AI-POWERED CYBER PHYSICAL SYSTEM(CPS): DETECTION & RESILIENCE

Seminar Report

Submitted by

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CERTIFICATE

This is to certify that the seminar entitled "AI-POWERED CYBER PHYSICAL SYSTEM(CPS): DETECTION & RESILIENCE" has been submitted by FATHIMA HAVIYA, Reg.No: 243242210701 , Semester IV in partial fulfilment of the degree of Master of Computer Applications of Mahatma Gandhi University, Kottayam during the period 2024-26.

Date :

Place :

Mr.Akbersha K E — **Faculty Guide**

Dr. Kavitha C R — **HOD, MCA**

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ABSTRACT

Cyber-Physical Systems (CPS) integrate computational intelligence with physical processes through tightly coupled sensors, actuators, and communication networks. As CPS are increasingly deployed in critical domains such as smart grids, autonomous vehicles, healthcare, and industrial automation, ensuring their security, reliability, and resilience has become a major challenge. Traditional monitoring and control techniques are insufficient to detect evolving cyber threats, system faults, and unexpected physical disturbances.

This seminar explores how Artificial Intelligence (AI) enhances CPS by enabling intelligent detection, prediction, and autonomous response mechanisms. AI-driven approaches—such as machine learning, deep learning, and reinforcement learning—can model system behaviour, identify anomalies, predict failures, and support real-time decision making. Furthermore, the integration of edge AI allows CPS to process data locally, reducing latency and improving security. The seminar also discusses resilience strategies such as self-healing architectures, adaptive control, redundancy, and predictive defence.

By combining AI with CPS, modern systems can achieve higher levels of robustness, efficiency, and autonomy. This makes AI-powered CPS a promising and impactful innovation for the future of smart infrastructures and critical applications.

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