SN Computer Science

GENETIC DISORDER DETECTION FOR HEMOPHILIA B USING MACHINE LEARNING

--Manuscript Draft--

Manuscript Number:	SNCS-D-24-02983
Full Title:	GENETIC DISORDER DETECTION FOR HEMOPHILIA B USING MACHINE LEARNING
Article Type:	Original Research
Section/Category:	Machine Learning
Funding Information:	
Abstract:	A genetic disorder stems from abnormalities in DNA or alterations in chromosome number or structure. These conditions often result from mutations inherited from parents or arising spontaneously. Many well-known diseases are linked to these genetic mutations. Genetic testing plays a crucial role in helping individuals make informed choices regarding the prevention, treatment, or early identification of hereditary disorders. Research indicates a rising prevalence of genetic disorders alongside population growth, highlighting the need for continued study and intervention. Hemophilia B is a hereditary bleeding disorder due to a deficiency in clotting aspect FIX, essential protein worried in blood clotting. This genetic situation commonly impacts adult males and may result in prolonged bleeding episodes even from minor injuries or spontaneous bleeding into muscle groups and joints. The severity of hemophilia B varies relying on the extent of issue F IX interest inside the blood. Causes of hemophilia B stem from mutations within the gene chargeable for generating aspect F IX, leading to its decreased or absent pastime. In integrating a genetic set of rules into Machine Learning venture, an initial population become created comprising various sets of hyperparameters for Support Vector Machine (SVM), Random Forest (RF), XG-Boost, K-Nearest Neighbor (KNN), and Naive Bayes classifiers. Every candidate solution changed into evaluated primarily based on its overall performance, represented with the aid of the accuracy rating attained on a validation dataset. Subsequently, the populace turned into scaled to prefer better-acting solutions, and a fitness feature tailored to every classifier was computed. Using genetic operations like crossover and mutation, new generations of answers were generated, refining the hyperparameter combos.GA can optimize these algorithms by fine-tuning their parameters, helping them achieve better performance. Furthermore, GA can identify the most relevant features from a dataset, which can significantly improve model performance and efficiency. While GA is powerful, they require more computing power than traditional methods due to their iterative nature.
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