



Preamble

It is indeed a matter of pleasure to have initiated the National Conference on Computational Instrumentation NCCI-2010. It is less than a year ago when Computational Instrumentation (CI) activity was formally added in CSIO's structure. Although similar research activities were already going on in CSIO since many years, it was felt that a formal group could do more justice to the field.

A few months when we decided to hold such a conference, an obvious agenda was to expand the research area on a national basis. Therefore, the conference theme was fully aligned with CI@CSIO. The sole objective of the two-day event was to enroll as many researchers, academicians, students, industry professionals, policy makers etc. as possible. Effort was made to spread the message across the nation to reach such groups.

As you go through the programme and abstracts, it would be appropriate to share with you briefly the vision and mission of CI. To join the move in green conferencing, the details of CI and e-proceedings of the conference shall be available on our site www.csio.res.in. You may consider associating with or influencing our vision, mission and activities in the near future.

The **Vision** statement set for CI@CSIO is:

Providing a synergic (horizontal) integration of plurality of sensing and/or measurements to higher level meaning and objectives.

Computational Instrumentation simply means Computational Processing and Analysis and Visualisation of data for an end application. It is obviously an extension of the basic definition of instrument which consists of a sensor, signal conditioning and a display. CI@CSIO implies treatment and analysis of **more than one** sensing and measuring parameters with the higher level objectives of **Control, Inspection, Monitoring, Prediction, Forecasting, Recognition, and Diagnosis (CIMPFoRD)**. The sensing could be carried out using:

- Arrays
- Imaging
- Sensor Networks (including non-imaging)

The present **Mission** includes:

- Assistive Technology for Visually Impaired Persons and Deaf
- Medical Imaging and Therapy
- Molecular Imaging and Analysis
- Computer Aided Diagnosis
- Techniques for Early Warning
- Web/Wireless Services for Agro and Health Sector

by

- **Devising:** novel approaches for sensor mapping, layout, distribution, imaging and resolving
- **Seeking:** optimal choices of mapping and embedding algorithms to computing/processing architectures
- **Innovating:** continual methodologies in machine intelligence
- **Deploying:** applications in Sectors for Societal upliftment

The nation is now reaching of substantial growth of communication connectivity by satellite, mobile phones, internet, television, direct-to-home, cable and the like. More and more services and information networks such as e-governance, banking, finance, education, medical services, agriculture, railways, transport, defense, geographic/oceanic information, security, safety etc are changing the life of a common man. Monitoring, surveillance and supervision of operations are possible remotely any time and from any place. Such information services are becoming available 24x7, 365 days a year. With right information at right person at right place and time is leading to abundance of opportunities for development. All other infrastructures are taking advantage of the communication.

As we all know the spread of information is possible with further ubiquity of computers and other electronic devices and gadgets which become the source or destination of information. The sophisticated algorithms run in these devices and systems that mimic human capabilities of analysing and decision making. Many of them are acting independently like experts in various domains. One may wonder such systems would take over the humans or would have world of their own. Quite clearly when they make a network of a few or a large number connecting each others forming internet, they do have a world of their own. However computers and mobiles over the networks have definitely improved our daily life. India's national knowledge network (NKN) would be a significant contribution with wide spread of theory classes and laboratories sharing possible to revolutionize education and other research institutions.

The other worlds like plants and animals remain with nature and man's quest to conquer the world remains dissatisfied with more and more knowledge and understanding. However, science cannot progress without appropriate instrumentation. The instruments need to spread all over the geography, oceans and the space to monitor weather, environment, agriculture fields etc. Huge variety and diversity of sensors and subsystems are being evolved to make an assessment of all these domains at adequate time and space intervals.

What use this information would be without the power of perdition of weather, fertility, crop, suitability of soil and other natural resources, availability of minerals and other ground resources, fossil fuels and the

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like. Similarly various instrumentation systems could detect and warn the natural disasters such as earth quakes and tsunami and allow mitigation with minimal devastation. This is possible only when sophisticated algorithms that provide instruments the power of superior intelligence that human beings could boast earlier. Further the power of communication allows various instruments to share the information across the globe. The network also allows the control of the instrumentation from all over.

The applications of these are not limited to geography and agriculture by way of instrumentation for natural weather, resources etc. These extend to material science to provide depth of human health for all forms of diagnosis and therapies. The recent advances of micro and nano devices are further likely to increase their prevalence. The combinations of these technologies form useful solutions in industry for further development of products for strategic and civil life which suit the humans and exhibit human-like learning and decision making.

As one may observe that the conference themes are aligned with CI's mission. Looking at the response from the delegates, we feel encouraged to have devised it in this manner. We received overwhelming response not only from delegates but also from various leading speakers and other dignitaries who agreed to chair sessions. A balance has been made to share the research work of delegates with them.

Thankyou for attending and participating actively in the CSIO Golden Jubilee NCCI-2010.

I wish you a great success in your research ventures,

We shall be privileged to know your further interest and association,

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