometer- used to rotate the shaft at the desired degree using a gear

DC motor- used to rotate the shaft using a gear

Results

	Angle platform was programmed to rotate	Angle platform actually rotated	Angle platform was programmed to tilt	Angle platform actually tilted
Robot A	40°	40°	1°	1°
Robot B	60°	60°	20°	20°
Robot C	80°	80°	40°	40°
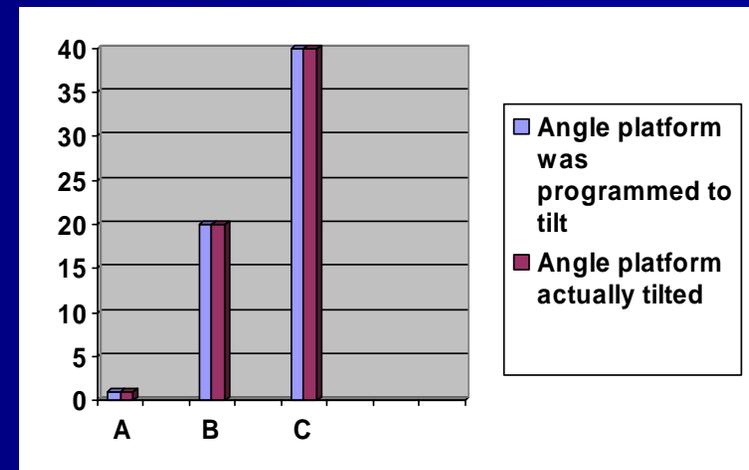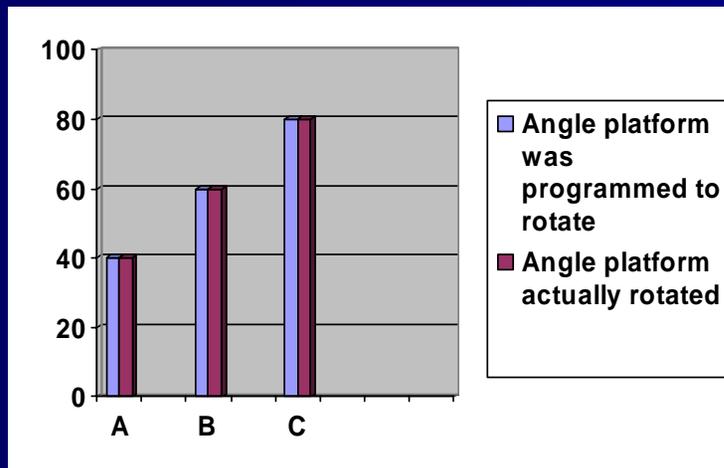
Discussion & Conclusions

- This research advances a user's control over the webcam.
  - Previously, it was required to have one webcam per robot in order to activate or control the robot via internet.
  - With this project it is now possible to control multiple robots through the internet with only one webcam viewing them to perform their tasks.

Applications/Future Research

- Useful by saving time and money
- Is useful for the ill or injured individuals
- Add temperature, humidity, and lighting
- Add multiple user interface

Acknowledgements

- Professor Vikram Kapila
  - Sang Hoon Lee (Nathan)
    - Hong Wong
    - DongYong Ko
  - Mr. Alessandro Betti
    - Mishah Salman
  - Professor Chris Leslie
    - YES Center