Editorial

With growing global challenges in environmental management, healthcare, and computational sciences, innovative research continues to shape more effective and intelligent systems for detection, prediction, and decision-making. This issue showcases cutting-edge studies that leverage machine learning and numerical methods to enhance wildfire prediction, medical diagnostics, and the precision of numerical solutions. Together, these contributions reflect the critical role of computational tools in supporting urgent societal and scientific needs.

Accurate classification of wildfire types is increasingly vital in the face of rising fire incidents linked to climate change and anthropogenic pressures. A comparative evaluation of supervised machine learning algorithms applied to satellite-based environmental data identifies the Decision Tree (DT) model as the most effective classifier, with a top accuracy of 96.69% across all performance metrics. Closely following are Random Forest (RF) and Gradient Boosting Classifier (GBC), both achieving consistently high results. In contrast, Support Vector Classifier (SVC) and Logistic Regression (LR) exhibit reduced precision and F1 scores, making them less suitable for this task. By applying a robust machine learning framework to real-world U.S. wildfire datasets, the study provides actionable insights into model selection for early warning systems, ultimately supporting more responsive and informed disaster management strategies [1].

Understanding the approximation errors in numerical solutions of differential equations is critical for ensuring mathematical accuracy in engineering and scientific modeling. This study enhances the precision of error estimation by utilizing the moving nodes method, which calculates approximation errors at specific nodal points within a defined grid. By expressing the discrete solution analytically and integrating the step size hhh and accuracy order ppp, the approach provides a more accurate representation of how the numerical solution diverges from the exact one. This refinement in approximation error analysis contributes to improved reliability in simulations and numerical computations, particularly in fields where precision is paramount [2].

Polycystic Ovary Syndrome (PCOS), a widespread endocrine disorder, poses significant diagnostic challenges due to its complex symptom profile and associated metabolic risks. Using clinical and lifestyle data, this study evaluates the predictive capabilities of seven machine learning models for PCOS classification. Logistic Regression (LR) emerges as the most effective algorithm, achieving the highest scores in accuracy (91.7%), precision (96%), and ROC AUC (96.8%). The superior performance of LR is enhanced through the use of Synthetic Minority Over-sampling Technique (SMOTE) for addressing class imbalance and ANOVA F-score feature selection for identifying key predictors. The model's interpretability and simplicity position it as a practical solution for clinical decision-support systems, facilitating early diagnosis and intervention while maintaining transparency in healthcare settings [3].

These studies collectively underscore the transformative potential of data-driven methodologies in addressing real-world issues with accuracy, speed, and adaptability. Whether through predictive environmental analytics, refined numerical modeling, or intelligent healthcare diagnostics, the featured research reaffirms the indispensable role of computational science in advancing societal resilience and technological progress.

References:

[1] R. Taha, F. Musleh, A. Rahman Musleh, "Fire Type Classification in the USA Using Supervised Machine Learning Techniques," *Journal of Engineering Research and Sciences*, vol. 4, no. 6, pp. 1–8, 2025, doi:10.55708/js0406001.

[2] Dalabaev Umurdin, Khasanova Dilfuza, “Analysis of Difference Schemes of Two-Point Boundary Value Problems using the Method of Moving Nodes,” *Journal of Engineering Research and Sciences*, vol. 4, no. 6, pp. 9–15, 2025.

[3] R. Taha, H. Zain El Abdin, T. Musleh, “Comparative Analysis of Supervised Machine Learning Models for PCOS Prediction Using Clinical Data,” *Journal of Engineering Research and Sciences*, vol. 4, no. 06, pp. 16–26, 2025, doi:10.55708/js0406003.

Editor-in-chief

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