LPS - Leptospirosis Diagnosis And Outbreak Prediction Using Machine Learning Techniques

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Problem Statement

Leptospirosis is a severe zoonotic bacterial disease that is often misdiagnosed due to its non-specific symptoms such as fever, headache, and muscle pain, which resemble dengue and malaria. In tropical countries like India, frequent flooding, poor sanitation, and environmental conditions increase infection risk. There is a lack of intelligent, early diagnostic systems and reliable outbreak forecasting tools to support clinicians and public health authorities in timely intervention.

Proposed Solution & Mechanism

We developed a dual-module machine learning-based web system for early diagnosis and outbreak prediction of leptospirosis.

➢ Patient clinical symptoms and laboratory results are entered → disease risk is predicted using XGBoost.

➢ Historical disease surveillance data is processed → future outbreak trends are forecasted using LSTM.

➢ Feature selection techniques (Chi-square & statistical tests) identify key contributing indicators.

➢ Monthly time-series analysis is performed for state-wise outbreak forecasting.

➢ A Flask-based web interface allows real-time prediction and visualization.

The system achieved **90.78% accuracy** in diagnosis with high precision and specificity.

Tech Stack Used

- ✓ Frontend & Backend : Flask (Python), HTML, CSS, JavaScript
- ✓ ML Model (Diagnosis) : XGBoost Classifier
- ✓ Deep Learning Model (Outbreak) : LSTM (Long Short-Term Memory)
- ✓ Data Processing : Pandas, NumPy, Scikit-learn
- ✓ Visualization : Matplotlib
- ✓ Dataset Sources : Sri Lanka clinical dataset (diagnosis), IDSP dataset (outbreak forecasting)
- ✓ Feature Selection : Chi-square test, statistical p-value testing
- ✓ Deployment & Tools : GitHub, JSON, Pickle

Demo Link (Linkedin)

https://www.linkedin.com/posts/ssrinidhi18112004_leptospirosis-diagnosis-and-outbreak-prediction-activity-7421596810705801217-MdGT?utm_source=share&utm_medium=member_desktop&rcm=ACoAAD5-vP8BKQe8faYSG7c_K3JlJ7Gf7ZWmTck