

DKA Prediction in children using artificial intelligence: Improved emergency care

Arifa Parveen^{1*}, Mohsina Riffat², Sarang Shaikh³

1. Child Life Foundation, Hyderabad Pakistan

2. Child Life Foundation, Hyderabad Pakistan

3. NTNU, Norway

Correspondence to: Arifa Parveen

*Child Life Foundation, Hyderabad Pakistan

Email: drrfaabro@gmail.com

DOI: 10.24911/SJEMed.72-1709471807



Diabetics Keto Acidosis (DKA) is a serious health problem that requires timely intervention to prevent harmful consequences. This study analyzes various types of patient data, including clinical parameters and historical records such as family history, genetics, age, gender, etc., to identify early indications for developing DKA in children. The proposed AI-based system can support healthcare professionals in the emergency department by providing accurate and timely predictions/decisions. The dataset consisted of various clinical, and laboratory parameters such as "blood sugar level, hco₃, pH values, urinary ketones, acidosis, sodium, and potassium values". Furthermore, along with the above parameters the dataset also contained some additional parameters such as "gender, age, and family history". The total size of the dataset was 5000 rows with 978 rows as "children diagnosed with DKA" and 4021 rows as "normal children". For the model selection stage, we selected 08 different machine learning models such as logistic regression, k nearest neighbor, naïve Bayes, decision tree, random forest, gradient boosting, xgboost, and extra trees classifier. Additionally, we also split the above dataset into two sets (i.e., train, and test) with an overall distribution of 70%, and 30% for the train (3500 data points), and test (1500 data points); respectively. Throughout, the study, we strictly followed all the ethical guidelines to ensure patient privacy and data protection rights with relevant regulations. The preliminary results showed that the proposed AI-based prediction model achieved a high accuracy for predicting DKA in children based on the above dataset. Although, the dataset contained more samples of normal children (i.e., 80.5%) than DKA-diagnosed children but still the prediction model performed very well in identifying the DKA in the children. The best-performing model from the models selected in the methods part was found to be the extra trees classifier with overall accuracy, precision, recall, f1-score, and MSE of 81%, 78%, 81%, 73%, and 18%. By integrating, the developed predictive model into the emergency department, the medical officers or healthcare professionals can predict different patients at risk very quickly by providing the input data of the patients on which the proposed AI-based prediction model is trained.