AN ALGORITHM FOR STEERING CONTROL WITH SIMULATION RESULTS.

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Abstract:- The idea behind the paper was channelization of human thoughts to automated realization. It is decided to implement the theme of automatic maneuvering of vehicles and the unanimous choice of sensor was touch screen. It was started with the thought of being able to replace the steering of a car completely by a touch screen. It is drawn on the experience of driving to reach at the choice of touch screen as a drive interface. Another innovation was the touch screen controller being wireless. The idea is application of the user input tracking capability of the touch screen to an RC car control scheme. The Radio controlled car should follow the path drawn by user on a touch screen in real time.

Keywords: touch screen, automated vehicle, steering control, AVR microcontroller , wireless communication

1. INTRODUCTION:-

The idea behind the project is application of the user input tracking capability of the touch screen to an RC car control scheme. The Radio controlled car should follow the path drawn by user on a touch screen in real time. Driving system relied on man-machine-environment cooperation is presented. With this evaluation architecture, the reliability of two driving modes in automated driving system. The touch screen provides users with fewer response options thus simplifying the decision making involved in current driving scheme**.** The experience of driving to reach at the choice of touch screen as a drive interface. Another innovation was the touch screen controller being wireless. The development of multipoint touchscreens facilitated for the tracking of more figure on the screen,thus operation require more thqn one figure arepossible.Thase devices also allow multiple users with fewer response options thus simplifying the decision making involved in current driving scheme.There is an active role of visual perception and ordinary human prehensions which helped us in making our choice.

Related Work:

A touchscreen is a display that can detect the presence and location of a touch within the display area. The term generally refers to touch or contact to the has two main attributes. First, it enables one to interact with what is displayed directly on the screen, where it is displayed, rather than indirectly with a mouse or touchpad. Secondly, it lets one do so without requiring any intermediate device, again, such as a stylus that needs to be held display of the device by a finger or hand. Touchscreens can also sense other passive objects, such as a stylus. However, if the object sensed is active, as with a light pen, the term touchscreen is generally not applicable. The ability to interact directly with a display typically indicates the presence of a touchscreen.[2] [3][4]The touchscreen in the hand. Such displays can be attached to computers or, as terminals, to networks. They also play a prominent role in the design of digital appliances such as the personal digital assistant (PDA), satellite navigation devices, mobile phones, and video games. This system, introduced by Tyco International's Elo division in 2006, uses more than two piezoelectric transducers located at some positions of the screen to turn the mechanical energy of a touch (vibration) into an electronic signal.[12] The screen hardware then uses an algorithm[8][10][11] to determine the location of the touch based on the transducer signals. This process is similar to triangulation used in GPS. The touchscreen itself is made of ordinary glass, giving it good durability and optical clarity. It is usually able to function with scratches and dust on the screen with good accuracy.

FOUR WIRE RESISTIVE TOUCH SCREEN CONTROLLER:

KEY FEATURES

1. Supports 4 wire resistive touch panels
2. Low power standby current typically less than 2 µA at 5.5V
3. Maximum speed of 500 coordinate pairs per second
4. Automatic wake up and return to standby
5. 10 bit A/D

6. On-chip touch screen current drivers - no external driver required
7. UART interface.

Touch-screen interfaces are effective in many information appliances, in personal digital assistants (PDAs), and as generic pointing devices for instrumentation and control applications. Getting the information from a touch screen into a microprocessor can be challenging.

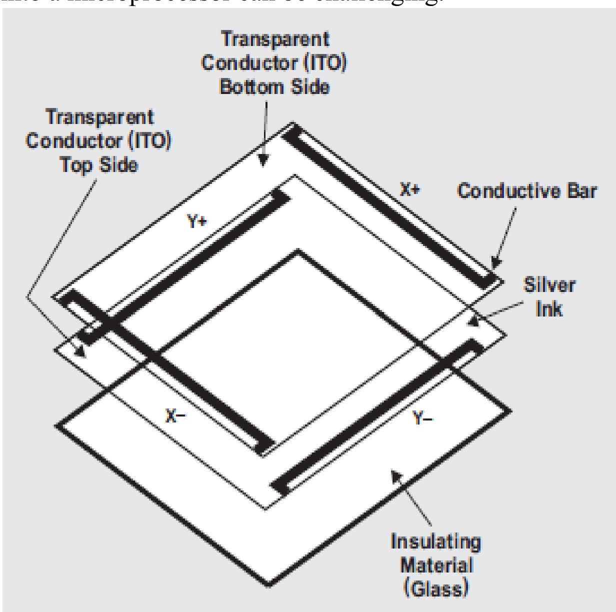
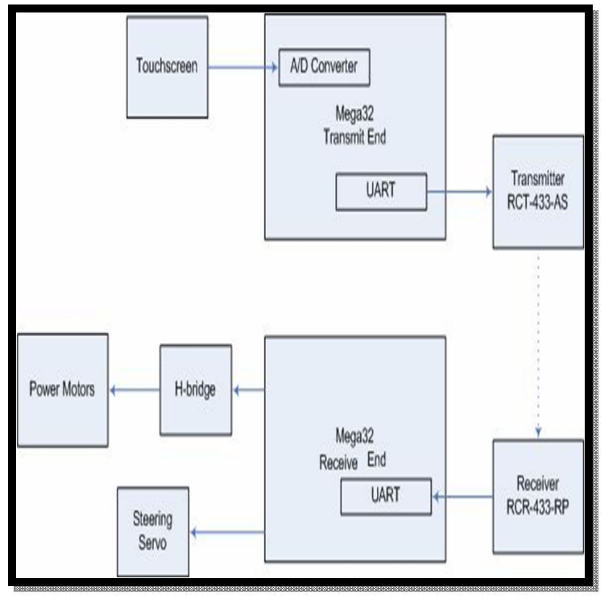


FIG: RESISTIVE TOUCH SCREEN.

This article introduces the basics of how resistive touch screens work and how to best convert these analog inputs into usable digital data. Issues such as settling time, noise filtering, and speed trade-offs are addressed. Resistive touch screens consist of a glass or acrylic panel that is coated with electrically conductive and resistive layers made with indium tin oxide (ITO) . The thin layers are separated by invisible spacers. Resistive screens are generally the most affordable type of touch screen, which explains their success in high-us applications like PDAs and Internet appliances. Although clarity is not as good as with other touch-screen types, resistive screens are very durable. The only concern is that the resistive layers can be damaged by a very sharp object. The circuits determine location in two coordinate-pair dimensions, although a third dimension can be added for measuring pressure in 4-wire configurations. The device has the capability to do a 2, 5, and 13 point calibration..
When a position is measured on a 4-wire touch screen, voltage is applied across the screen in the Y direction; and a touch presses the layers together, where a voltage can be read from one of the X electrodes. The contact made as a result of the touch creates a voltage divider at that point, so the Y coordinate can be determined; the process then repeats with the X direction being driven, and a reading is taken from one of the Y electrodes. A touch-screen controller is simply an ADC that has built-in switches to control which electrodes are driven and which electrodes are used as the input to the ADC. The ADC can often be operated with different reference modes: single-ended or differential.

LOGICAL STRUCTURE:



It is realized from the beginning that following a user input path has numerous pitfalls. The most obvious problem lies in the fact that a user input path cannot be exactly translated to RC car movements. The RC car has a very limited range of angles it can turn, and a user input path can very easily exceed the rate of turn for the car. Furthermore, the user can easily move the stylus faster than the car can reasonably follow.

2. The Working Principle:

When the screen is touched, it pushes the conductive ITO coating on the PET film against the ITO coating on the glass. That results the electrical contact, producing the voltages. It presents the position touched. The pins (X left) and (X right) are on the glass panel, and the pins (Y up) and (Y down) are the PET film. The microprocessor applies +5V to pin (X left) on the glass panel, and the voltage is uniformly decreasing to pin (X right) for 0V because of the resistive ITO coating on the glass substrate, and the PET film is grounded. When the touch screen is not touched, the controller detects the voltage on the PET film is zero. The next electric cycle, the microprocessor applies +5V to pin (Y up) on the PET film, and the voltage is uniformly decreasing to pin (Y down) for 0V. When the touch screen is not touched, the controller detects the voltage on the glass panel is zero.

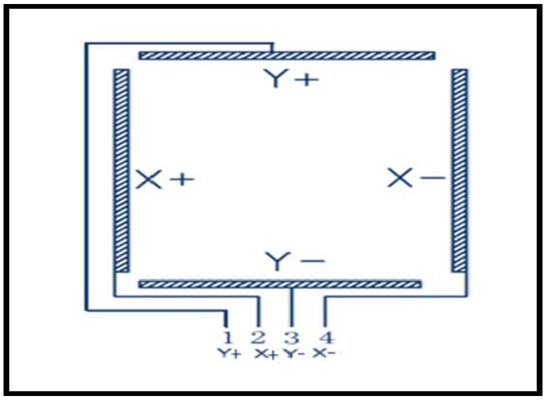


Fig. touch screen

When the touch screen is touched, a voltage on the glass substrate proportional to the X (horizontal) position of the touch appears on the PET film. This voltage is digitized by the A/D Converter and subjected to an averaging algorithm. Then it is stored and transferred to the host. Hence, the X position is produced. The next electric cycle, a voltage on the PET film proportional to the Y (vertical) position of the touch appears on the glass substrate. This voltage is digitized by the A/D Converter and subjected to an averaging algorithm. Then it is stored and transferred to the host. Hence, the Y position is produced. Extrapolating the direction from the points requires a bit more math and a lot more creativity. What is most important here are the not the absolute angles derived from the points, but the angle compensation needed by the car with respect to its current position.

An Algorithm

Background Math

The touchpad is quantized into a 50 x 25 grid of points (based entirely on the real life dimensions of the screen itself).

1 line = 50 millivolt

And variation = 0 to 25 volt.

= 25000 millivolt

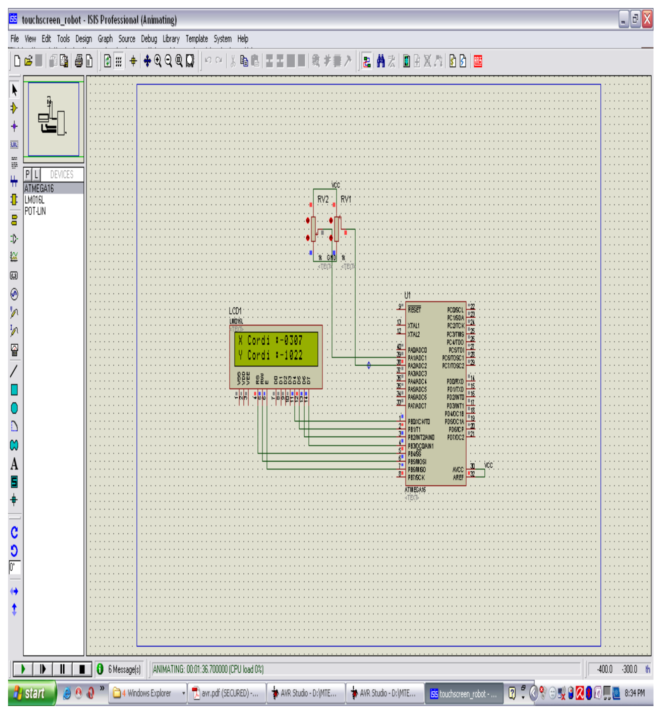
Below microcontroller will grab the coordinates of the current location of the user stylus (or nailed finger) 30 times a second. If the user speeds up the stylus, naturally the points will be further spaced apart. It is entirely from this quantization that both speed and direction are calculated.

Simulation:

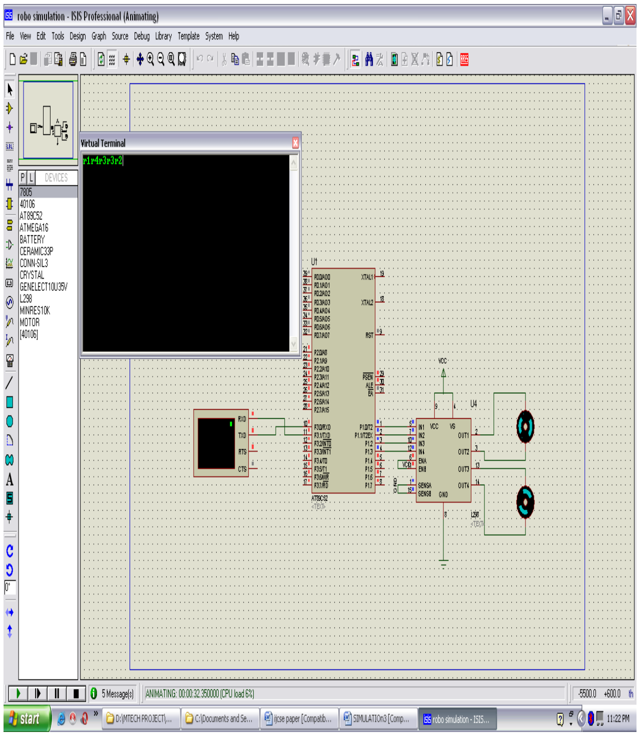
The simulation is based on the code written for the Touch screen vehicle. The simulation of the Transmitter side consist of touch screen which is used to give command to the vehicle. The LCD is used to show the coordinates of the touch screen and to show the command. As the screen is touched it takes continues points on the touch screen and then the vehicle get the command of FORWARD, REVERSE, LEFT, and RIGHT. The ASK wireless Transmitter is used to send the command to the vehicle.

On the other hand The receiver side consist of the vehicle robot which follows the command given through the touch screen. A 12 Volt DC Geared motor is used for the vehicle. As the code for the receiver side consist of R1 for FORWARD, R2 for REVERSE, R3 for LEFT and R4 for RIGHT. The motion of the vehicle is totally depends on the command and the motor behaviour. A ASK wireless RF receiver is used for the wireless communication. Here, the command through the touch screen is given; the voltage of the touch screen is measured and is digitized. . The coordinates are displayed on the touch screen. With the RF Transmitter signal is transmitted to the RF receiver on the receiver side. According the code get executed and vehicle follows the command. In this way the Simulation on Transmitter and the Receiver side is given below:

Simulation for the Transmitter



Simulation for the Receiver



3. conclusions

The aim of this paper has been to drive an autonomotive vehicle along a desired path .For implementing a touch screen general-purpose microprocessors can frequently be used to replace special-purpose chips, often at reduced cost. This project takes advantage of the AVR's multipurpose analog /digital port to create a touch-screen controller. The drive speed and angle will calculated accordingly to the X and Y coordinates. The modified model reference adaptive control has shown to be capable to ensure a satisfactory performance and stability when the dynamic of the autonomous vehicle and the unexpected disturbances are assumed to be completely unknown. Simulation results for the touch screen are also given with the paper.

The advancement of this paper can be by giving the serial port to the PC through the application.

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