



Thesis Project Form

Title (tentative): Development and validation of an Artificial Intelligence model for the automatic assessment of image quality in low-dose chest radiography in premature infants

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Description

Motivation and application domain

Chest X-rays in premature infants require a delicate balance between reducing radiation doses and maintaining diagnostic quality. The absence of objective and reproducible metrics for assessing image quality limits the optimisation of protocols. Artificial Intelligence offers advanced tools for automatic, standardised and clinically relevant assessment, applicable in paediatric imaging and radiation protection.

General objectives and main activities

The overall objective of the thesis is to design, train and validate an Artificial Intelligence model capable of automatically estimating the diagnostic quality of AP chest X-ray images acquired at bedside in premature infants, in a real clinical setting at a paediatric IRCCS (Scientific Institute for Research, Hospitalisation and Healthcare). The work involves: (i) analysing DICOM data and quality scores assigned by expert radiologists; (ii) defining image-based features and/or training supervised deep learning models using the composite quality score as a reference; (iii) evaluating the model's performance in terms of accuracy, robustness and generalisability; (iv) analysis of the impact of dose, additional filtration and clinical factors on model estimates, with the aim of supporting the optimisation of low-dose radiological protocols.

Training Objectives (technical/analytical tools, experimental methodologies)

Students will acquire advanced skills in medical image analysis, artificial intelligence applied to healthcare, and clinical data management. They will also develop skills in integrating computational models, clinical assessment, and radiation protection in paediatrics.

Place(s) where the thesis work will be carried out: DIBRIS - Istituto Gaslini

Additional information

Maximum number of students: 2