**K8sAutoPilo: AI-Driven Kubernetes Failure Prediction**

**Overview**

K8sAutoPilo is an AI-driven failure prediction system for Kubernetes clusters. It leverages **Prometheus** for real-time data generation, a **Random Forest** model trained on historical failure datasets (generated via **LitmusChaos**), and predictive analytics to proactively identify potential failures.

**Key Features**

* **Real-time Data Collection:** Uses **Prometheus** to gather Kubernetes cluster metrics.
* **Failure Prediction Model:** Trained using historical datasets with **Random Forest**.
* **Automated Failure Detection:** Predicts failures and helps in proactive issue resolution.
* **Seamless Integration:** Directly processes Prometheus-generated data and predicts failures.

**Tech Stack**

* **Kubernetes** (for cluster management)
* **Prometheus** (for real-time metric collection)
* **LitmusChaos** (for generating historical failure datasets)
* **Random Forest Model** (for failure prediction)
* **Python, Pandas, Sklearn** (for data processing and ML model training)
* **Flask/FastAPI** (for API deployment)
* **Tkinter** (for visualization)

**Project Flow**

1. **Kubernetes Cluster Data** ➝ Collected using **Prometheus**.
2. **Data Loading** ➝ The collected data is directly fed into the model.
3. **Failure Prediction Model** ➝ Trained with **LitmusChaos**-generated failure datasets using **Random Forest**.
4. **Prediction Output** ➝ Model predicts possible failures.
5. **Result Visualization** ➝ Output is displayed using **Tkinter** or APIs.