Collaborative Research Project 1 Plan

The project is one of the important components of the course. Please choose one of the following Topics. Please note that the project needs to be completed in three phases:

**Phase 1:**

**Submission of the Project Proposal: (February 02, 2025)**

A one-page proposal (identifying techniques/software/methods to solve the given security problem, provides references) must be submitted to the instructor for approval. There will be maximum of two students for each project.

**Phase 2:**

**Project Progress Presentation (March 02, 2025)**

**Phase 3:**

**Final Demo and report of the project (April 28 – May 04, 2025)**

List of TOPICS

1. **Network Security**
2. **1. AI and Machine Learning in Threat Detection**
3. **2. 5G Network Security**
4. **3. Quantum Cryptography and Post-Quantum Security**
5. **4. Zero Trust Architecture**
6. **5. Blockchain for Network Security**
7. **6. IoT Security and Privacy**
8. **7. Cloud Security and Multi-Cloud Environments**
9. **8. Cyber Threat Intelligence Sharing and Interoperability**
10. **9. Privacy-Preserving Security Models**
11. **10. Next-Generation Firewall and Intrusion Detection Systems**
12. **11. Security for Autonomous and Connected Vehicles**
13. **12. Zero-Day Vulnerabilities and Patch Management**
14. **13. Distributed Denial of Service (DDoS) Mitigation**
15. **14. Social Engineering and Human Factors in Cybersecurity**
16. **15. Securing Software-Defined Networks (SDN)**
17. **Big Data**
18. **AI-Driven Big Data Analytics**
19. **Privacy-Preserving Big Data Analytics**
20. **Real-Time Big Data Processing**
21. **Big Data Integration and Interoperability**
22. **Edge Computing and Big Data**
23. **Big Data for Predictive Maintenance**
24. **Data Quality and Cleaning in Big Data**
25. **Big Data for Personalized Healthcare**
26. **Ethics and Governance in Big Data**
27. **Distributed and Scalable Big Data Systems**
28. **Big Data and Blockchain for Data Integrity**
29. **Data Lakes vs. Data Warehouses**
30. **Big Data for Smart Cities**
31. **Natural Language Processing (NLP) for Big Data**
32. **Big Data for Financial Market Analysis**
33. **Sustainability and Green Big Data**
34. **Data Visualization for Big Data**
35. **Big Data in Cybersecurity**
36. **Drone Security**
37. **Secure Communication Protocols for Drone Networks**
38. **Drone Authentication and Authorization Mechanisms**
39. **Countermeasures to GPS Spoofing in Drones**
40. **AI and Machine Learning for Autonomous Drone Security**
41. **Drone-Based Intrusion Detection Systems for Critical Infrastructure**
42. **Privacy Concerns and Data Protection in Drone Surveillance**
43. **Drone Vulnerabilities and Exploits in Public and Commercial Systems**
44. **Drone Jamming and Anti-Jamming Technologies**
45. **The Role of Blockchain in Drone Security**
46. **Legal and Ethical Implications of Drone Security Measures**
47. **Security of Drone-Based Delivery Systems**
48. **Drone Swarm Security and Coordination**
49. **Drone Security in Urban Air Mobility (UAM) Systems**
50. **Drone Forensics and Incident Response**
51. **Physical Security of Drone Hardware**