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Core focus areas:

- ❖ Programming Languages & Compilers
- ❖ Semantic Web & Web Accessibility
- ❖ Web Security
- ❖ Education Technologies & Pedagogy
- ❖ Model Driven Software Engineering
- ❖ Formal Software Engineering for Systems

Web Accessibility

Web is prolific with a lot of useful content. However, some segments of the user population may find some of the relevant material on the web complex, foreign and incomprehensible. The intent of our research is to be able to make existing web content be more accessible to wider range of end-users who may have different sociocultural and cognitive abilities. We propose to overcome this through Renarration.

Students: Sai Gollapudi (PhD); Soumya (MS) <saraswati.soumya@research.iiit.ac.in>

Publications: ISEC 2018, ICDCIT 2018, ICON 2017, ICEGOV 2017,ISKE 2017, ISEC 2017, SEKE 2017, CHI 2014, W4A 2014, APCHI 2013, HCI 2013, T4E 2013, T4E 2012

Web Security

The focus of this research is to design policy based architectures to mitigate browser-vectored cross-origin attacks. Our group has modeled and designed CORP (Cross-Origin Request Policy) to mitigate CSRF (Cross-origin Request Forgery), timing attacks, and browser based DDOS Attacks.

Students: Akash Agrawall (MS, graduated), Krishna C. Telikicherla (MS, graduated)

Publications: ISEC 2017, ICISS 2017, ICISS 2014, IWP 2014, TR(IIIT)

Model based approach development of Virtual Labs

The focus of this research is to develop a pedagogy-based authoring and learning virtual environment for science and technology experiments.

Students: Mrityunjay Kumar (PhD) , Krutam Hathi (CSD)

Publications: ICALT 2018, ICALT 2020 (Submitted)

Type system for a Domain Specific Language for Tensor computations

Tensors are generalizations of matrices and are used heavily in Machine Learning algorithms and systems (e.g., TensorFlow).   The aim of the current work is to build a type system for Tensors that can automatically annotate tensor expressions and support variable-free tensor expressions (combinators).

Students: Bharathi Ramana Joshi (CSD) <bharathi.joshi@research.iiit.ac.in>

Feedback control approach to Concurrency

Feedback Control is perhaps the most important design principle in engineering.   This research applies feedback control principles to arrive at modular design of concurrent algorithms.   Currently, we have explored classical algorithms: like Dining Philosophers and Peterson's mutual exclusion algorithm and fine-grained concurrency in linked lists.

Collaborators: Prof. Viswanath Kasturi <viswanath.iiithyd@gmail.com>;   Bharath Jayaraman, University of Buffalo;

Students: Arjun Sanjeev (CSD)

Publications: AFMSS-2018, TR(IIIT)

Knowledge-centered approach for engineering Control System S/W

The focus of the ongoing Digital and Industry 4.0 revolution is on re-engineering business operations to take advantage of various technologies, including robotics, cyber-physical systems and IoT.   Control system s/w is at the heart of many of these system. With current practice, conceptualization and prototyping typically takes several months and considerable manual effort. We are working on an environment for rapid prototyping of control s/w synthesis that is based on capability composition, system contracts and knowledge models.

Collaborators: Tata Innovation Labs (Pune)

Students: Amar Banerjee (PhD)

Publications: ISEC-2019, ISEC 2018