**🦴 Spine Condition Prediction using Machine Learning**

**📖 Overview**

This project focuses on predicting **spinal conditions** using **machine learning models**. Spinal issues can significantly affect a person’s lifestyle, and early detection through data-driven insights can help in timely intervention and better treatment.

The dataset used in this project contains various biomechanical attributes related to the spine. By applying machine learning techniques, we aim to classify whether a person’s spine is **normal** or shows signs of **abnormalities**.

The application is deployed using **Streamlit** to provide an **interactive web interface**, making it easier for users to input values and get predictions instantly ⚡.

**🎯 Objectives**

* 🧾 Preprocess and clean the dataset for model building.
* 🤖 Train machine learning models to classify spinal conditions.
* 📊 Evaluate performance using metrics such as **accuracy, precision, recall, and F1-score**.
* 🌐 Deploy the model using **Streamlit** for real-world usability.

**⚙️ Features**

✅ Upload patient feature values and get prediction results.  
✅ Data preprocessing and feature selection for better performance.  
✅ Machine learning classification with multiple algorithms.  
✅ Interactive **Streamlit Web App** with easy-to-use UI.  
✅ Supports real-time predictions.

**📊 Dataset Information**

* **Source**: Spine dataset containing biomechanical features.
* **Target Column**: Class\_att (Normal or Abnormal)
* **Preprocessing**: Removed target column for feature-only dataset storage.

**🚀 Tech Stack**

* **Languages**: Python 🐍
* **Libraries**: pandas, numpy, scikit-learn, matplotlib, seaborn
* **Deployment**: Streamlit 🌐
* **Version Control**: GitHub 💻

**🧪 Model Training**

Several machine learning models were experimented with, including:

* 📌 Logistic Regression

The best-performing model was deployed for prediction in the web application.

**🌟 Future Improvements**

* Adding deep learning models for improved accuracy.
* Enhancing visualization with advanced analytics.
* Expanding dataset for better generalization.
* Deploying on cloud platforms like AWS/GCP for scalability.

**🤝 Contributing**

Contributions are welcome! 🎉

* Fork this repo
* Create a feature branch
* Submit a Pull Request 🚀

**📜 License**

This project is licensed under the **MIT License**.

🔥 Built with passion for **Machine Learning & Healthcare AI**.