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Advanced Academic Final Year Projects

2026 - 27

TITLE & ABSTRACT

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Consensus-Based Resource Allocation Strategy With Hormone-Based Workload Scheduler in Edge-Fog-Cloud Continuumt

This project is a cloud-edge resource management system designed to optimize workload distribution across edge, fog, and cloud environments. A hormone-inspired scheduling mechanism dynamically analyzes workload conditions and available computing resources. Consensus-based resource allocation helps different computing layers coordinate their decisions efficiently. The system aims to reduce processing delays, resource congestion, and unnecessary workload migration. It supports efficient and adaptive resource management for distributed real-time applications.

Minos: Bringing Accountability and Traceability to Attribute-Based Keyword Search

Minos is a cloud-based secure search framework designed to provide accountability and traceability for attribute-based keyword searches. The system allows authorized users to search encrypted cloud data using predefined access attributes. Search activities can be monitored to identify unauthorized or suspicious access attempts. The platform maintains traceable records while protecting sensitive information stored in the cloud. It improves security, access control, and accountability in cloud-based data search systems.

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Latency Uncertainty-Aware User Allocation in Mobile Edge Computing

This project focuses on allocating users to suitable edge computing resources while considering uncertain network latency. The system analyzes user requests, edge-server availability, network conditions, and processing requirements. An allocation mechanism dynamically assigns users to edge nodes with suitable latency characteristics. The approach helps reduce response time and improve service quality for mobile applications. It is suitable for real-time applications requiring low-latency edge computing services.

Encrypted-State Quantum Compilation Scheme Based on Quantum Circuit Obfuscation for Quantum Cloud Platforms

This project presents a security-oriented framework for protecting quantum computing workloads in cloud environments. Quantum circuits can be transformed or obfuscated before being submitted to a remote quantum computing platform. The encrypted-state approach aims to protect sensitive quantum algorithms and computation states from unauthorized observation. The system manages secure communication between users and quantum cloud resources. It provides a foundation for privacy-preserving quantum computing as a cloud service.

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Optimizing Immersive Services With Parallel In-Network Rendering and Deep RL

This project is a cloud-edge optimization framework for improving real-time immersive applications such as virtual and augmented reality. Parallel rendering techniques distribute computationally intensive rendering tasks across suitable network resources. Deep reinforcement learning dynamically selects resource and rendering strategies based on workload and network conditions. The system aims to reduce rendering latency and improve user experience. It supports scalable real-time immersive services across distributed cloud and edge environments.

Popularity Uncertainty-Aware Online Edge Data Migration

This project focuses on dynamically migrating frequently accessed data between edge computing nodes. The system analyzes changing data popularity and access patterns to predict suitable migration decisions. Uncertainty-aware mechanisms help prevent unnecessary data movement when popularity changes rapidly. Online migration allows the system to adapt continuously to real-time user demand. The approach improves data availability, reduces access latency, and optimizes edge storage utilization.

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Explainable Graph Ensemble Learning for Multivariate Time Series Anomaly Detection in Cloud Microservice Architectures

This project develops an intelligent monitoring system for detecting anomalies in cloud-based microservice applications. Monitoring data from multiple services is represented using graph relationships and analyzed using ensemble machine learning models. The system identifies unusual patterns across CPU usage, memory, response time, network traffic, and service dependencies. Explainable techniques provide information about the possible causes of detected anomalies. It supports real-time cloud monitoring and faster identification of microservice failures.

Research on Smart Wireless Aerial Networks Facilitating Digital Twin Construction

This project explores the integration of wireless aerial networks with cloud and edge computing for digital twin applications. Aerial devices can collect real-time environmental and operational data from distributed physical systems. Edge and cloud resources process the collected information to construct and update digital representations. The system supports continuous data synchronization between physical and virtual environments. It can be applied to smart infrastructure, industrial monitoring, transportation, and other distributed applications.

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A Cloud-Based Distributed System for Scalable Multi-Agent Simulation of Pig Health Monitoring Models

> This project develops a cloud-based distributed simulation platform for analyzing animal health monitoring models. Multiple software agents represent animals, health conditions, environmental factors, and monitoring activities. Cloud computing resources allow large-scale simulations to run simultaneously without depending on a single machine. The system can process health-related parameters and simulate different disease or environmental scenarios. It provides a scalable environment for research, testing, and predictive livestock health analysis.

Navigating the Edge-Cloud Continuum: A State-of-Practice Survey

> This project provides a comprehensive analysis of modern edge-cloud computing architectures and technologies. It studies how computational workloads can be distributed between end devices, edge nodes, fog resources, and centralized cloud platforms. The study compares latency, scalability, resource utilization, security, and deployment considerations. Different application scenarios and workload placement strategies are analyzed. The work provides guidance for designing efficient distributed computing systems.

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Hybrid Data Lake Entities Localization Optimization Based on Complex Networks

This project focuses on optimizing the placement and localization of data entities within distributed cloud data lakes. Complex network models are used to represent relationships between datasets, users, applications, and storage resources. The system analyzes access patterns and data dependencies to determine efficient data placement. Optimization techniques aim to reduce data access latency and unnecessary data movement. It supports scalable and efficient management of large distributed data repositories.

AutoScaleAI: An AI-Powered Framework for Cloud Resource Optimization Using Telemetry Analytics

AutoScaleAI is an intelligent cloud resource optimization framework that uses telemetry data to manage computing resources dynamically. The system collects real-time information such as CPU utilization, memory usage, network traffic, response time, and workload volume. Machine learning models analyze these metrics and predict upcoming resource requirements. Automated scaling mechanisms can increase or decrease resources according to workload conditions. The framework improves resource utilization, application performance, and operational efficiency.

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Enabling Service Continuity for Stateful Service Segmentation in Mobile Edge Computing Toward 6G

This project focuses on maintaining service continuity when stateful applications are distributed across mobile edge environments. The system monitors user movement, service states, network conditions, and edge resource availability. Application states can be transferred or synchronized between edge nodes when users move across coverage areas. The approach aims to minimize service interruption and data loss. It supports reliable low-latency applications in future mobile and 6G-oriented environments.

Hybrid Framework for Resource Allocation in Heterogeneous HPC and Cloud Environments Using Fuzzy Logic and Machine Learning

This project develops a hybrid resource allocation framework for heterogeneous high-performance computing and cloud environments. Fuzzy logic evaluates workload requirements and resource characteristics under uncertain conditions. Machine learning models classify workloads and identify appropriate computing resources. The framework dynamically assigns jobs according to performance and resource availability. It aims to improve execution efficiency, utilization, and workload scheduling across distributed computing infrastructures.

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CO-NAS: Joint Neural Architecture Search for Compression, Quantization, and Edge–Cloud Model Offloading

CO-NAS is an intelligent framework for optimizing deep learning models deployed across edge and cloud environments. Neural architecture search identifies suitable model structures while considering compression and quantization requirements. The system determines which portions of a model should execute locally and which should be processed in the cloud. Optimization considers computation, memory, communication, and latency constraints. It enables efficient deployment of AI models on resource-constrained edge devices.

Reversible Data Hiding in Shared Images Using Overlapped Coefficients in Polynomials

This project presents a secure data-hiding mechanism for protecting and embedding confidential information within shared images. Polynomial-based techniques are used to distribute hidden information across multiple image components. The reversible approach allows the original image to be recovered after the embedded data is extracted. The system can support secure image sharing across cloud storage and communication environments. It provides an additional security mechanism for confidential image and data transmission.

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Quantum-Resistant Security for Blockchain-Enabled 6G Networks: A Comprehensive Review

This project investigates security requirements for blockchain-enabled 6G communication environments in the presence of future quantum computing threats. It studies quantum-resistant cryptographic techniques suitable for protecting distributed network transactions and identities. The review analyzes blockchain, cloud-edge computing, and post-quantum security mechanisms. Potential vulnerabilities and deployment challenges are examined across 6G infrastructures. The work provides recommendations for developing resilient and future-ready network security architectures.

Flexible Network Functions in Edge Clouds: Enhancing Processing Capabilities With StateProc

This project focuses on implementing flexible network functions within edge cloud environments. The system allows network processing tasks to be dynamically deployed closer to users and applications. State management mechanisms maintain service information while network functions are moved or scaled. Edge resources can process traffic locally to reduce dependency on centralized infrastructure. The approach improves network flexibility, processing efficiency, and responsiveness for real-time services.

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Intelligent Robots for Mass Personalization: A Cloud-Edge-Terminal Collaborative Mechanism for Deep Learning ModelsT

This project develops a collaborative cloud-edge-terminal architecture for intelligent robotic applications. Robots collect real-time sensor information and perform immediate processing using local or edge resources. Computationally intensive deep learning tasks can be transferred to cloud resources when required. The architecture dynamically coordinates processing between robots, edge nodes, and cloud servers. It supports scalable intelligent robotics with reduced latency and improved computational efficiency.

Adaptive Cloud–Edge Coordination for Real-Time Phishing URL Detection With Distributed Caching and ONNX-Based Inference

This project develops a real-time phishing URL detection system using coordinated cloud and edge computing. Incoming URLs are analyzed using a machine learning model optimized for fast inference. Distributed caching stores frequently analyzed URLs and results to reduce repeated processing and network communication. Edge nodes perform rapid detection while cloud resources can handle model updates and larger workloads. The system improves phishing detection speed, scalability, and response efficiency.

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Surveying Root Cause Analysis Techniques: A Comprehensive Review of Aspects for Multi-Service Applications

This project studies techniques for identifying the root causes of failures in distributed cloud and microservice applications. It analyzes application logs, metrics, traces, service dependencies, and system events. Different machine learning and rule-based approaches for fault localization are compared. The study examines challenges related to complex service dependencies and distributed failures. It provides insights for developing effective automated monitoring and root cause analysis systems.

Fault Tolerance in Fog Computing: Hybrid Approach

This project develops a hybrid fault-tolerance mechanism for fog computing environments. The system monitors fog nodes, network connections, workloads, and service health to identify failures. Backup resources and workload migration mechanisms are used to maintain service availability when failures occur. Intelligent decision-making can determine suitable recovery actions based on current resource conditions. The approach improves reliability and continuity of real-time applications deployed across fog infrastructure.

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Adaptive Cloud–Edge Coordination for Real-Time Phishing URL Detection With Distributed Caching and ONNX-Based Inference

This project presents a cloud-edge architecture for detecting malicious and phishing URLs in real time. Edge nodes perform lightweight URL analysis using optimized ONNX-based machine learning inference. Frequently requested URL results are stored through distributed caching to reduce repeated model execution. Cloud resources support centralized model management, updates, and large-scale analytics. The system provides fast, scalable, and adaptive phishing detection for distributed applications.

Exploring Time Predictability for High-Bandwidth Memory Technology

This project analyzes the timing behavior and predictability of high-bandwidth memory systems used in high-performance computing environments. The system studies memory access patterns, latency variations, bandwidth utilization, and workload characteristics. Experimental measurements can be collected under different workloads to identify timing behavior. Statistical and analytical techniques are used to evaluate predictability. The study supports efficient memory-aware scheduling for cloud and high-performance computing applications.

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A Lightweight Convolutional Neural Network for Edge Computing-Oriented Transmission Line Defect Recognition

This project develops a lightweight deep learning model for detecting transmission line defects using images. The model is optimized to operate efficiently on resource-constrained edge computing devices. Image preprocessing and convolutional neural networks are used to identify cracks, damage, missing components, or other defects. Edge-based inference enables real-time inspection without continuously transferring large image data to centralized servers. The system supports intelligent infrastructure monitoring and predictive maintenance.

AI-Based Detection and Classification of Adversarial and Fault-Induced Threats in Split Computing

This project develops an AI-based security framework for identifying threats in split computing environments. Deep learning models are divided between client and edge or cloud resources to reduce local computational requirements. The system analyzes intermediate representations and communication behavior to identify adversarial manipulation and system faults. Machine learning techniques classify different threat categories and generate security alerts. It improves the reliability and security of distributed AI applications.

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Resilient Networked Control Systems Subject to Cyber Threats: A Data Encryption and Cloud Computing-Based Model Predictive

This project develops a secure cloud-assisted control framework for networked systems exposed to cyber threats. Sensor and control information is protected using data encryption mechanisms during communication with cloud resources. Model predictive control techniques analyze system conditions and generate appropriate control decisions. The system incorporates mechanisms for handling communication disturbances and potential cyber attacks. It aims to maintain reliable and secure operation of connected control systems.

Edge Computing-Based Distributed Intrusion Detection Systems via Multi-Hop Split Learning

This project develops a distributed intrusion detection system using edge computing and split learning. Multiple edge devices collaboratively train an intrusion detection model without directly sharing their raw network data. Deep learning computation is divided across participating devices and edge resources to reduce local processing requirements. Multi-hop communication allows distributed nodes to participate in model training and detection. The approach improves privacy, scalability, and real-time network threat detection.

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IIoT Attack Detection Using Genetic Algorithm-Optimized Neural Networks

This project develops an intelligent intrusion detection system for Industrial Internet of Things environments. Network traffic and device activity are collected from industrial communication systems and analyzed for suspicious behavior. A genetic algorithm optimizes neural network parameters and feature selection to improve attack classification. The trained model identifies normal and malicious network activities in real time. The system supports secure and intelligent monitoring of industrial IoT infrastructure.

Lightweight WebAssembly-Based Intrusion Detection for Zero Trust Edge Networks

This project develops a lightweight intrusion detection mechanism for zero-trust edge computing environments. WebAssembly enables security analysis components to execute efficiently across different edge platforms with low resource requirements. Network traffic, authentication events, and device behavior are monitored for suspicious activities. The system applies machine learning or rule-based detection to identify potential threats in real time. It provides a portable and efficient security layer for distributed zero-trust edge networks.

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