CSC 714 Real Time Computing Systems

Progress Report

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Tasks	Status
Reading papers on fault tolerance in sensor networks. The following papers were covered: • Iman Saleh et. all - In-Network Fault Tolerance in Networked Sensor Systems - DIWANS'06, September 25 2006, Los Angeles, California, USA. • Skender Ben Attia et. all - Fault-Tolerance Mechanisms for Zigbee Wireless Sensor Networks For detailed report click here.	Karthik
Selection of Operating system. Going through the Contiki OS paper as well as analyzing the feasibility of using Contiki for the project simulation	Manav
Selection of Operating system. Going through the Mantis OS paper as well as analyzing the feasibility of using Mantis OS for the project simulation	Amey
Discussion for comparison of OSes and deciding which OS to use (we decided to use contiki) Some of the points we considered were: • Like tinyOs, contiki is also based on an event-based model. However, tinyOS does not support preemption under any circumstances (except interrupts). Contiki has a user library which can support multithreading within a process if the user chooses to. • Mantis OS offers the traditional approach of multithreading. This approach has a high memory requirement compared to a hybrid approach like contiki, which efficiently uses the memory on the motes. • The installation of contiki was far easier than Mantis OS. Mantis OS required installation of quite a few python dependencies before it could be used with motes. Contiki Os just required msp430 gcc to be installed along with contiki to get it working. • Contiki gives a variety of options in message communication interfaces. There are inbuilt libraries for mesh networks, broadcast, unicast etc. Contiki Os also implements an IP stack on the motes, which can one of the options for simulation of this project.	Amey & Manav
- Setting up LNP on the system and getting it working with the RCX. Required for simulation of data mule in the project.	Manav

• Getting the LNP(Legos Network Protocol) daemon installed and running on the machine. • This had quite a lot of issues. The main issue was related to the uart chip which has also been documented in the previous project reports. It is suggested that the command to be run is: Setserial /dev/ttyS0 uart 16450 As documented in one of the earlier projects this also gives error on the OS lab machines. One of the new factors absent from the previous reports is the fact that in previous projects LegOS was used and in here we were using brickOS. According to the site [http://lnphost.sourceforge.net/] brickOS has minor modifications over the legOS protocol which were not updated in lnpd. • I was still not able to get it working in addressing mode. However I was able to get it working in the integrity mode which is unreliable communication. The integrity mode is fine for one RCX but for multiple RCX when you need to address packets to a specific RCX a solution is still needed. • Wrote a wrapper program to parse and execute commands from PC to the RCX. Setting up LNPD is required to implement the data mule in our project.	
Downloaded Contiki and set it up on the Machine . • There were a few hiccups in the installation of contiki, mainly related to installation of correct version of msp430gcc. Installation and building of contiki OS itself is quite straightforward.	Common
Going through contiki source files and examples and writing a few small mote applications to get familiarized with the contiki environment. • As mentioned above most of the contiki documentation is in the source comments and examples.Written small test applications for contiki to get familiarized with the contiki environment. Led applications, collecting sensor readings, sending message packets from one node to another using rime interfac	Manav
Writing and defining the detailed network structure and the behavior and roles of individual components. This also gives a rough design of the various components of the multihop algorithm and various techniques involved. The entire design document can be seen *here.*	Manav & Karthik
Formalize the algorithm from the document in the form that it can be converted to code.	Incomplete
Start implementation of algorithm on the motes.	Incomplete
Implement the coordinator application which will run on the workstations.	Incomplete
Implement the data mule program on the RCX.	Incomplete
Combine all of them to simulate a sensor network.	Incomplete