ABSTRACT

Cystic Fibrosis (CF), a genetic disease that affects the digestive system and lungs. It is a complex genetic disorder characterized by the malfunction of the Cystic Fibrosis Transmembrane Conductance Regulator (CFTR) protein, leading to severe respiratory and digestive complications. Early diagnosis and prognosis of CF are crucial for personalized treatment and improved patient outcomes. This project intends to create a platform that analyzes lung images using deep learning techniques to predict an individual's risk of developing CF. In this project, deep learning techniques are used for predicting the risk of CF based on genetic information. By using advanced deep learning models, such as Local Binary Pattern (LBP), Grey Level Co-occurrence Matrix (GLCM) and Convolutional Neural Network (CNN), this platform will analyze genetic sequences to identify patterns associated with CF predisposition. This platform aims to provide individuals with actionable information regarding their genetic health through an intuitive interface and strong privacy safeguards. By using a diverse and extensive dataset, the platform ensures robustness and generalizability across various populations. This will ultimately enable early intervention and better outcomes for those who are at risk of CF. This platform can serve as an educational tool, helping to train medical professionals and researchers in the application of deep learning in genetic disease diagnostics. Overall, this project showcases the potential of deep learning-based approaches in genetic disease prediction, particularly for complex disorders like cystic fibrosis.