COJAG®

About Cojag:-

Cojag Smart Technology Pvt.Ltd operating under the trade name COJAG is an Indian technology oriented startup. Cojag was founded as an aim to develop an Internet of things (IoT) devices in IIT Kharagpur, but it's now based in Nagpur. Our aim is to create a unique world by amalgamating technology.

We are a group of young enthusiastic technocrats currently creating our footprints in various domains of IoT sector, agriculture, education and consultancy services. The firm also provides platform to young talent with a vision of acknowledging and materializing their innovative ideas. We have major investments in IoT, Analytics, Machine Learning, Artificial Intelligence, Web & App development and Hardware modelling. We promote the idea of co-working space and provide industrial space on rent to set up new plants.

If you are a startup, small or medium sized enterprise, you can benefit by engaging us in any or all of your areas from product ideation till it become live. The beauty is that we associate ourselves closely with you to ensure the strategies are executed with finesse to deliver results.

EMBEDDED AND ROBOTICS WORKSHOP

Summary

The Robotics and Embedded Systems Workshop convened to begin discussion on the necessary research to advance the application of Robotics and embedded systems. This workshop provided the opportunity to focus on embedded systems while incorporating the relevance of other related disciplines to foster collaborative efforts in this area.

Presentations and discussion addressed the capabilities and limitations of effectively employing trusted hardware-enabled components in embedded systems. This included, but was not restricted to, the following areas:

new research and development in enabling trust in embedded systems
methods and techniques for establishing trust in embedded systems
lessons learned from research and development projects on embedded systems security
gaps in current research

Based on the workshop presentations and candid exchange of ideas and concerns, the authors of this report developed recommendations for potential research directions for improving trust in embedded systems.

Research is needed on isolation and memory management methods to improve the level of trust feasible in 8-bit microcontroller systems today.
Coherent trust models based on sound criteria for, and principles of, trust are necessary to support both acquirers and researchers.
A reference implementation of end-to-end use of trusted computing in an embedded system would be a valuable community resource to explore the characteristics of such a system and to understand necessary compromises, shortfalls and limitations.
Tool support is necessary to aid embedded development and design teams in their consideration and incorporation of security and trust into their requirements, specifications, designs, and implementations.

Introduction

What is Robotics?

Robotics is the study of robots. Robots are machines that can be used to do jobs. Some robots can do work by themselves. Other robots must always have a person telling them what to do.

Robotics is a branch of engineering that involves the conception, design, manufacture, and operation of robots. This field overlaps with electronics, computer science, artificial intelligence, mechatronics, nanotechnology and bioengineering.

Why Robotics?

Robotics is increasingly being considered as the fourth "R" of learning, "Reading, writing and aRithmatic" that modern-day students must understand to succeed in a highly competitive, technology-driven world. Robotics integrates all STEM fields in way no other subject can cover. Robotics is the mother of all subjects. It integrates mechanical, electrical, electronics, control engineering, computer science, technology, math and science. .

What is the use of Robotics?

Today's robots assist in high precision surgeries such as brain and heart surgery. They are also used to test quality control in pharmaceuticals. In the future service robots are expected to surpass the industrial robot market. Many manufacturers are starting to look into fields that are lacking workers.

What is Embedded System?

An embedded system is a computer system with a dedicated function within a larger mechanical or electrical system, often with real-time computing constraints. It is embedded as part of a complete device often including hardware and mechanical parts. Embedded systems control many devices in common use today.

Why Embedded System?

Embedded systems are where the software meets the physical world. As we put tiny computers into all sorts of systems (door locks, airplanes, pacemakers), how we implement the software is truly, terrifyingly important. Writing software for these things is more difficult than computer software because the systems have so few resources. Instead of building better software, the trend has been to allow a cowboy mentality of just getting it done.

What is the use of embedded system?

The uses of embedded systems are virtually limitless, because every day new products are introduced to the market that utilize embedded computers in novel ways. In recent years, hardware such as microprocessors, microcontrollers, and FPGA chips have become much cheaper.

Workshop Goals

Robotics

- To introduce students to the science of robotics.
- To introduce students to programming and programming techniques for robots.
- To have students use the engineering model of testing, re-evaluating, Modifying and trying again.
- To show the variety of robots in use today.

Embedded System

The goals for our workshop is to present a new pedagogy for laboratory experiments for Embedded computing and to show simple inexpensive hardware that may be employed to develop experiments that would be adaptable to a number of engineering disciplines.

It is readily adaptable "out of the box" for Electrical and Computer Engineers, but could also be adapted for a part of introductory courses in real-time programming for Computer Science Majors and as a component of mechatronics for Mechanical Engineers.

Workshop Format and Plenary Sessions

- Introduction about the company
- Introduction
    1. Embedded system
- Introduction to the software
    1. Arduino
    2. Proteus
    3. MATLAB
- Brief introduction of the components
- Wiring up the components
- Integration of Hardware and Software
- coding
- Testing
    2. Robotics

Summary of Plenary Session – Day 1

- Company presentation
- Formal discussion about the latest technology
- Introduction of our workshop
- Detail session on the hardware and software
- Research work
- Query solving session

Break Out Session – Day 1

Following the problem panel the workshop participants will break into three separate groups with each group challenged to describe a realistic scenario that relied on embedded systems and robotics. Each group was free to capitalize on the expertise and interests of their constituents to develop a scenario. Once the scenario was developed, the group put on a black-hat to describe how the particular system described could be attacked. After exhausting potential attack scenarios, the group became white-hat defenders to describe how to protect the system described in the initial scenario. The teams were comprised of equal distributions of researchers, acquirer/users, and producers. The teams received no guidance or restrictions on what scenario to describe, making them rely on advocacy to emerge from the expertise within each of the teams.

Summary of Plenary Session - Day 2

- Setting up Arduino IDE for project
- Install the ESP8266 Board Package
- Install the Arduino JSON library
- Setting up HTML app
- Wiring up everything
- Arduino
- ESP
- Writing Arduino Code(Sketch)
- Final things to do
- Report making
- Overview of report

Registrations starting from 1ˢᵗ Sept, 2017

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