

Indian Statistical Institute

Applied Statistics Unit

SEMINAR NOTICE

(Pre-Submission Seminar)

Speaker: Prabal Banerjee

Title: Leveraging Blockchain for Secure, Fair and Efficient Data Trading, Storage and Exchange

Date: 08 June, 2023

Time: 11:00 AM

Venue: ASU Seminar Room

Online Platform: Google Meet (meet.google.com/gfp-bawr-rfh)

Abstract:

In today's digital age, data holds unprecedented importance, serving as a key commodity for the most valuable companies worldwide. This exponential growth in the significance of data has led to the emergence of data marketplaces, platforms for data trading, and content sharing. However, the present models are often found inadequate, failing to satisfy crucial properties such as fairness, efficiency, security, privacy, and adherence to regulations. Furthermore, the integrity of data stored on potentially malicious cloud servers is at constant risk, and mechanisms to check its integrity are often limited by assumptions of honesty among involved parties. There is also a dire need to ensure the owner's consent and the traceability of data trade, especially for sensitive information. Additionally, artists seeking to monetize their content on sharing platforms are often subjected to opaque and unfair practices, with consumers unable to authenticate the originality of content.

To address these multifaceted challenges, this thesis presents a comprehensive, blockchain-based solution. We propose a data marketplace that leverages blockchain to satisfy all desirable properties and provide an end-to-end protocol for trading sensitive information, guaranteeing consent, traceability, and fairness. To safeguard data integrity in cloud storage, we design a Proof of Retrievability (PoR) protocol that takes into account adversarial assumptions and utilizes blockchain smart contracts and state channels for practical audit solutions. Our proposed decentralized content sharing platform ensures fairness and transparency in content monetization, by developing a transaction processor that automatically pays out the content creators and the storage facilitators using smart contracts. Lastly, we introduce \vader, a decentralized solution for the fair exchange of digital goods involving three parties, offering trusted execution with minimal operational overhead. Through prototype implementations and evaluations, we demonstrate that our proposed solutions not only offer scalability and efficiency but also significantly improve upon existing models, making them ideal for wide-scale deployment.

All are invited to attend.