



Design and Develop a GUI Tool for Universal Embedded Automation System

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Abstract

We are developing a GUI tool for a universal Embedded Automation System. This universal Automation System has high speed Microcontroller which has analog, digital, serial communication and pulse width modulator. By using this Microcontroller we develop various applications. To Develop those application we have develop the code either in C or Assemble languages. To avoid it we are developing a GUI tool to program this universal system. We developed this application by depending on the .Net Platform. By Selecting the buttons and pins it will work. In this system both embedded programming tool and UEAS both are interacting through the Serial communication. By developing this tool any one can develop their own and required artificial intelligent system.

1. Introduction

In present world there is great demand in developing the automation application. In all the applications we are using different types of sensors and different types of protocols and some times we are taking serial data from one machine and handling the other machine.

To develop the entire system we have designed and developed to two systems those are embedded based automations board and other is GUI based programming Tool. To develop UEAS we used a high speed AVR Microcontroller ATMEGA328. it is a 8 bit microcontroller and executes instructions in a single clock cycle. In this AVR controllers e have 8 analog and 10 digital pins. We can use some digital pins as a UARTS. These are most useful features to develop various applications. In this board we have added one more feature that is Storing the data automatically in the cloud. By using this feature end user easily get the data remotely at the real time. To program the functions of this UEAS we should use Automation GUI Tool. In this UEAS board we have developed all the internal codes. By using this GUI application we can enabling and disabling it. To send the data to the cloud from the machine there is no need to write the code for it. Simple we can give it cloud web address and say enable this

feature. If you want to update the data in fixed or particular intervals of time we have another feature that is Real time clock by enabling real time clock we can trigger those things in a specified time.

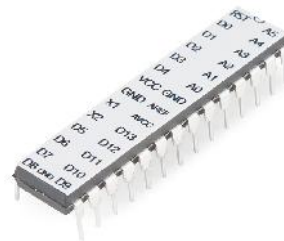


Figure. 1 AVR ATMEGA328 controller

This is windows based GUI application any window operating system above 7 and has .net framework 1.0. In application we have different group boxes. Every group box has its own significance. This GUI application and UEAS both are connected over 9600 baud rate. This GUI Application have Analog Pins Group Box, Digital Pins Group box, Serial Communication, Data Transmitter and Receiver to the Cloud tool box and Real Time Tool. According to the requirement we will select the tool and configure the system UEAS. Once we configure UEAS it works like as a dedicated tool no need to write the code for it. This GUI data will interact with the hardware of the UEAS and generate code inside and works. Once we program this UEAS board we can reprogram it 10000 time. If we forget the internal configuration of the system by pressing restore button to we read its internal program what we defined before.

Once we connected our UEAS to the GUI application we have press the Refresh button by pressing this button GUI application check to which port we have connected this UEAS board and showed it is in drop down box. Once you said configure it will active all the other buttons and our GUI application will ready to program the tool.

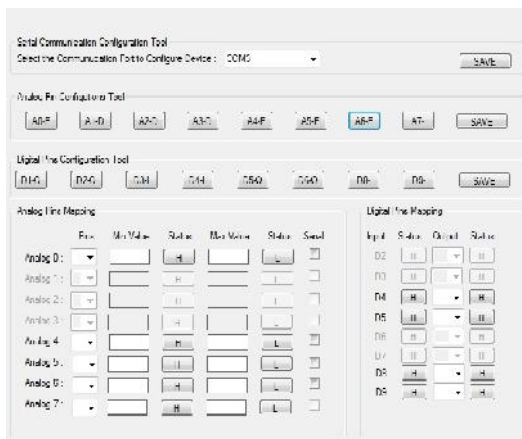


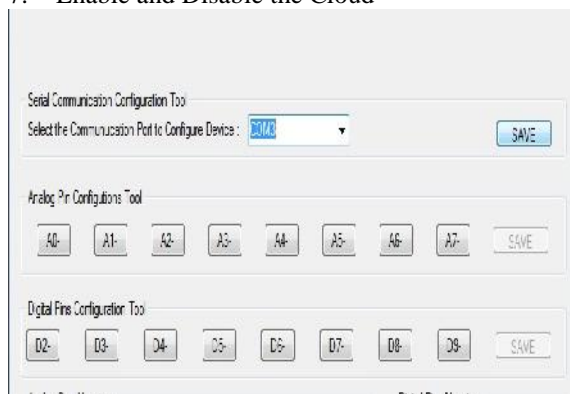
Fig2: Embedded Application View

To develop this application we have used .Net 2008. This application is totally based on button, text boxes and drop downs. This application can run on any windows platforms.

User Interface The tool is very user friendly and intuitive and uses a GUI interface implemented in .Net to communicate with the Embedded System. Various features are self – explanatory. Forms are easy to fill in updated very easily through a serial communication. The application includes tool-tip hints to give a brief description of the particular input field. List boxes are used to assign the output to the input pins and its characteristics

Feature of GUI Application:

1. Can configure Analog pins and calibrate the analog sensor.
2. can configure the digital I/Os either pin as input or output
3. Configure the Serial communication protocol.
4. Enable and disable the data logger facility.
5. Enable and Disable the RTC to trigger the machine
6. Simulate the UEAS system easily
7. Enable and Disable the Cloud



About UEAS:

The general hardware structure data acquisition system based is on Microcontroller is given. Sensors are used for process monitoring. Each I/O channel can select a variety of electrical and non-electrical signals like current, voltage, resistance etc. This Sensor output signal is taken into microcontroller pins and microcontroller has inbuilt Analog to digital Converter. Measured data from the analog pin and operate the configured pin. If it is required the data will be logged in the SD card or send the data over the cloud.

To send the data over the cloud we are using the GPRS technology. By using this technology we are sending the data to the cloud each and every data which are coming over the analog and digital pins. By using it user easily analyse the system by sitting in remote locations.

Application to Develop using UEAS:

1. Home Automation Systems
2. Agriculture based remote field data measurement system.
3. Industrial based processes management systems
4. Air and Pollutions measurement systems



CONCLUSION

My aim to develop this project is make the embedded system design easy and use it is various application. Writing coding is not required. Any layman can do it.

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