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## 1 Introduction: background, Motivation, Problem Statement

### Background:

Epilepsy is a significant neurological disorder affecting millions worldwide, including Pakistan. Despite its prevalence, there has been limited progress in developing models specifically tailored for epilepsy diagnosis in Pakistan. Existing systems often rely on international datasets, which do not reflect the local population's characteristics. Furthermore, no dedicated model exists to assist doctors in accurately diagnosing epilepsy using locally sourced EEG data.

### Motivation:

International healthcare systems use advanced models for real-time epilepsy prediction, enabling timely interventions. Inspired by these successes, we aim to create a similar system for Pakistan using local, non-public EEG data from Shalimar and Mayo Hospitals. This ensures the model is tailored to the local population, bridging a critical gap in healthcare and improving diagnosis accuracy.

### Problem Statement:

Current epilepsy diagnostic methods are manual and time taking. Existing models rely on international data, making them unsuitable for Pakistan's population. Our project aims to fill this gap with a localized, real-time solution and for the help of Young Doctors.

## 2 Detailed Literature Review

No.	Study	Year	Key Insight	Limitation	Relevance
1[1]	CNN-LSTM Detection	2023	Accurate detection	No real-time prediction	Highlights real-time need
2[2]	LSTM Prediction	2023	Real-time prediction	Limited to LSTM	Motivates integration
3[3]	Multi-Channel Detection	2021	DL on EEG data	No real-time collection	Supports local real-time data
4[4]	ML for Real-Time	2023	Explores ML techniques	Lacks implementation	Promotes localized models
5[5]	Early Prediction	2023	Focuses on early prediction	No integrated detection	Aligns with dual functionality

## Objectives

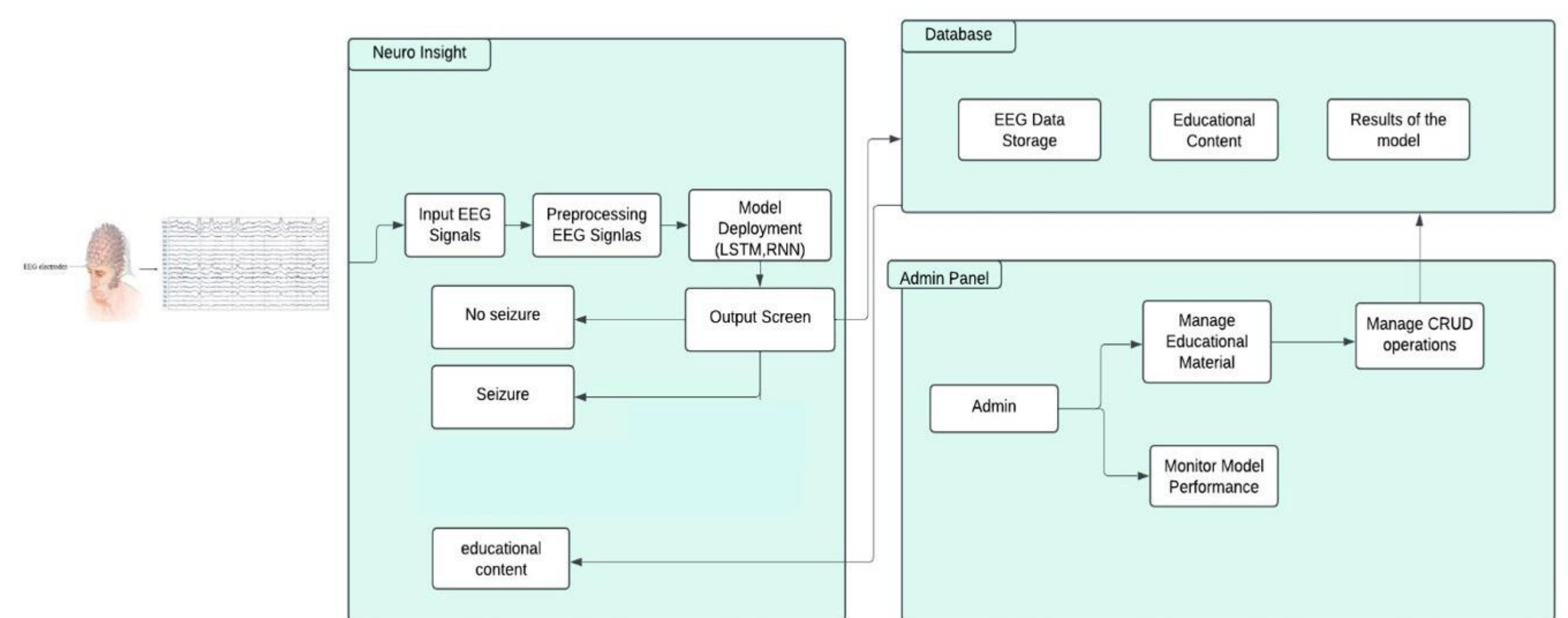
- ❑ Develop a seizure detection system using EEG data.
- ❑ Utilize deep learning models (RNN, LSTM) to enhance accuracy and efficiency.
- ❑ Collect and preprocess EEG data from local hospitals for model training.
- ❑ Create a user-friendly application to assist doctors in diagnosing epilepsy.

## 3 Features

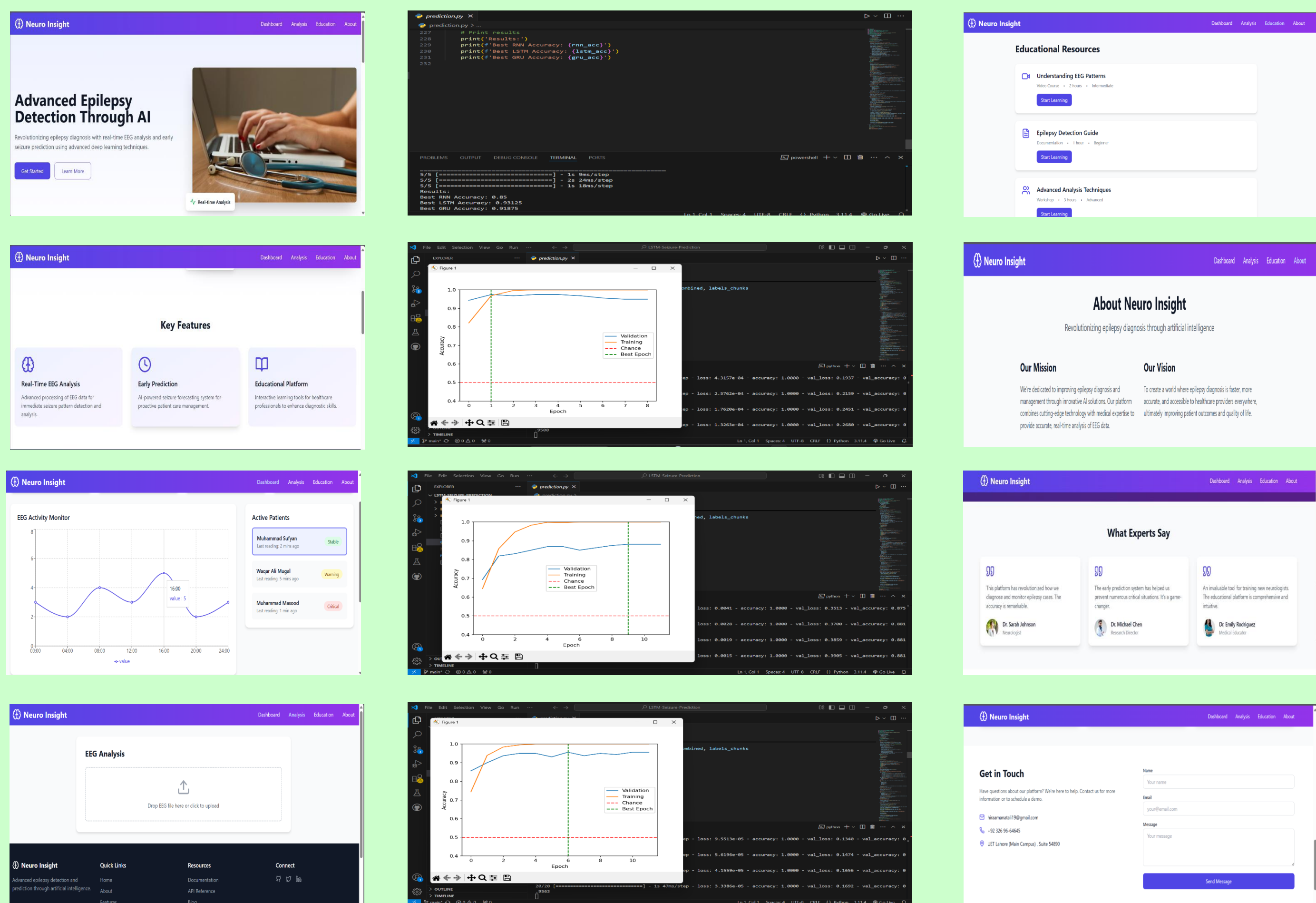
**Neuro Insight** is a deep learning-based system designed to assist doctors in diagnosing epileptic seizures using localized EEG data.

- ❑ Epileptic seizure detection using EEG data.
- ❑ Utilizes localized EEG data from Hospitals in Lahore.
- ❑ User-friendly interface for doctors to input and analyze EEG data.
- ❑ Integrates deep learning models (RNN, LSTM) for accurate diagnosis and prediction.
- ❑ Automates EEG analysis to reduce manual errors and save time.
- ❑ Provides educational support for doctors with diagnostic insights

## 4 System Architecture/ Approach/ System Design



## 5 Working Demo



## Conclusion

In conclusion, **Neuro Insight** represents a significant advancement in the field of epilepsy diagnosis. By integrating deep learning models with EEG data, the system provides healthcare professionals with an accurate, efficient, and automated tool for detecting seizures. The use of local data from local Hospitals ensures the system's relevance to the local population. With secure data handling and a user-friendly interface, Neuro Insight not only improves diagnostic accuracy but also serves as an educational resource for doctors, ultimately enhancing patient care and clinical outcomes.

## References:

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