Multi-Touch Display Controller

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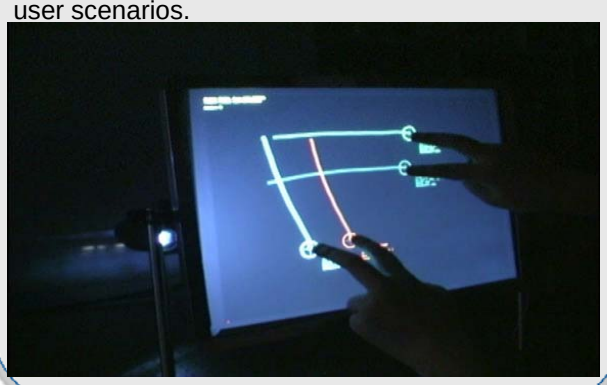
Abstract

A low-cost laser scanning system for simultaneously detecting multiple fingers on top of a computer display for more intuitive interactions between the user and computer.

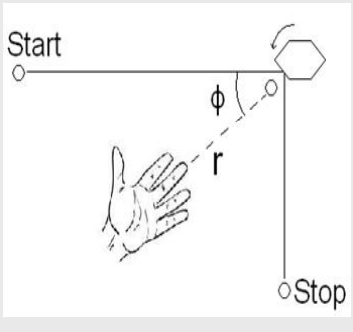
Introduction

Touch technologies were largely based on single touch, single user interfaces in the beginning; however, since the advent of devices such as the Apple iPhone or new Microsoft Windows 7, the change is coming. Multi-touch interfaces are the future. Multi-touch allows for multiple input, multiple user scenarios.



Method

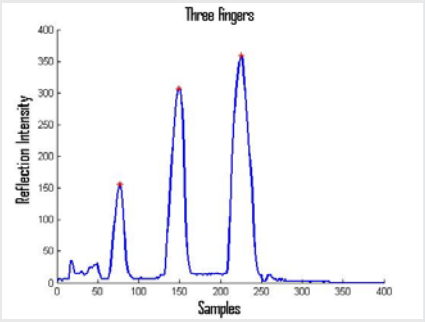
- ❑ Laser scanning will be used for finger detection.
- ❑ Positional coordinates will be determined by reflected laser light.
- ❑ A high speed polygon mirror scanner will send a laser beam across the display.
- ❑ Each time the user breaks the beam of light, the detector will sense the reflection.
- ❑ Light intensity will determine distance.
- ❑ Timing will determine the angle.
- ❑ Positional data will be processed using an ATMEGA32 microprocessor.
- ❑ This data will be sent via USB to the computer.



Conclusion and Results

Our purpose is to research and develop an inexpensive multi-touch tool that will allow LCD computer monitors to be freed of the barriers instituted by the common computer mouse and keyboard. The final goal for this project is to fabricate a device that will interface through common USB to a PC that essentially turns a regular LCD into a multi-touch display. We would like to complete our goal while maximizing particular features of our objectives such as :

- ❑ Adjustability
- ❑ Accuracy
- ❑ Resolution



The project was largely successful at meeting our objectives. The apparatus has the potential to be adjustable to fit multiple screen sizes. Given the proper calibration, the scanning and display are accurate. The resolution is also satisfied and can be adjusted with the software. Future work with this project would allow for multiple ways to display multi-touch capabilities. With driver development, this device should be able to replace computer mice as a user input.