

Problem Statement

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

Category: Artificial Intelligence, Machine Learning, Deep Learning, Healthcare, Video Processing


Description: TeleICU is concept for monitoring ICU patients from remote locations to reduce the burden of on-site intensivist. Currently there are multiple products available in this domain where one profession seating at remote location physically monitors one or two remote patients in TeleICU. The proposed solution should work to reduce the burden of remote health care professional so, one remote health care professional can monitor 5 or more patients at single time.

Unique Idea Brief (Solution)


1. The first step I took was completing the setup of all ICU equipment in the tele-ICU room.
2. These are high-resolution devices equipped with cameras to monitor patients 24/7.
3. The concept of the tele-ICU involves one person monitoring the patients remotely and notifying the doctor or nurse as needed.
4. The problem statement mainly involves assisting patients in remote locations.
5. The goal is to utilize computer vision to identify patient conditions through video feeds from the tele-ICU cameras, without relying on audio.
6. To begin, I watched a few YouTube videos, such as "ICU SEASON," and used these videos as data sets for the tele-ICU camera.

7. I downloaded the video, installed the necessary libraries, and extracted frames from the video, storing them in a folder named "ICU_season_frames."
8. After extracting the frames, I trained a model and organized the frames into folders named "train"(no.of images 1013), "val"(no.of images 123) and testset(no.of images 62) for training and validation purposes.
9. I also categorized certain frames into three distinct groups: doctor, nurse, patient, and family member.
10. Converted the frames to images and those images were annotated as bounding box using "AnyLabelling" tool.
11. Trained a model based on yolo model version V10 then validated the results
12. The results were validated to identify the required classes

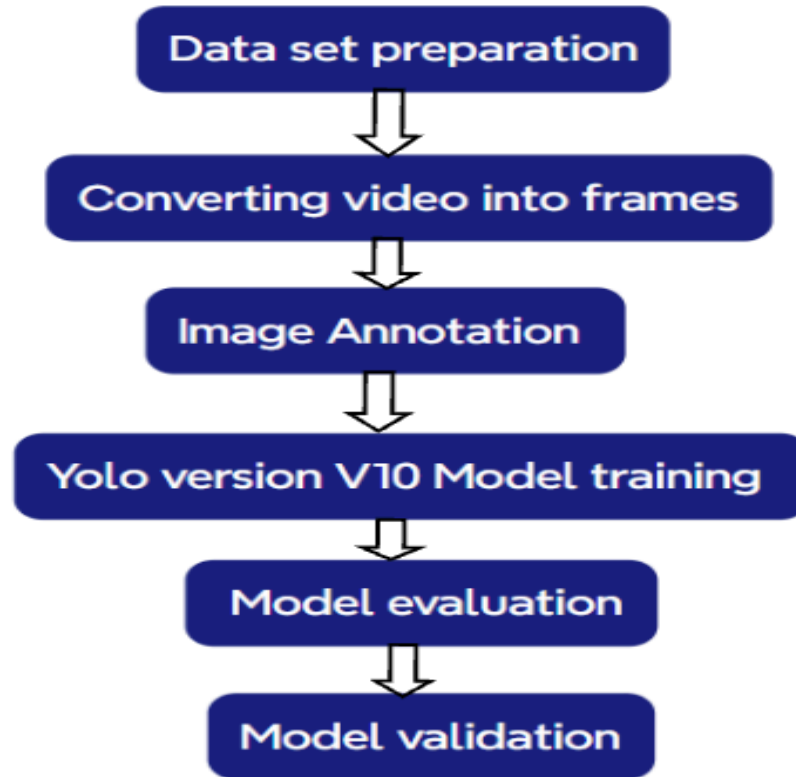
Features Offered

- Real time detection of tele ICU members
 - Concepts in Machine Learning
 - Video Processing
 - Programming Skills (Python)
 - Deep Learning - Train/Validate/Test with Data
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Process flow

- 1. Data set preparation**
 - 2. Converting video into frames**
 - 3. Image Annotation**
 - 4. Yolo version V10 Model training**
 - 5. Model evaluation**
 - 6. Model validation**
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Architecture Diagram



Technologies used-

- Colab ide
 - Programming language used- Python
 - Frame extractor
 - AnyLabelling -image annotation
 - GitHub - for uploading all the details of project
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Team members and contribution:

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Conclusion

The trained model is capable of providing real-time identification of persons in the ICU room. This model can further be deployed to get the real-time camera feed for easy identification.

Thus, making the remote monitoring of ICU is possible.
