Time Series: Vital Signs Monitoring

Modeling ICU vital signals (HR, BP, SpO2) with RNN/LSTM/Transformer for deterioration prediction

Key Vital Signs

Monitored vital signs

- Heart Rate (HR): Beats per minute
- Blood Pressure (BP): Systolic/Diastolic
- Oxygen Saturation (SpO2): Blood oxygen
- Respiratory Rate (RR): Breaths per minute

Time Series Characteristics

Temporal patterns of vital signals

- Irregular sampling intervals
- Missing values (sensor errors)
- Trends and periodicity
- Abrupt changes (events)

Deep Learning Models

Time series prediction architectures

- LSTM: Long-term dependencies
- GRU: Lightweight recurrent network
- Temporal CNN: Dilated convolutions
- Transformer: Attention-based

Multimodal Integration

Vital signals and other data

- Vitals + Laboratory tests
- Vitals + Medication records
- Vitals + Clinical notes
- Time alignment required

Early Sepsis Warning

Cardiac Arrest Risk Prediction

ICU Length of Stay Estimation