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FRUCT, Sister Society of ComSoc: Academia-to-Industry Cooperation in Open Innovations Format

By Sergey Balandin, FRUCT Oy, Finland

Many university groups are actively working to apply their scientific results in business, but to be efficient and grounded they need industrial input on up-to-date trends and demands. FRUCT, a Finnish-Russian Association which has become a Sister Society of IEEE ComSoc, was designed as an open innovation framework targeted in developing partnership between industrial and academic research, help to find research partners and incubate new competences. FRUCT involves students and postgraduates in the research process and forms research work groups for solving high-tech problems in ICT. Also FRUCT enhances interest to science and builds convenient infrastructure for collaborative and effective execution of distributed research projects.

Nowadays FRUCT participant includes 21 research teams from the universities of Russia, Finland, Ukraine and Denmark that makes the program one of the most important cooperation programs in Europe in ICT field.

FRUCT in a Nutshell

The basis of the FRUCT association was created on top of voluntary community and developed into a competence and business incubator. The association runs joint research and development in the open innovations format. FRUCT association operates in the following mode:

- Identifying regional R&D teams interested and ready for such form of ICT cooperation.
- Creating new competences and corresponding niches for joint R&D projects.
- Finding ambitious students that want to take part in industry-oriented research projects.
- Shaping project to help long-term strategic partnership between industry and universities.
- Joint implementation of the project, ensuring good visibility of the achieved results.

In addition to the main operational activities FRUCT actively participates in development of the scientific, research and training ecosystem of the region:

- Renewing university courses and organize technological trainings on latest technologies.
- Establishing connections between academic and industry experts and their research teams.
- Promoting information on the latest industrial trends, ongoing cooperation projects and other types of new opportunities in the region.
- Forming teams for performing research and development for most advanced and highly risky topics with high extent of uncertainty.
- Arising prestige of the scientific research and helping engaging students and postgraduates.
- Helping to keep strong ties between top young graduates/researchers and their universities.

FRUCT activities can be clustered around three directions: infrastructural, research and training. Main activities of the training component are:

- Development of new courses and advanced training programs for regional universities.
- Contribution to new educational standards, by promoting idea of integrating new technologies into the classical disciplines.
- Support of the intercollegiate exchanges of lectures and courses.
- Support of students and postgraduates exchange, organization of the new multi-site M.Sc. programs for exchange students.
- Organization of regular summer and winter schools and trainings that are open for all interested students and university staff.

In average FRUCT trainings are organized once every 3 weeks and cover all main regions of north-west and central Russia and Finland. Every year FRUCT organizes two large conferences in Russia and Finland, summer and winter schools.

It is well known that universities often experience difficulties in keeping best students at the departments. The close partnership with industry provides association with a strong brand, challenging and concrete research and development tasks and additional resources, which attracts students and helps to solve resourcing problem. On the other hand, the companies are interested in long-term and high-risk research done by the universities, and benefit from getting closer to the edge of science, to allow faster adoption of new key scientific findings. Also the early industrial feedback is in mutual benefit as it enables correct tuning and presentation of result of the new findings to make them more clear from technological point of view. Key research priorities of FRUCT are:

- Mobile healthcare (m-Health) research and development of prototype solutions for fitness, wellbeing and new medical services.
- Research and development of Smart Space technologies and Internet of things.
- Research in the field of the cross-platform development for devices with the significant variation of technical characteristics.

Research potential of FRUCT is based on a network of regional laboratories that includes: Mobile technologies laboratory at Petrozavodsk State University (http://oss.fruct.org), Open Source and Linux laboratory at St-Petersburg State Electrotechnical University "LETI" (http://osll.fruct.org), Cross-platform services laboratory at Yaroslavl State University (http://yar.fruct.org), Wireless laboratory at Nizhny Novgorod State University (http://wl.fruct.org) and other labs and teams (full list can be found at FRUCT web).

Another important role of FRUCT is support and coordination of professional communities. Currently FRUCT supports four communities: Russian Qt community (http://qt.e-werest.org), Regional Smart Spaces and Internet of Things

(Continued on Newsletter page 4)

Highlighted Activities from the IEEE Communication Society Bangladesh Chapter Year 2011-2012

By S. M. Altaf Hossain, Founder Chair of IEEE ComSoc Bangladesh Chapter

IEEE Communication Society Bangladesh chapter observed IEEE Day-2011 on 6th October'2011 with elaborate program in Bangladesh like other countries of the world. To celebrate the day IEEE ComSoc Bangladesh Chapter in association with Daffodil International University organized a seminar on "Next Generation Communication Technology and Bangladesh." Prof. Dr. M. Lutfar Rahman, Vice Chancellor, Dafodil International University was present in the seminar as the chief guest while Prof. Dr. Aynal Haque, Chairman, IEEE Bangladesh section was present as a special guest. Presided over by S. M. Altaf Hossain, President, IEEE ComSoc Bangladesh, Mr. Abu Saeed Khan, Secretary General, Association of Mobile Telecom Operators of Bangladesh was the Keynote Speaker in the seminar. The seminar was also addressed by Ms. Tahera Hossain and Dr. Lutfa Akhter of IEEE ComSoc Bangladesh. Ms. Shaila Sharmeen conducted the seminar. A large number of students and faculty members of EEE, ETE and CSE Department of Daffodil International University attended the seminar.

It was announced in the seminar that IEEE ComSoc Bangladesh was going to organize Inter University Student Paper Contest-2011.

ComSoc Bangladesh Chapter organized this Student paper contest to increase activity of students among whole Bangladesh and to support their thesis/projects task by awarding two best submitted papers through it. ComSoc Bangladesh Chapter organized student paper contest by following IEEE rules. We prepared our own ComSoc Bangladesh section website for it which is by named http://comsoc.org.bd and prepared online paper submission process through this website. All students submitted their papers through this website which was prepared by following IEEE paper submission process. We circulated our paper submission news to all possible universities and their respective departments through mail and by circulating our paper contest news through contest Flyer.

In the end, the best 2 papers were selected for the oral final and for giving awards. After that ComSoc arranged Award Ceremony Program at DRIK ICT Conference Center on Saturday, 21th January'2012. The two finalist groups were presented their papers on before all executive committee members and in the presence of IEEE section chair Professor Dr. Aynal Haque. After the presentation, some brief information about IEEE membership and ComSoc membership benefits was discussed by IEEE Section chair Professor Dr. Aynal Haque and IEEE ComSoc chair S M Altaf Hossain. After that two winner group were awarded by prizes money, crest and certificates.

Mr. SM Altaf Hossain, Founder Chair of the IEEE ComSoc Bangladesh Chapter, addressing the seminar on "Next Generation Communication Technology and Bangladesh" at IEEE Day 2011 (Photo by Mafiz and Tahera).

This first contest is now becoming our power to organize international conference from IEEE Communication Society Bangladesh Chapter. The participants have noted a high level of quality which will improve year by year and it will soon transform into a real International Contest from this section.

After that IEEE Communication Society Bangladesh Chapter sponsor an International Conference on Informatics, Electronics and Vision(ICIEV2012), International Conference on Informatics, Electronics & Vision (ICIEV2012) held on May 18th -19th 2012, Nabab Nawab Ali Chowdhury Senate Bhaban (Senate Auditorium), University of Dhaka, Dhaka, Bangladesh. The ICIEV provides vibrant opportunities for researchers, industry practitioners and students to share their research experiences, research results, ideas, review of various aspects and practical development experiences on Informatics, Electronics, Computer Vision and related fields.

IEEE Communication Society Bangladesh chapter is the technical co sponsor of this conference and ComSoc also help to live stream important conference sessions on the following URL: http://www.drik.tv/iciev2012/. ComSoc Bangladesh Chapter Chair S M Altaf Hossain was present on the inauguration program along with Vice-Chancellor Arefin Siddique University of Dhaka. ComSoc Bangladesh chapter treasurer Ms. Tahera Hossain also present her recent research paper on ICIEV 2012.

Now for the rest of the part of this year 2012 we make plan for different type of activities from our chapter and our main focus is to give idea of our country students about the recent trends of technology demand and to motivate them to do more work and to create a STRONG research field in Bangladesh.

ICIEV '2012 inauguration, from right to left: Mr. S M Altaf Hossain, Dr. Norizaku Ikoma (Kyushu Institute of Technology, Japan), Vice-Chancellor Dr. Arefin Siddique (University of Dhaka). (Photo by Mafiz and Tahera).

Distinguished Lecturer Tour of Prof. Pierre Moulin in India

By Prof. Deergha Rao Korrai, Chair of the Communications and Signal Processing Societies Joint Chapter, Hyderabad, India

One of the best initiatives of the IEEE is the DL program that brings experts to give lectures at Chapters on all continents. A DL tour of Dr. Pierre Moulin, IEEE Fellow, University of Illinois, USA, was held in India during May 2012. Lectures entitled "Information Embedding: From Theory to Practice," and "Robust Hashing and its application to Content Identification," were given in India from 14 May to 18 May 2012 with the following schedule:

1) Pune, 14 May 2012 (one lecture) on "Information Embedding: From Theory to Practice."

2) Hyderabad, 16 May 2012 (two lectures) on "Information Embedding: From Theory to Practice" and "Robust Hashing and its application to Content Identification."

3) Bangalore, 18 May 2012 (one lecture) on "Information Embedding: From Theory to Practice."

The IEEE Signal Processing Society funded Dr. Moulin's DLT. His lectures in Hyderabad were organized by the Communications/Signal Processing Societies joint chapter of IEEE Hyderabad Section, and his lectures at Pune and Bangalore were organized by the Signal Processing Chapters of the respective sections.

During the lectures on "Information Embedding: From Theory to Practice" at Pune, Hyderabad, and Bangalore. Dr Moulin has mentioned that Watermarking, fingerprinting, and steganography applications require secure embedding of information bits into a cover signals (audio, video, etc.) . and outlined the practical approaches to such problems. In these applications, information is hidden within a host data set and is to be reliably communicated to a receiver. The host data set is intentionally corrupted, but in a covert way, designed to be imperceptible to a casual analysis. Next, an attacker may seek to destroy this hid-

(Continued on Newsletter page 4)

Dr. Pierre Moulin (4th from left), and other IEEE volunteers of the Pune section after the lecture at Pune.

From left Mr. MGPL Narayana, immediate past section chairman , Mr. Jasti Srinivas, TMC chapter Secretary ,Dr. Pierre Moulin, Dr.Atul Negi, Section chair, Dr. Deergha Rao Korrai, Comm/SP Chapter Chair, Mr.T.S.N.Murthy, Comm/SP chapter Vice-Chairman of the Hyderabad section after the lecture at TCS, Hyderabad.

Conference by Spain COIT: The Challenge of Internet of Things

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The past 31st of May, a conference entitled The Challenge of Internet of Things (IoT) was held, organized by the Colegio Oficial de Ingenieros de Telecomunicación (COIT) [1]. The conference had the goal of giving a broad perspective on all of the main topics related with the progressive adoption of Internet of Things and the world of opportunities and challenges engineers have to face in the following decades [2]. A wide participation from research institutions, telcos, system integrators, regulators and SMEs gave a rich and ample view on the topic of IoT. The session was also video streamed in order to give the conference global visibility.

The conference was divided in several topics, dealing with economical, technical, legal and technical aspects related with the adoption of IoT. The first section was devoted to the impact of IoT in persons, with the main focus on the opportunities to enhance the quality of life of people that have some type of disability, need e-health telemonitoring or are in some sort of risk of social exclusion. In this scenario, tools such as semantic webs play a key role in the success of real deployment.

The potential business opportunities derived from the introduction of IoT was described by the President of EMEA region of Neoris. In the timeframe of this decade, the adoption of IoT in different sectors such as automotive, healthcare, smart grids, smart cities, and transportation logistics is forecasted to support tens of billions of devices connected to IoT, with an expected investment worldwide in the order of a trillion dollars. This economic projection clearly indicates the enormous business opportunities, especially in the engineering community.

A following session was devoted to the evolution of telecommunication networks in order to provide an adequate platform for IoT. Telcos as well as regulators provided their view on the great opportunities in terms of business (different business models, evolving from Average Revenue Per User, ARPU, to Average Revenue Per Device, ARPD). This change in the business model has a direct impact on the engineering design of the individual elements (aspects such as integrated SIMs or Machine to Machine compliance), as well as on the overall network design. In this sense, the need to adopt IPv6 was also explored, due to the mandatory need for more IP addresses which have already been consumed in actual IPv4.

The advent of Internet of Thing leads to changes in the interaction between people as well as machines is performed. There is a great deal of information that can potentially be transported in this new scenario, which has great implications in legal as well as security aspects. Different views were exposed, related with privacy and security issues as they are being developed by the Internet Governance Forum [3], as well as the legal framework adopted in a worldwide scale and more particularly in Spain. It is worth noting that the number and types of different security threats is increasing, from cyberterrorism, hacktivism to industrial espionage, among others. This is leading to new business opportunities, in which security is being considered at initial design stages of myriad of different systems that are being deployed and can evolve to be the support for IoT.

(Continued on Newsletter page 4)

SPAIN COIT/*continued from page 3*

The development and deployment of the necessary infrastructure (heterogeneous networks as well as end user devices) is already underway. Different views, from system integrators, service providers and network operators were exposed in an afternoon session. Different technologies, such as RFID and NFC are already providing initial experiences in the IoT universe, applied to logistics, geo-location or security. This has led to different real life experiences, such as IoT ecosystems in which network convergence is already being analyzed and tested. In a complementary way, the role of M2M services and its adoption, which implies several particular issues such as the large amount of potential units, the diverse operation (from quasi-continuous transmission to sporadic transmission of events) and the variety of implementation options (from mobile networks, to WBAN or proprietary standards, such as Z-Wave). In the context of future devices and sensors, an interesting approach to the potential of nanotechnology applied to the field of IoT was described, with the description of MEMS and NEMS devices which could be used in the future.

An element that must be considered in order for IoT to be adopted in a global scale is to address interoperability. To this extent, the current status of standardization and normalization were presented, as well as current experiences with multi-stack devices that are under test. The combination of flexible devices with the progressive definition and adoption of standards will indeed ensure the success of IoT settlement.

Finally, several real experiences developed by SMEs within the Wireless Sensor Network Ecosystem of COIT [1] were presented, as examples in the deployment of interconnected elements which are part of the IoT environment. These companies, which are all leaded by Telecommunication Engineers and have a strong relation with universities and research institutions, are developing solutions that are currently finding application in areas such as structural monitoring, smart grids, real time location systems or agricultural sensing just to name a few. In all cases, in-house developments have been proposed, with great flexibility to adapt to future demands and with the integration in the IoT.

To sum up, the advent of IoT implies changes not only in the way business models are developed, but also in the way we live. The near future will be one in which IP connectivity will be taken to the next level, with technological, social, economic and legal implications. It is clearly an opportunity for engineers to put our knowledge in order to create wealth and to improve the quality of life of our societies.

Further Reading

[1] http://www.coit.es/index.php?op=redessensores
[2] Internet of things. UIT. 2005. http://www.itu.int/osg/spu/publications/internetofthings/
[3] http://www.intgovforum.org/cms/

DISTINGUISHED LECTURE/*continued from page 3*

den information, and for this purpose, introduce additional distortion to the data set. Side information (in the form of cryptographic keys and/or information about the host signal) may be available to the information hider and to the decoder. Further, he has quoted the fact that the level of precision in many image formats is far greater than that perceivable by average human vision. Therefore, an altered image with slight variations in its colors will be indistinguishable from the original by a human being, just by looking at it. By using Least Significant Bit (LSB) embedding process, the image itself will seem unaltered. He has also discussed the basic properties such as Fidelity, Payload, Robustness/Security, and Detectability of the information embedding. Fidelity says that the Embedding of information should not cause perceptual degradation of host signal. Payload refers to number of bits of information that are embedded in the host signal .This can vary from megabytes of information to few bits. Payload is often normalized by number of samples of host signal. Robustness refers to the ability of embedding algorithm to survive signal processing operations such as compression, filtering, cropping, and insertion. Detectability means no secret is made of fact that information is embedded in host signal.

During the lecture on "Robust Hashing and its application to Content Identification" at Hyderabad, Prof. Pierre Moulin has stressed the need to compress signals (audio, video, etc.) into short bitstrings for the purpose of reliable identification (instead of reconstruction) in many modern applications, including management of user-submitted content websites and gave an overview of the fundamental decision-theoretic and information-theoretic concepts and outlined practical approaches to such problems. Also, he has exposed the research challenges like Signal processing primitives for robust hashes, Efficient string matching algorithms, General framework for hash function design and Information-theoretic challenges such as what is the fundamental relation between database size, hash length and robustness?

FRUCT/*continued from page 1*

community «Are You Smart» ruSMART (http://rusmart.e-werest.org), Regional Mobile Healthcare community (http://mhealth.e-werest.org) and Russian Mobile Linux community (http://meego.e-werest.org).

Conclusion

The article gives an overview of FRUCT association, its basic principles of organization and operations, shares our experience and status of activities. FRUCT is open and free for new university teams. Association members benefit by collaborating with research groups from ICT industry and top regional universities. Enrollment of new team is invitation based. We welcome you to apply for membership and you will get invitation to FRUCT as long as you are sharing our principles. Also you can join FRUCT individually by registering at www.fruct.org. You can use study materials from FRUCT pages, e.g. www.fruct.org/trainings, take part in events www.fruct.org/events and join social groups: in Facebook (http://facebook/OpenInnovations), Vkontakte (http://vc.com/ OpenInnovations), Skolkovo (http://community.sk.ru/net/fruct/) and FRUCT social network (http://social.fruct.org).

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