DEPARTMENT OF ELCTRONICS & COMPUTER ENGINEERINGEMBEDDED SYSTEMS EXCELLENCE CENTRE

Dept Name : Electronics and Computers Engineering
Name of Research Group : EMBEDDED SYSTEMS

The Embedded Systems Excellence centre was started in the University to support the Inter Departmental Research Activity. The faculty and students from different departments are working in this centre for their Ph.D., M.Tech and B.Tech Thesis and Project works. Research work is in progress in the following areas.

1. **Remote Monitoring and controlling of embedded systems**
2. **Securing the embedded systems**
3. **Testing the embedded systems**
4. **Networking the Embedded systems**
5. **Development of Communication standards for implementing the embedded networks within Local area and wide area.**
6. **Developing special networks based on embedded systems a. Sensor Networks for agriculture management**
7. **Application development**
   a. Condition monitoring and controlling through embedded systems b. Temperature Monitoring and controlling of nuclear reactors
8. **Intelligent Systems.**

The Action Plan for the centre in terms of R&D for the next three years (2013-16)

1. **To get at least 4 sponsored projects in the area of Embedded Systems**
2. **To further strengthen Research Facilities available at Embedded Systems Lab/Centre**
3. **To guide the existing Ph.D., students to complete their research work.**
4. **To encourage the new faculty to register for Ph.D., in the areas of the sponsored projects proposed to apply in the Embedded Systems.**
5. **To identify the Industries and R&D organizations and make arrangements to depute the M.Tech Embedded Systems Students to R & D Organizations and Industry for their final Projects.**
6. **To organize a National workshop in the area of Embedded Systems every year.**
7. **To organize Faculty Development Program in Embedded Systems every year.**
8. **To Conduct an International Conference on Recent Trends in Embedded Systems for creating a common platform where Academicians, R&D organization and Industry can interact with each other to bridge the gap among the three**.

The following are the faculty in the Embedded Systems Research Group.

S. No.	Name	Designation	Status
1	Dr.A.S.C.S. Sastry	Prof.ECE	Group Head
2	Dr. K.Sreenivasa Ravi	Prof., ECM	Member
3	Dr. J.K.R Sastry	Prof., CSE	Expert Member
4	Dr. V. Chandra Prakash	Prof., CSE	Member
5	Prof. K.Subba Rao	Prof., EEE	Member
6	Mr. Rayala Ravi Kumar	Assoc. Prof. ECE	Member
7	Mrs. J. Sasi Bhanu	Asst. Prof., CSE	Member
8	Mr. D. B.K. Kamesh	Asst. Prof, FED	Member
9	Mr. K. Sripath Roy	Asst. Prof., ECE	Member
10	Mr.Ch.Raghava Prasad	Asst. Prof., ECE	Member
11	G. Sowmya Bala	Asst. Prof., ECM	Member
12	K. Prathyusha	Asst. Prof., ECM	Member

Ph.D., Scholars in the Embedded Systems Excellence Centre

S. No.	Title of the Project	Student Name	Status	Year	Faculty/ Supervisor
1	Refined Clean Room software Engineering Methodology for development of Embedded systems	Prof. V Chandra Prakash	Awarded		Dr. Dr L.S.S. Reddy & Dr. J.K.R. Sastry
2	Securing the embedded systems through side channels	Prof. K. Subba Rao	About to submit		Dr. J.K.R. Sastry
3	Dynamic Management of monitoring and controlling embedded systems from remote locations	Mrs J. Sasi Bhanu	In progress		Dr. J.K.R. Sastry & Dr. A. Vinay Babu
4	Testing embedded systems through Clean room software engineering Methodology	Mr. D. B.K. Kamesh	In progress		Dr. K.Raja Sekhara Rao
5	Networking of heterogeneous embedded system	Mrs. N. Neeraja	In progress	2010	Dr. K.Sreeni-vasa Ravi. & Dr.J.K.R. Sastry
6	Dynamically reconfigurable RFID Tags	N. Rajesh Babu	In Progress	2011	Dr. K.Sreeni-vasa Ravi

However the Sensor networks and Image Processing groups are a lso associated with this Excellence Centre. Some of the above mentioned plans are already started and are in progress. The details are as follows.

Projects Ongoing:

S. No	Name of the project	Faculty	Funding agency	Funding Lakhs	Status
1	Securing the embedded system from side channels	Prof. S.Venka-teswarulu & Mrs. D. Radha	WOS DST	23.6	In Progress
2	Web Description and Building Models for Sensors to Discover knowledge for Prediction and Decision Making.	Dr.K.Raghava Rao	DST NRDMS	15.54	In Progress
3	Object Identification and Tracking through SmartTags using Mobile phones.	Dr.J.K.R Sastry & Dr. K. Sreenivasa	Internal	4.90	In Progress
4	Measurement of the vertical wind power and temperature structures of PBL by using Tri – axial Mono static Doppler	Dr.K.Sreenivasa Ravi & M. Gnanakiran	Internal	1.46	In Progress

Project Applied:

1. Securing the Embedded systems from external Interface and hacking
   Dr.J.K.R. Sastry – **RPS-AICTE – 23.60 Lakhs**

2. Development of Artificial Neural Network Models for weather Forecasting
   Dr.K.Sreenivasa Ravi **RESPOND- ISRO- 25.00 Lakhs**

The members of the group were divided in to four subgroups for applying sponsored research project.

Group1: Sensor Networks for Agriculture Reforms

Dr.K.Sreenivasa Ravi

G. Sowmya Bala

K.Prathyusha

Group2: Intelligent Tags

Dr.J.K.R Sastry

Prof.K.Subba Rao

K.Prathyusha

Mrs.J. Sasi Bhanu

Group 2:Software Development & Testing for Embedded Systems

Dr. V. Chandra Prakash

Mr. D. B.K. Kamesh

Mrs. J. Sasi Bhanu

Group 4: Mobile Health Care

Dr. K.Sreenivasa Ravi

Mr. Rayala Ravi Kumar

Mr. K. Sripath Roy

Mr.Ch.Raghava Prasad

Project to be applied:

A. "Developing a Smart Wireless Sensor System for Agricultural Systems "
DST (NRDMS) - Dr. K. Sreenivasa Ravi by june2013

B. "Intelligent Tags" **DST – Dr.J.K.R. Sastry**

C. "Real time Condition Monitoring and Controlling of a Mechanical system"
DST- Dr. K. Sreenivasa Ravi under Inspire scheme by August 2013

D. "Development of Movable Doppler SODAR for the measurement of Wind Energy in Coastal Regions" **MES - Dr. K. Sreenivasa Ravi**

E. " Mobile Health Care System" **Mr. Rayala Ravi Kumar**

To further strengthen Research Facilities available at Embedded Systems Lab/Centre:

i. MODROBS Scheme for ES Lab - **AICTE- 20.00 Lakh**s
ii. Management approved budget of Rs. 5.0 Lakhs for year 2013-2014 towards purchase of
    a. ARM Development Boards
    b. PIC Development Boards
    c. Protious Licensed Software

To encourage the new faculty to register for Ph.D., in the areas of the sponsored projects proposed to apply in the Embedded Systems.

The new faculty K. Prathyusha and G. Sowmya Bala who are applied for Ph.D., at KLU are involved in the preparation of the proposals for the following sponsored projects to be applied.

"Developing a Smart Wireless Sensor System for Agricultural Systems "

"Real time Condition Monitoring and Controlling of a Mechanical system"

To identify the Industries and R&D organizations and make arrangements to depute the M.Tech Embedded Systems Students to R & D Organizations and Industry for their final Projects.

The group is already conducting M.Tech., Embedded Systems Course and the following Industries and Research Organizations have been identified and tie-ups have to be initiated with the help of IRP department.

A. Mr. D. Ramakrishna MD., Effotronics Pvt. Ltd., Vijayawada
B. Mr. T.Madhav MD., Spectrochem Instruments Pvt. Ltd., Hyderabad
C. Mr. Raman Vaidyanathan, Vice Precident, Embedded Systems Practice at Mahindra Satyam, Bangalore.

D. Mr. B.Sridhar, Head - Embedded Systems Practice at CMC Ltd., Hyderabad. E. HCL – Head - Embedded Systems Division

F. ECIL – Head - Embedded Systems Division

G. DRDO – Embedded Systems Division

To organize a National workshop in the area of Embedded Systems every year.

AICTE sponsored National Workshop on "WIRELESS SENSOR NETWORKS VIS-À- VIS SENSOR WEB ENABLEMENT" - WSNSWE -2013 is organized from May 23rd – May 25th 2013 by Sensor Networks Research Group under Embedded Systems Excellence Centre.

Activities Planned:

One Workshop to be organized during October 2013 on one of the following areas

1. Networked Embedded Systems
2. Cognitive Radio

To organize Faculty Development Program in Embedded Systems every year

As K L University is introducing ARM processors in the UG programs of various departments an FDP on **ARM Processor & Development tools** planned and is going to be organized by Dr.K.Sreenivasa Ravi during November 2013.

Embedded Systems Designers Club:

Under the guidance of the ESRG **Embedded Systems Designers Club** was started with the following objectives

1. Sharing of knowledge among the students and faculty.
2. Conduction of seminars, workshops and project expos.
3. Attending seminars, conferences and webinars in the area of embedded systems.
4. Tests on programming skills.
5. Organizing classes for hands on experience for various development tools such as RIDE, KEIL, PROTUS, TOPVIEW SIMULATOR, LINUX, and CADENCE.
6. Developing Prototype Models for Embedded Systems using Microcontrollers.
7. Indentifying and joining into mailing groups or technical groups.

Eligibility:

1. Any Under Graduate / Post Graduate student having enthusiasm and interest to take up any challenging activity in the area of Embedded Systems.
2. Any faculty from all the departments of Engineering College, having interest and passion to aid and afford needful knowledge to the student members of this Club.

Faculty members of Embedded Systems Designers Club

1. Dr. K. Srinivasa Ravi
2. Dr. J.K.R. Sastry
3. Prof. K.Subba Rao
4. Dr. V. Chandra Prakash
5. Mr. M. Suman
6. Mr. N.V.K. Ramesh
7. Mr. P. Kotewsararao
8. Mr. T. Narendra Babu
9. Dr. A.S.C.S.Sastry
10. Mr. R. Ravi Kumar
11. Mrs. J. Sashi Banu
12. Mr. K. Sripathi Roy
13. Ms. G. Sowmya Bala
14. Ms. K. Prathyusha
15. Mr. G. S. Sarma
16. Mr. D. B. K. Kamesh

Student members of Embedded Systems Designers Club

M-Tech – E.S

1. P. Susmitha
2. Y. N. S. D. S. Manyam
3. Annam. Neeharika
4. B. Chinmayi Roopa
5. R. Gopi Krishna
6. T. Hema Madhuri
7. G. Suvarna Rani
8. N. Srividya
9. Yashaswi
10. Thejavardhan Reddy
11. T. Nandini
12. Y. Gopinath
13. T. Venkatrao
14. V. Deepthi
15. K. Srij

B-Tech –E.C

1. V. Prudhviraj
2. K.V.S. Mounika
3. P. Tejaswini
4. G. Avinash
5. Abdul Zameer Shaik
6. T. Sainath
7. A. Anoop Babu
8. K. Vamsi Krishna
9. B. Srividya
10. Shaheena Parveen. N
11. USSV. Subbrarayudu
12. N. Srikanth
13. K. Sunil Kumar
14. E. T. Jaswanth Reddy
15. Y. Venkateswarlu
16. P. Sai Anudeep

1 Logo for Embedded Systems Designers Club was designed by M.Tech (ES) students launched by Dr.J.K.R Sastry on 22-03-13.

2 The III year ECM students under the guidance of ECM Faculty mentors exhibited few Prototype models of microcontroller based systems during SURABHI – 2013.

3 A Lecture on COGNITIVE RADIO was given by M.Ashoka Chakravarthi Asst. Prof. ECE department for M.Tech (ES) students on 28/03/2012.

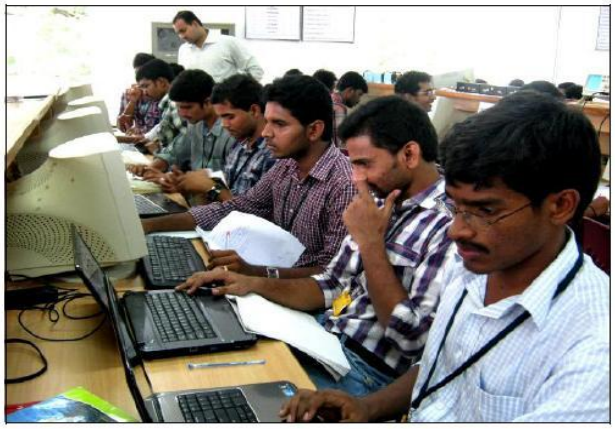
The ES Research Group Members from other departments are instructed to initiate the students from their respective departments to become members of **ESD_Club.**

A VIEW OF THE EMBEDDED SYSTEMS LAB

EMBEDDED SYSTEMS LAB

EMBEDDED SYSTEMS LAB(ECM)

ARM 7 DEVELOPMENT BOARD



MICROPROCESSORS LAB(ECE)

R & D center

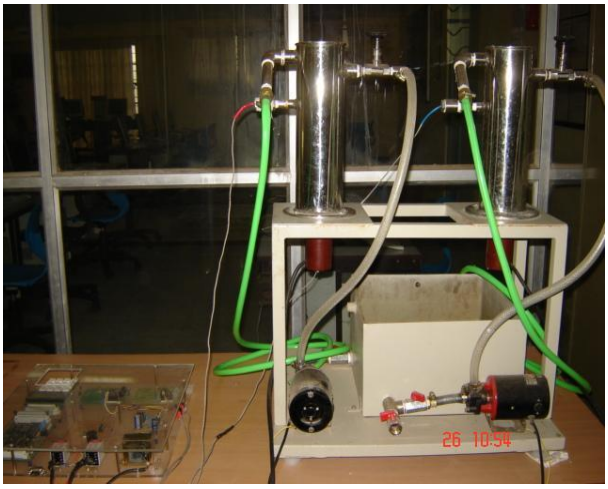
ES Lab for Post Graduates

Pilot Model for Nuclear Reactor monitoring and Temperature Controlling System.

The following experimental setup is a Pilot Model for Nuclear Reactor monitoring and Temperature Controlling System. The pilot project is built around ARM7 and the interconnections between various devices (Sensors, Operational Amplifiers, A/D Converters, Micro Controllers, Buzzer, pumps, LCD and Key Board) are shown Embedded Board.

The Embedded Board is connected to a Personnel computer and the communication between the PC and the embedded Board is achieved through RS232C interface. The communication Interface is used to submit reference temperatures to the embedded Application and to receive the Temperature measurements, operation of the Pumps and the buzzer so that the operations taking place in the production systems can be mimicked.

Front View of the System



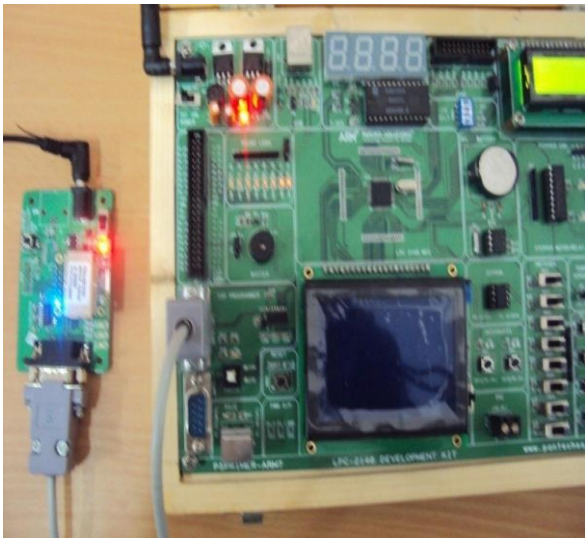
Back View of the System

Embedded system Control

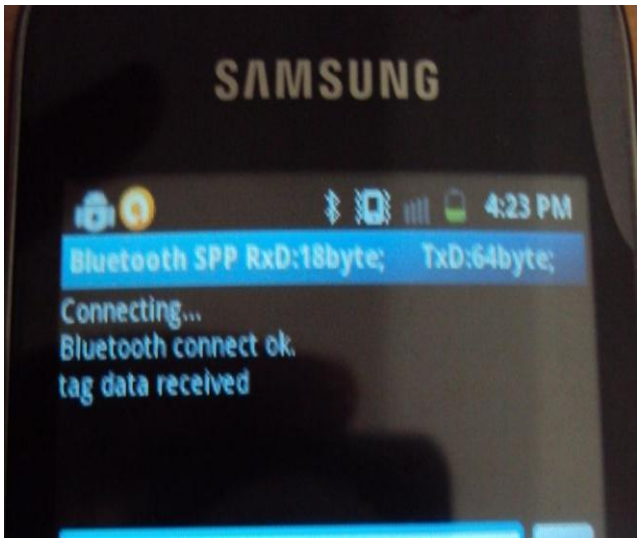
Monitoring through the

Model for Intelligent Tag System

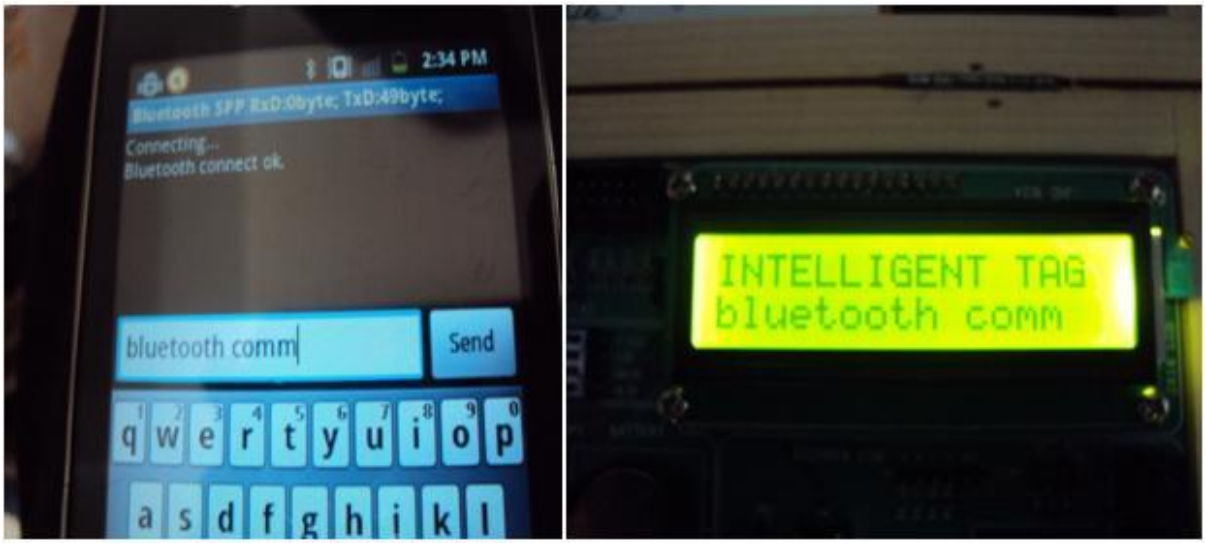
Architectures, methods, algorithms, devices have been developed that make the intelligent Tags intelligent to cater for location identification, identification of Tags, alerting, Tamper detection, enforcement of security while communicating with remote host, extension of Android architecture on the host side to accommodate remote applications, system integration, power management, effecting communication.



Bluetooth Module Interfaced With LPC2148

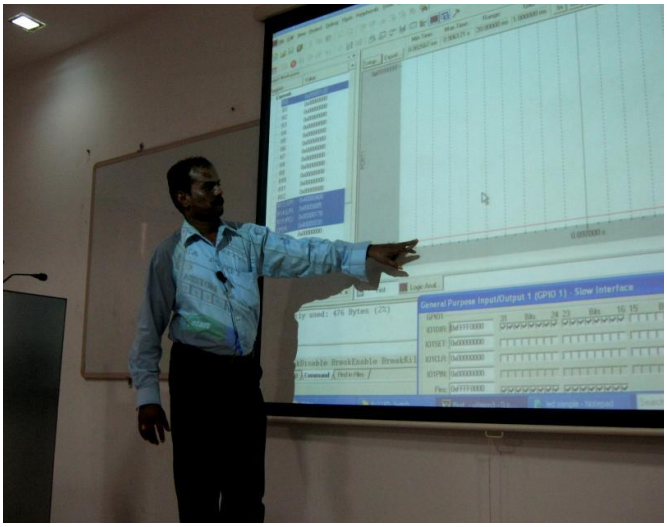


Acknowledgment to the Data Sent To the TAG



Communication Establishment Data Sent From Mobile Displayed On LCD

Work shop on ARM Processors and Development Tools on Sep. 15 2011.



A workshop on Android is going to be organized on March 10th 2012.