Submission Summary

Conference Name
Fourth International Conference on Computing, Communication, Security and Intelligent Systems (IC3SIS 2026)

Paper ID
753

Paper Title
Clinical Scan Support System (CSSS): MobileNetV2-Based Multi-Class Medical Image Classification with Role-Enforced Human-in-the-Loop Clinical Workflow and Automated PDF Reporting

Abstract
Background/Aim: Radiological diagnostic workflows are fragmented across disconnected clinical roles, causing delays between AI inference and patient report delivery. This paper presents the Clinical Scan Support System (CSSS), a full-stack web platform that integrates a MobileNetV2 deep learning classifier within a structured four-role clinical pipeline with automated PDF diagnostic report generation and SMTP email delivery.
Methods: MobileNetV2 was trained with transfer learning on 217,875 images spanning six disease classes assembled from three publicly available datasets, split 70/15/15 using strati f ied sampling (seed=42). Training preprocessing used Keras ImageDataGenerator (rescale 1/255, rotation 10°, zoom 0.1, horizontal flip); inference preprocessing uses OpenCV with bilinear resize to 224×224 and float32 normalization. The classification head is: GlobalAveragePooling2D → Dense(128, ReLU) → Dense(6, Softmax). Training used Adam (α = 10−4), categorical cross-entropy, batch size 16, EarlyStopping (patience=3). The backend uses RESTful Web Services (Python 3.10), the frontend RESTful Web Services 14, and security uses JWT (HS256, 60min), bcrypt, and OTP two-factor authentication.
Results: The model achieved 89.51% test accuracy, macro averaged sensitivity 0.891, specificity 0.978, precision 0.885, and F1 0.887. Inference averaged 0.73s on CPU. All ten functional test scenarios passed.
Conclusions: CSSS demonstrates that clinical AI deployment can be achieved with open-source tools while maintaining patient safety through mandatory multi-stakeholder verification and confidence thresholding at τ = 0.75.
Index Terms—Medical image classification, MobileNetV2, transfer learning, COVID-19 detection, sensitivity, specificity, human-in-the-loop, role-based access control, automated PDF reporting, confidence thresholding, RESTful Web Services.

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Primary Subject Area

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Submission Files

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