Here are five research papers from the first quarter of 2025 that focus on predicting student performance and personalized interventions using machine learning techniques:

1. **Enhancing Student Performance Prediction in e-Learning Ecosystems Using Machine Learning Techniques**

   Authors: Fatima Ezzahraa EL Habti, Mustafa Hiri, Mohamed Chrayah, Abdelhamid Bouzidi, and Noura Aknin

   Published in: International Journal of Information and Education Technology, Volume 15, Number 2, February 2025

   Abstract: This study examines the effectiveness of machine learning techniques in forecasting learner success within e-learning ecosystems, using the Open University Learning Analytics Dataset (OULAD). Four machine learning algorithms—Random Forest, Logistic Regression, Support Vector Machine (SVM), and Linear Discriminant Analysis (LDA)—were analyzed. The Random Forest algorithm outperformed the others, achieving a 91% accuracy rate in classifying student outcomes into "Distinction," "Pass," and "Fail" categories.

2. **Machine Learning-Driven Student Performance Prediction for Enhancing Tiered Instruction**

   Authors: Yawen Chen, Jiande Sun, Jinhui Wang, Liang Zhao, Xinmin Song, and Linbo Zhai

   Published in: arXiv preprint, February 2025

   Abstract: This study integrates machine learning-based student performance prediction with tiered instruction to enhance student outcomes. Five representative machine learning methods were analyzed, with Random Forest showing the best performance. Based on the classification results, tiered instruction was applied, setting different teaching objectives and contents for various student levels. The comparison of teaching outcomes between control and experimental classes demonstrated the effectiveness of the proposed framework.

3. **Predicting Academic Success: Machine Learning Analysis of Student, Parental, and School Efforts**

   Author: Yingying Zhang

   Published in: Asia Pacific Education Review, March 2025

   Abstract: This study leverages machine learning techniques to predict academic performance by analyzing the relative importance of student, parental, and school efforts. Using data from the China Education Panel Survey, four machine learning tools—Lasso, Random Forest, AdaBoost, and Support Vector Regression (SVR)—were employed to identify the most relevant effort variables influencing academic achievement.

4. **Intelligent System for Student Performance Prediction Using Machine Learning**

   Authors: Mustafa S. Ibrahim Alsumaidaie, Ahmed Adil Nafea, Abdulrahman Abbas Mukhlif, Ruqaiya D. Jalal, and Mohammed M AL-Ani

   Published in: Baghdad Science Journal, Volume 21, Issue 12, December 2024 (Online First: May 2024)

   Abstract: This study aims to develop an intelligent solution for predicting student performance using supervised machine learning algorithms. Three algorithms—Random Forest, Extra Trees, and K-Nearest Neighbors—were employed. The Extra Trees algorithm achieved the highest accuracy (98.15%), followed by Random Forest (94.03%) and K-Nearest Neighbors (91.65%).

5. **Predicting Academic Success of College Students Using Machine Learning Techniques**

   Authors: Sahar Helal, Jian Li, Lian Liu, Ehsan Ebrahimie, Shane Dawson, David J. Murray, and Qiang Long

   Published in: Data, Volume 9, Issue 4, April 2024

   Abstract: This study investigates the application of machine learning techniques to predict academic success among college students. Various algorithms were analyzed to identify the most significant predictors of academic performance, considering student heterogeneity.

These papers provide insights into the application of machine learning techniques for predicting student performance and designing personalized interventions.