Rajaraman Lecture Series

Eyes-on-Research

Department of Computer Science And Engineering

The Mathematics of Prompting: From Conditional Probability to AI Coding Agents

Dr. Satish Chandra

Abstract: For the better part of a century, programming was considered a quintessentially human act of creation, a pursuit demanding intellectual rigor coupled with a sense of aesthetics. This has changed precipitously over the last few years. Today, substantial amounts of software can be written by simply "prompting" an AI coding agent, making programming increasingly accessible to everyone.

How can a few words of instruction cause a machine to generate, understand, and even repair computer programs?

In this talk, I will trace the development of this remarkable technology from first principles, assuming only freshman-level mathematics. We will explore the now-ubiquitous large language models (LLMs), the surprising power of prompting, and the coding agents that purport to be a programmer's willing and sometimes telepathic assistants. I will also outline some of the open technical challenges that researchers are working to address.

Dr. **Satish Chandra** is a **research scientist** at **Meta**, where he applies machine learning techniques to improve developer productivity. His work has spanned many areas of programming languages and software engineering, including program analysis, type systems, software synthesis, bug finding and repair, software testing, and application of AI to software development. His research has been widely published in leading conferences in his field. Dr. Satish Chandra obtained a PhD from the **University of Wisconsin-Madison**, and a B.Tech from the **Indian Institute of Technology Kanpur**, both in computer science. He is an **ACM Fellow** and **a distinguished alumnus of IIT Kanpur**.

Time: **5:15PM, Thursday 5th November 2026**
Venue: **RM101, CSE**

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