Keynote Speech

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Topic: Unconventional Proving Techniques in Cyber – Physical Systems

Abstract: Cyber - Physical Systems [CPS] are “Engineered systems that are built from, and depend upon, the seamless integration of computational algorithms and physical components”. CPS have the potential to provide much richer functionality - including efficiency, flexibility, autonomy, and reliability – than systems that are loosely coupled, discrete, or manually operated. CPS also can create vulnerability related to protection, security and reliability. This can result in a chaotic collapse around the many new complex and powerful technological systems we rely on. The very complexity and interconnectedness of such CPS warrants unconventional proofing to unravel. Moreover, CPS is diffused across the social fabric. The sociology of mathematics is quite elusive for the construction of formal proofing in CPS. The gap between rigorous argument and formal proof in the sense of mathematical logic is one that will close in CPS.

The frightening possibility is that the question of what is a proof may reach the law courts. What does it mean when mainstream explanations of our physical reality are based on what even scientists cannot comprehend? The generic characteristics of CPS are:

- Self-organization
- Interdependence
- Feedback
- Far from equilibrium
- Exploration of the space of possibilities
- History and path dependence
- Creation of new order

Cyber risk is an increasing concern in the complex, connected world of CPS. The complexity of the ecosystem, the connectivity of devices and the criticality of devices and services all increase risk, and the necessary formal proofs are elusive to take an effective action. “Fake People” is the Case Study presented in this address to illustrate unconventional proofing in Humane Security Engineering of CPS.

References:


Biography: Dr. T V Gopal is presently teaching Computer Science and Engineering at the CEG Campus, Anna University. One of his research areas includes “Science and Spirituality”. Dr. T V Gopal has published around 75 Research Papers. He has written four books and Co-Edited Seven Conference Proceedings. He is actively associated with many professional societies such as CSI, IEEE and ACM India Council. He is an Expert Member of the Editorial Advisory Board of the International Journal of Information Ethics. For further details, please visit: https://vidwan.inflibnet.ac.in/profile/57545