BONAM VENKATA CHALAMAYYA INSTITUTE OF TECHNOLOGY & SCIENCE

(AUTONOMOUS)

DEPARTMENT OF ARTIFICIAL INTELLIGENCE & MACHINE LEARNING

III Year II Semester

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REINFORCEMENT LEARNING
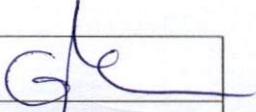### 23AM6T03

COURSE OUTCOMES:

- Enumerate the elements of Reinforcement Learning
- Solve then-armed Bandit problem
- Compare different Finite Markov Decision Process
- Discuss about Monte Carlo Methods in solving real world problems
- List the Applications and Case Studies of Reinforcement Learning

UNIT-I: The Reinforcement Learning Problem: Reinforcement Learning, Examples, Elements of Reinforcement Learning, Limitations and Scope, An Extended Example: TicTac-Toe, Summary, History of Reinforcement Learning.

UNIT-II: Multi-arm Bandits: An n-Armed Bandit Problem, Action-Value Methods, Incremental Implementation, tracking a Nonstationary Problem, Optimistic Initial Values, Upper-Confidence-Bound Action Selection, Gradient Bandits, Associative Search (Contextual Bandits)

UNIT-III: Finite Markov Decision Processes: The Agent–Environment Interface, Goals and Rewards, Returns, Unified Notation for Episodic and Continuing Tasks, The Markov Property, Markov Decision Processes, Value Functions, Optimal Value Functions, Optimality and Approximation.

UNIT-IV: Monte Carlo Methods: Monte Carlo Prediction, Monte Carlo Estimation of Action Values, Monte Carlo Control, Monte Carlo Control without Exploring Starts, Off policy Prediction via Importance Sampling, Incremental Implementation, Off-Policy Monte Carlo Control, Importance Sampling on Truncated Returns

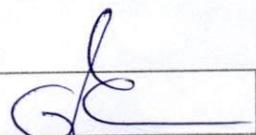| Dr. O. SRINIVAS RAO, Professor, Department of CSE, UCEK JNTUK, Kakinada	Dr. JIMSON MATHEW Professor Dept of Computer Science and Engg. Indian Institute of Technology Patna	Prof. CHAPRAM SUDHAKAR Professor, Department of CSE, National Institute of Technology, Warangal - 506 004 Telangana, INDIA	Mr. RAJESH BOBBURI COO & Director, HighQ Labs Pvt Ltd, Rajahmahendravaram	Mrs. G VIJAYA KUMARI Assoc Professor &HoD Department of CSE-AI & DS, AIML B.V.C.I.T.S, Batlapalem

UNIT-V: Applications and Case Studies: TD-Gammon, Samuel's Checkers Player, The Acrobot, Elevator Dispatching, Dynamic Channel Allocation, Job-Shop Scheduling.

TEXT BOOKS:

1. Richard S. Sutton and Andrew G. Barto, "Reinforcement LearningAnIntroduction",2ndEdition, The MIT Press,2018

2. Marco Wiering, Martijn van Otterlo Reinforcement Learning: State-of-the Art (Adaptation, Learning, and Optimization (12))2012th Edition

REFERENCE BOOKS:

1. Vincent François-Lavet, Peter Henderson, Riashat Islam, An Introduction to Deep Reinforcement Learning (Foundations and Trends(r) in Machine Learning), 2019.

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