

Chapter 4

A Transparency System for ICU Using Machine Learning and AI

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ABSTRACT

Patients in ICUs risk death. Years of opacity, miscommunication, and lack of real-time oversight have compounded medical errors and damaged stakeholder trust in this vital situation. The new ICU transparency system uses AI and deep learning to fix these concerns. Healthcare providers and patients face many unknowns. Medication errors, unmonitored vital signs, and lack of real-time medical data have harmed patient care and confidence. The ICU transparency system handles them well. This novel method offers real-time monitoring, accurate medication recording, and transparency. Guardians and healthcare providers can quickly access patient data for decisions. Vital sign analysis employing AI-driven algorithms detects health issues early. A transparent, collaborative, error-reducing healthcare environment boosts confidence and saves lives. The authors revisit systemic issues and the AI-powered critical care transformation approach in this study.

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1. INTRODUCTION

In today's time in the field of hospitals and healthcare, there is a lack of transparency between patients, guardians, doctors and hospital management (van Doorn et al., 2021). Therefore it is the need of the hour that a necessary system of transparency should be implemented such that it ensures transparency amongst everyone and maintains trust and integrity for the hospital system. Object detection using machine learning is a sophisticated computer vision approach that empowers models to identify and locate objects within images or video frames. Unlike simple image classification, object detection provides more granular information by not only categorizing objects but also delineating their precise positions in the image. The process begins with a meticulously labelled dataset containing annotated objects, specifying their class and bounding box coordinates (Aznar-Gimeno et al., 2021). Machine learning models, often leveraging Convolutional Neural Networks (CNNs) for feature extraction, are trained on these datasets. Various model architectures, such as Faster R-CNN, YOLO, and SSD, employ different strategies to balance accuracy and speed. The ultimate goal is to predict bounding boxes around detected objects, indicating their spatial presence in the image. This technology finds applications in diverse fields, including autonomous vehicles, surveillance, and image-based medical diagnostics, offering a versatile and powerful tool for real-world object identification tasks.

2. RESEARCH QUESTIONS

RQ1: What is the need for a transparent system?

There are many irregularities in private hospitals, which include visit timings, poor and irregular usage of medical facilities, improper usage of medicines, lack of data integrity and unsatisfied patient's guardians. A transparent system is essential to address numerous irregularities prevalent in private hospitals. These irregularities encompass a range of issues, from inconsistent hospital visit timings to the inefficient and irregular utilization of medical facilities, as well as the improper administration of medicines (Zhang et al., 2020). Moreover, the lack of data integrity further exacerbates these challenges, compromising patient care and overall healthcare outcomes. Additionally, unethical practices geared solely towards financial gains undermine the trust between healthcare providers and patients. Therefore, implementing transparency within hospital operations is crucial to ensure accountability, enhance patient safety, and uphold the integrity of the healthcare system.

RQ2: How will it impact patients?

Patients should be guaranteed straightforwardness between specialists, healing centres and themselves. Hence, they are guaranteed a legitimate treatment when conceded in an ICU. In this manner, they do not have a feeling of doubt and cheating by clinic authorities. Patients must be ensured straightforwardness within the intuitive between specialists, clinics, and themselves to instill certainty in accepting appropriate treatment, particularly when conceded to an ICU (Luo et al., 2022). This confirmation makes a difference in annihilating sentiments of doubt and the doubt of being abused by healing centre specialists. Straightforwardness cultivates a sense of security, empowering patients to believe that their well-being is prioritized over all else. By advancing open communication and clarity in therapeutic methods and charging phones, patients can feel engaged and consoled amid their healthcare travel, eventually driving to make strides in understanding results and upgrading in general fulfilment with the healthcare framework.

RQ3: How will it impact hospitals and doctors?

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