

Generating Synthetic Fetal Cardiocography Data with Conditional Generative Adversarial Networks

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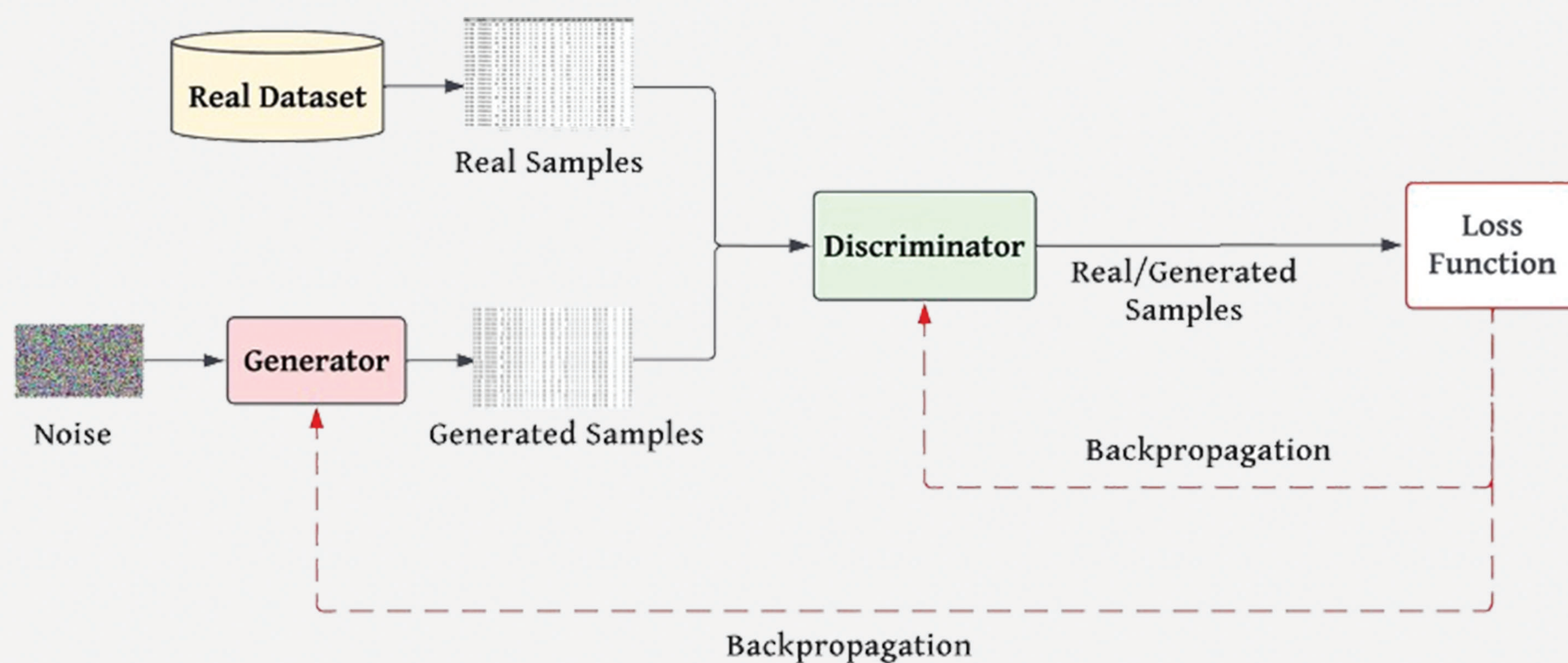
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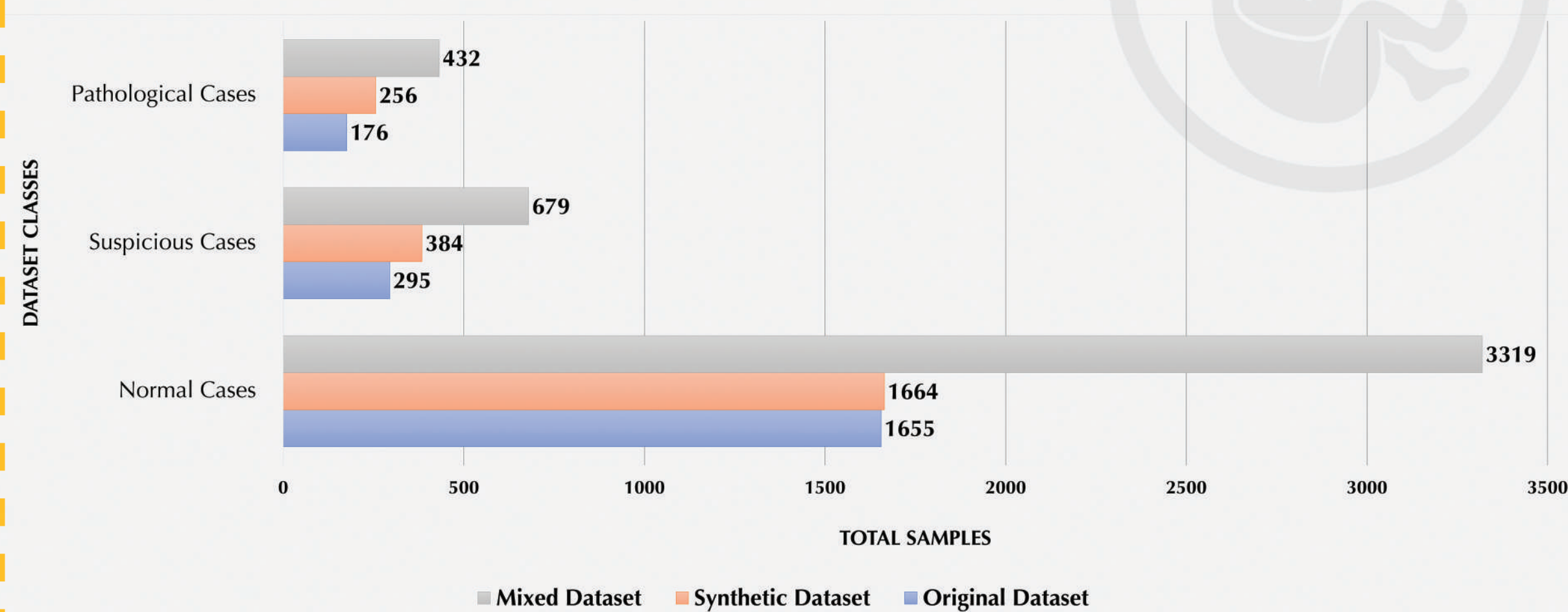
Abstract

This study proposes using a conditional generative adversarial network (CGAN) to generate synthetic data for predicting fetal health diagnosis from a publicly available Fetal Cardiocography (CTG) dataset. The study also evaluates the efficacy of the Generative Adversarial Network (GAN), expressly Conditional GAN, in the clinical problem. We analysed 2126 fetal cardiocogram samples that medical doctors labeled. We used CGAN-generated data with Support Vector Machines (SVM) and Extreme Gradient Boosting (XGBoost) as classifiers to show the performance of classifiers using the real and the synthetic dataset. The experiment results indicate that the synthetic dataset performs comparably to real data regarding classifier performance.

Methodology



Dataset

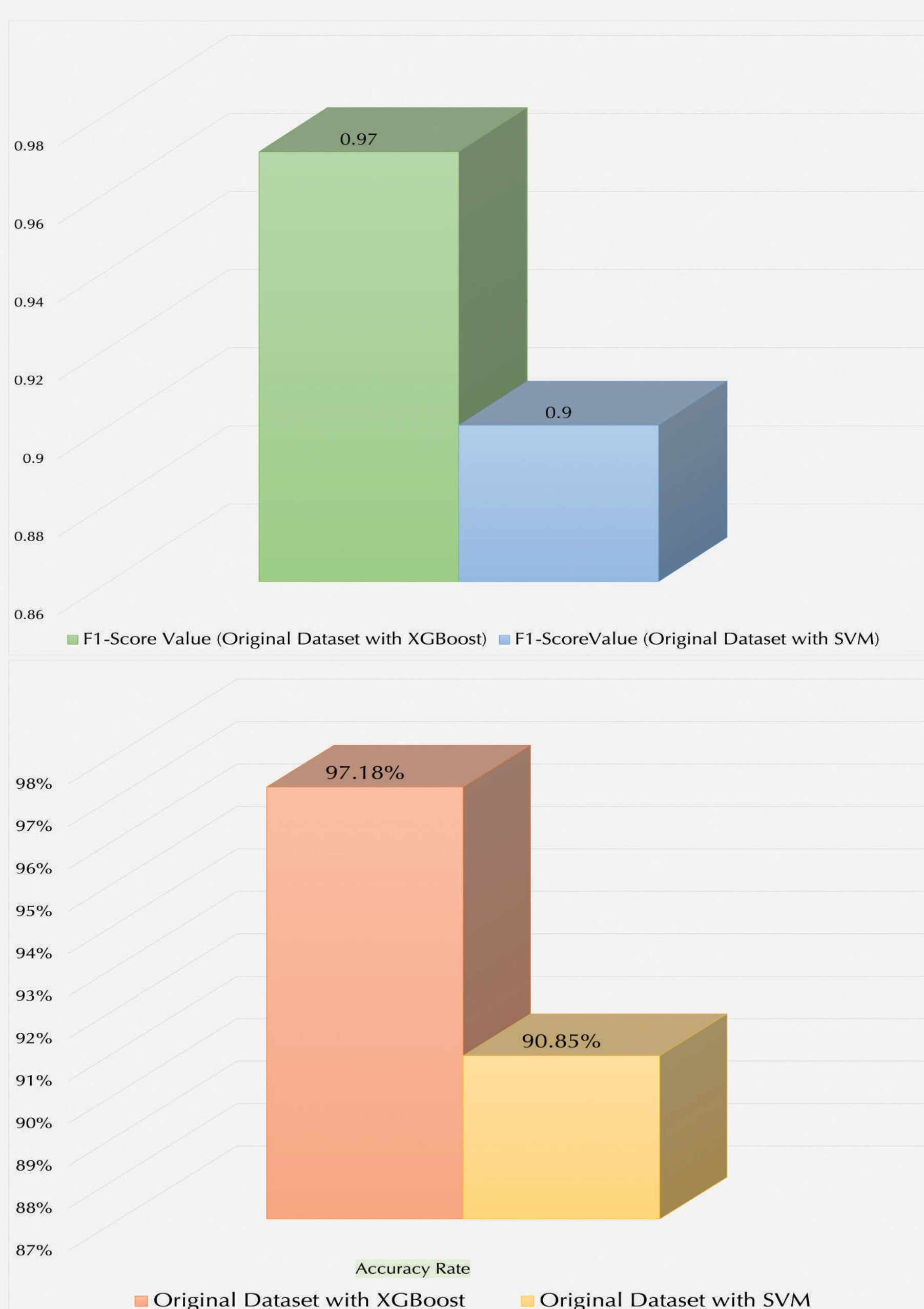


Highlights

The experimental results demonstrate that the XGBoost classifier outperformed the SVM classifier on the original dataset, while both classifiers performed well on the synthetic dataset, with SVM slightly better. When applied to the mixed dataset, the XGBoost classifier achieved higher accuracy than the SVM classifier.

Experimental Results

Original Dataset



Synthetic Dataset



Mixed Dataset

