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Survival analysis on machine learning methods for efficient predictive analytics in cloud environment

M Nandhiya[1], Dr. C R Durgadevi[2]
[1] Department of Computer Science, NGM College, Pollachi, Tamil Nadu, India
[2] Associate Professor, Department of Computer Science, NGM College, Pollachi, Tamil Nadu, India

Abstract
Cloud computing serves as a foundational infrastructure for modern digital enterprises, enabling on-demand access to data and applications through scalable resources. This research addresses the challenges of predictive analytics in cloud environments, where traditional classification methods often struggle with high time complexity and limited accuracy. The methodology involves a systematic process of data collection from Internet of Things (IoT) devices, followed by noise-reducing pre-processing and feature selection for dimensionality reduction. The study evaluates various machine learning and deep learning models, including XGBoost, Bi-LSTM, and Light GBM, using two distinct datasets: Smart Farming Data 2024 (SF24) and a comprehensive healthcare dataset. Major findings indicate that for agricultural applications, a cluster-based classification method achieved a 88.25% prediction accuracy with a significant 39% reduction in prediction time. In healthcare scenarios, a Light GBM and KNN-based ensemble algorithm attained a superior accuracy of 89.66%. The study concludes that machine learning-based classification provides a robust framework for efficient predictive analytics, significantly outperforming conventional methods in both precision and computational efficiency.

Keywords: Classification, computing devices, data collection, data processing, dimensionality reduction, internet of things

Introduction
Cloud computing has emerged as a critical technology for providing efficient services at low costs. By utilizing Internet of Things (IoT) devices, vast amounts of data are collected and transmitted to central servers for diverse tasks, including predictive analytics in healthcare and smart farming. However, the environment faces challenges such as data granularity, complexity, and accuracy limitations. This paper proposes a comparative analysis of six machine learning models to enhance predictive performance.

Dataset description
Two primary datasets were utilized for experimental analysis:

- **Smart Farming Data 2024 (SF24):** Contains 2,200 records and 23 features, such as soil nitrogen levels, temperature, and crop density, collected from farming locations in California.
- **Healthcare Dataset:** A resource designed to mimic real-world patient data, including attributes like medical conditions, test results, and admission types.

Methodology
The proposed architecture involves four main stages:

1. **Data Collection:** Gathering evidence from sources like cloud storage and web browsers.
2. **Pre-processing:** Transforming raw data into a structured format to eliminate noise.
3. **Feature Selection:** Identifying relevant features to reduce training time and complexity.
4. **Data Classification:** Utilizing models such as Random Forest, Light GBM, and Federated Learning (FedSDM) to categorize data for future outcomes.

Results and Discussion
Experimental results demonstrate the efficiency of machine learning models:

- **Agricultural Application:** The cluster-based method improved accuracy by 2% and minimized prediction time by 39% compared to conventional methods.
- **Healthcare Application:** The Light GBM and KNN ensemble model improved accuracy by 2% and reduced prediction time by 52%.

Conclusion
The survey of various prediction methods highlights that machine learning-based classification significantly improves accuracy while reducing time consumption. These findings suggest that deep learning and optimized ensemble models are ideal for future cloud-based predictive frameworks.

References

1. Li Y, et al. "Outdoor LiDAR point cloud classification algorithm based on multilevel point cluster feature fusion," Heliyon, 2025.
2. Talaat FM. "Crop yield prediction algorithm (CYPA) in precision agriculture," Neural Computing and Applications, 2023.
3. Daliya VK, Ramesh TK. "A Cloud-Based Optimized Ensemble Model for Risk Prediction," IEEE Access, 2025.
4. Sai S, et al. "An IoMT-Based Incremental Learning Framework," IEEE Transactions on Machine Learning, 2024.
5. Eggen K, Fan H. "WAPooling: An adaptive plug-and-play module," International Journal of Applied Earth Observation, 2025.
6. Du W, et al. "Smart farm digital twin model based on edge-cloud architecture," Smart Agricultural Technology, 2025.