23CS802 AI-driven Distributed Systems, IoT, and Blockchain 1-0-2 : 2 Cr.

Course Objectives

This course is designed to provide students with research trends in distributed learning for AI based systems, IoT and blockchain technologies. Students will learn important concepts, tools and techniques adopted in the area.

Course Outcomes

CO1: To understand fundamentals of distributed systems and distributed learning
CO2: To be able to implement distributed middleware using cross-platform frameworks
CO3: To be able to implement basic smart contracts in permissioned blockchain
CO4: To get exposed to edge computing in IoT

CO-PO Mapping

PO/PSO / CO	PO1	PO2	PO3	PO4	PO5	PO6
CO1	2	1	1	1		
CO2	2		1	2	1	
CO 3	1	1	2	2		
CO4	1	1	1	2	2	

Syllabus

Basic concepts of Distributed Systems, Cloud Computing, Model-free Reinforcement Learning, Important Factors in Distributed Deep Learning, Large Language Models-data and model distribution, challenges and frameworks

Edge Computing, basic IoT programming on Arduino and offloading to Cloud platforms, gRPC - cross-platform high performance RPC framework.

Nextgen Wireless Communications and 5G - Latest research trends in Edge Computing, 5G/Beyond 5G

Introduction to Blockchain- Distributed ledger, hash pointers, consensus, byzantine fault-tolerant distributed computing, digital cash, smart contracts – basics and hands-on implementation in permissioned blockchain.

References:

1. Zaigham Mahmood, Ricardo Puttini, Thomas Erl, Cloud Computing Concepts, Technology & Architecture , Pearson, 2013
2. Bina Ramamurthy, Blockchain in Action, Manning publications, 2020
3. Ajay D. Kshemkalyani and Mukesh Singhal, Distributed Computing: Principles, Algorithms, and Systems, Cambridge University Press, 2011
4. Sutton and Barto, Reinforcement Learning: An Introduction, The MIT Press Cambridge, Massachusetts London, England, 2015
5. David Hanes, Gonzalo Salgueiro, Patrick Grossetete, Robert Barton, Jerome Henry, IoT Fundamentals: Networking Technologies, Protocols, and Use Cases for the Internet of Things", CISCO Press, 2017
6. https://grpc.io/docs/guides/

Evaluation Pattern

Assessment	Internal	External
Theory assignments (Quizzes)	20	
Lab assignments	20	
Seminar/Case study/Tech report	30	
End Sem exam		30