# Problem Statement

## Innovative Monitoring System for TeleICU Patients Using Video Processing and Deep Learning

- ➢ Overview: The critical need for continuous, real-time monitoring in Intensive Care Units (ICUs).
- ➢ Challenges:
  - ❖ Limited availability of specialist care in remote locations.
  - ❖ Reliance on manual monitoring which can lead to delayed interventions.
  - ❖ Difficulty in continuously tracking patient vitals and behaviors.

➢ **Impact: Inefficient monitoring can lead to missed critical health events, impacting patient outcomes.**

## Unique Idea Brief (Solution)

- **Solution: An innovative monitoring system that uses video processing and deep learning to continuously analyze patient conditions in TeleICU settings.**
- **Core Concept: Leveraging AI to enhance traditional monitoring methods by providing real-time insights into patient movements, facial expressions, and vital signs.**

## Features Offered

- **Real-Time Monitoring: Continuous analysis of video feeds to monitor patient conditions.**
- **Pose Estimation: Detection of patient movements and posture using pose estimation models.**
- **Facial Expression Analysis: Interpretation of facial expressions to identify pain or discomfort.**
- **Vital Signs Estimation: Non-invasive estimation of heart rate from video feeds.**
- **Alert System: Automated alerts for caregivers based on detected anomalies.**

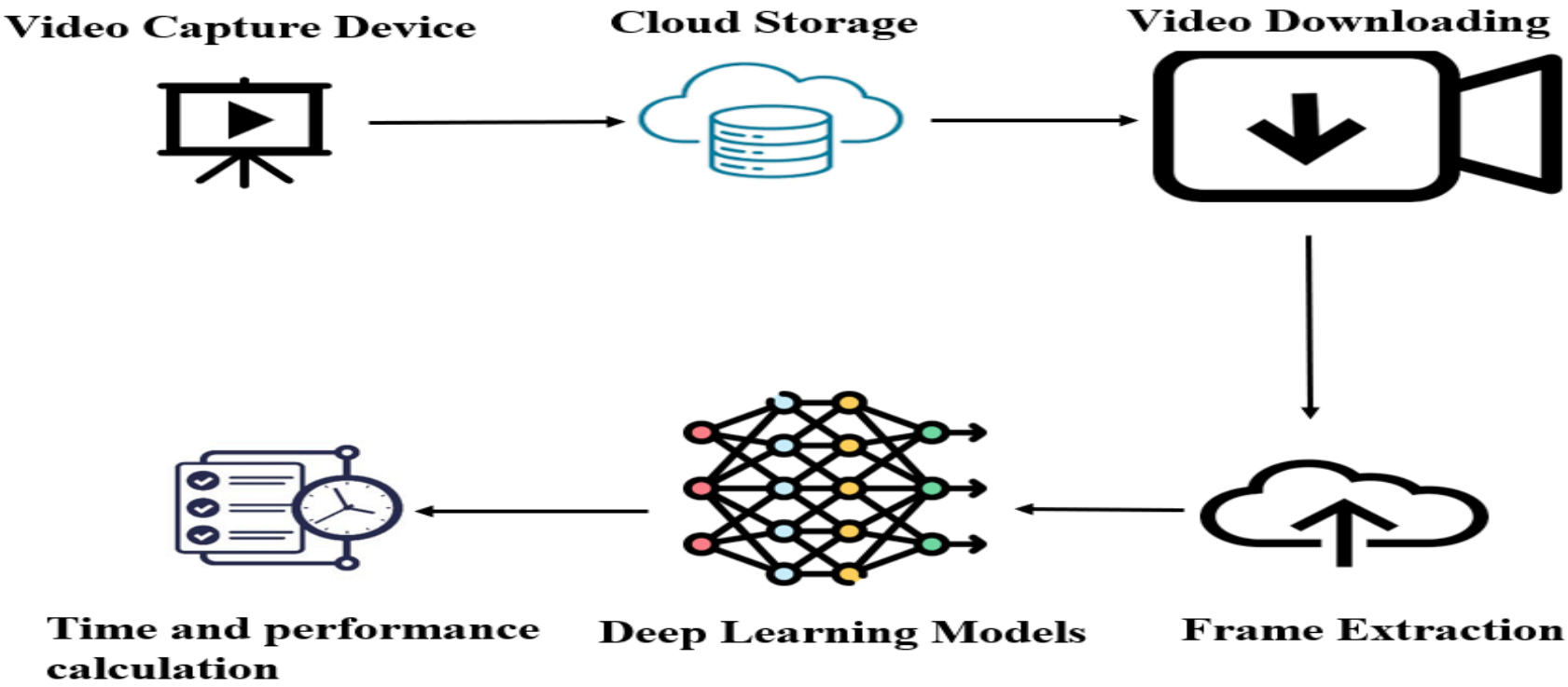
# Processflow

- ★ **Step 1: Video Capture**
  - **Continuous video feed from cameras installed in the ICU.**
- ★ **Step 2: Video Downloading**
  - **Download video files from cloud storage (e.g., Google Drive).**
- ★ **Step 3: Frame Extraction**
  - **Extract frames from video files for further processing.**
- ★ **Step 4: Pose Estimation and Facial Expression**

## Analysis

- Analyze extracted frames using deep learning models.

# Architecture Diagram



# Technologies used

- Programming Language: Python
- Libraries:
  1. `OpenCV` for video processing.
  2. `requests` for downloading files.
  3. `os` for file handling.
  4. `time` for performance measurement.
- Software used :VS code
- Deep Learning Frameworks: TensorFlow and Keras
- Pre-Trained Models:

  Custom pose estimation model

- **Hardware: Standard computing hardware with optional GPU acceleration for improved performance**

## Contribution:

- **To Healthcare:**
  - ➢ Enhanced patient monitoring, leading to quicker response times and improved patient outcomes.
  - ➢ Reduced workload for medical staff by automating routine monitoring tasks.
- **To Technology:**
  - ➢ Application of advanced video processing and deep learning techniques in a critical care environment.
  - ➢ Development of a comprehensive and scalable

**solution for remote patient monitoring.**

# Conclusion

The project demonstrates the feasibility and benefits of using video processing and deep learning for monitoring TeleICU patients.This further encourages for future research and development in this field to enhance TeleICU systems and improve patient care.

**Thank you**

**Regards~ Sushmitha S**