

1. Record Nr.	UNISA996558469503316
Titolo	Clinical Image-Based Procedures, Fairness of AI in Medical Imaging, and Ethical and Philosophical Issues in Medical Imaging : 12th International Workshop, CLIP 2023 1st International Workshop, FAIMI 2023 and 2nd International Workshop, EPIMI 2023 Vancouver, BC, Canada, October 8 and October 12, 2023 Proceedings // Stefan Wesarg [and nine others], editors
Pubbl/distr/stampa	Cham, Switzerland : , : Springer, Springer Nature Switzerland AG, , [2023] ©2023
ISBN	3-031-45249-6
Edizione	[First edition.]
Descrizione fisica	1 online resource (327 pages)
Collana	Lecture Notes in Computer Science Series ; ; Volume 14242
Disciplina	610.28563
Soggetti	Artificial intelligence - Medical applications Diagnostic imaging Diagnostic imaging - Data processing
Lingua di pubblicazione	Inglese
Formato	Materiale a stampa
Livello bibliografico	Monografia
Nota di bibliografia	Includes bibliographical references and index.
Nota di contenuto	Intro -- Additional Editors -- CLIP Preface -- CLIP Organization -- FAIMI Preface -- FAIMI Organization -- EPIMI Preface -- EPIMI Organization -- Contents -- CLIP -- Automated Hand Joint Classification of Psoriatic Arthritis Patients Using Routinely Acquired Near Infrared Fluorescence Optical Imaging -- 1 Introduction -- 2 Background -- 3 Method -- 4 Results -- 5 Discussion and Future Work -- References -- Automatic Neurocranial Landmarks Detection from Visible Facial Landmarks Leveraging 3D Head Priors -- 1 Introduction -- 2 Methods -- 2.1 Datasets and Preprocessing -- 2.2 Models Training and Evaluation -- 3 Experimental Results -- 3.1 Neurocranial Landmark Coordinates Prediction -- 3.2 3DMM Validation -- 3.3 Ablation Study -- 4 Discussion and Conclusions -- References -- Subject-Specific Modelling of Knee Joint Motion for Routine Pre-operative Planning -- 1 Introduction -- 2 Method -- 2.1 Contact Surface Model of PF and TF Joint -- 2.2 Computation of Knee Flexion Angle -- 2.3 Matching Tibia and Patella Poses -- 3 Experiments and

Discussions -- 3.1 Evaluation of Generated Patella and Tibia Poses -- 3.2 Evaluation of Tibia and Patella Pose Matching -- 4 Conclusion -- References -- Towards Fine-Grained Polyp Segmentation and Classification -- 1 Introduction -- 2 Method -- 2.1 Swin Transformer Encoder -- 2.2 Multi-Scale Feature Enhancement -- 2.3 Patch-Expanding Decoder -- 2.4 Upsample Head -- 2.5 Loss Function -- 3 PolypSegm-ASH Dataset -- 4 Results -- 4.1 Experiments on PolypSegm-ASH -- 4.2 Experiments on Binary Polyp Segmentation -- 4.3 Ablation Study. Effect of Up-Samples Before Predictions -- 5 Conclusion -- References -- Automated Orientation and Registration of Cone-Beam Computed Tomography Scans -- 1 Introduction -- 2 Materials -- 3 Proposed Method -- 3.1 Automated Standardized Orientation (ASO) -- 3.2 Automated Registration (AREg). 3.3 Evaluation Metrics -- 3.4 Implementation -- 4 Results -- 4.1 Orientation -- 4.2 Registration -- 5 Discussion -- 6 Conclusion -- A Appendix -- References -- Deep Learning-Based Fast MRI Reconstruction: Improving Generalization for Clinical Translation -- 1 Introduction -- 2 Methods -- 2.1 Background -- 2.2 Physically-Primed DNN for MRI Reconstruction -- 3 Experiments -- 3.1 Dataset -- 3.2 Experimental Methodology -- 3.3 Results -- 4 Conclusions -- References -- Uncertainty Based Border-Aware Segmentation Network for Deep Caries -- 1 Introduction -- 2 Related Work -- 2.1 Dental Caries Image Segmentation -- 2.2 Uncertainty Quantification -- 3 Method -- 3.1 Border-Aware Network Using SDF -- 3.2 Uncertainty Based Caries Segmentation -- 4 Experiments and Discussion -- 4.1 Dataset and Settings -- 4.2 Verification of SDF Effectiveness -- 4.3 Verification of Model Robustness -- 5 Conclusion -- References -- An Efficient and Accurate Neural Network Tool for Finding Correlation Between Gene Expression and Histological Images -- 1 Introduction -- 2 Methodology -- 2.1 Data -- 2.2 Label Generation -- 2.3 CNN Training and Testing -- 2.4 Significance Testing and Gene Set Analysis -- 3 Results -- 3.1 Resnet Comparison -- 3.2 Significant Genes and Pathways -- 3.3 Correlations Between Model Performance and Data Properties -- 3.4 Comparison of Findings with Other Methodologies -- 4 Conclusions -- References -- FAIMI -- De-identification and Obfuscation of Gender Attributes from Retinal Scans -- 1 Introduction -- 1.1 Differential Privacy for Image Obfuscation -- 1.2 Deep Learning for Diabetic Retinopathy and Sex Classification -- 2 Materials and Methods -- 2.1 Dataset -- 2.2 Pre-processing -- 2.3 De-identification Framework -- 2.4 Evaluation Framework -- 3 Results -- 3.1 Full Image Snow Results -- 3.2 VS-Snow Results -- 4 Discussion -- 4.1 Privacy-Utility Tradeoff. 4.2 Importance of Vasculature -- 4.3 Limitations and Future Work -- References -- Unveiling Fairness Biases in Deep Learning-Based Brain MRI Reconstruction -- 1 Introduction -- 2 Background -- 2.1 Fairness Definitions -- 2.2 Source of Bias -- 3 Methods -- 4 Experimental Analysis -- 4.1 Dataset and Pre-processing -- 4.2 Implementation Details -- 4.3 Results -- 5 Discussion -- 6 Conclusion -- References -- Brain Matters: Exploring Bias in AI for Neuroimaging Research -- 1 Introduction -- 2 Current Problems -- 2.1 Structural Problems -- 2.2 Specific Biases -- 3 Mitigation Strategies -- 3.1 Collect More Representative Data -- 3.2 Share and Collaborate -- 3.3 Reduce Reliance on Inaccessible Data Collection Methods -- 3.4 Develop Both Generic and Specific Models and Employ Transfer Learning -- 3.5 Consider the Use of Data Augmentation -- 3.6 Raise Awareness of Bias and Engage in PPI -- 4 Limitations -- 5 Conclusion -- References -- Bias in Unsupervised Anomaly Detection in Brain MRI -- 1 Introduction -- 2 Materials and Methods -- 3 Experiments and Results -- 3.1

Baseline Performance -- 3.2 Impact of Bias -- 3.3 Sources of Bias -- 4
Conclusion -- References -- Towards Unraveling Calibration Biases in
Medical Image Analysis -- 1 Introduction -- 2 Numerical Experiments
on Real Data -- 2.1 Data -- 2.2 Model Training -- 2.3 Platt Scaling --
2.4 Performance Evaluation -- 2.5 Results -- 3 Synthetic Experiments
-- 3.1 Data -- 3.2 Performance Evaluation -- 3.3 Results -- 4
Discussion -- References -- Are Sex-Based Physiological Differences
the Cause of Gender Bias for Chest X-Ray Diagnosis? -- 1 Introduction
-- 2 Related Work -- 3 Methods -- 3.1 Datasets -- 3.2 Sampling
Strategy -- 3.3 Experimental Settings -- 4 Results -- 4.1 Model
Performance Across Diseases, Gender Ratios, and Datasets -- 4.2
Comparison of Different Sampling Strategies.
4.3 Breast Cropping Does Not Mitigate Gender Biases -- 4.4 Dataset
Bias v.s. Model Bias -- 5 Discussion and Conclusions -- References --
Bayesian Uncertainty-Weighted Loss for Improved Generalisability on
Polyp Segmentation Task -- 1 Introduction -- 2 Related Work -- 3
Method -- 4 Experiments and Results -- 4.1 Dataset and Experimental
Setup -- 4.2 Results -- 5 Conclusion -- References -- Mitigating Bias
in MRI-Based Alzheimer's Disease Classifiers Through Pruning of Deep
Neural Networks -- 1 Introduction -- 2 Materials and Methods -- 2.1
Data and Preprocess -- 2.2 Debiasing by Pruning -- 3 Experiment --
3.1 Implementation and Evaluation -- 3.2 Comparison -- 4 Result -- 5
Discussion and Conclusion -- References -- Auditing Unfair Biases in
CNN-Based Diagnosis of Alzheimer's Disease -- 1 Introduction -- 2
Materials and Methods -- 2.1 Data Description and Preprocessing --
2.2 Models -- 2.3 Bias Evaluation Metrics -- 3 Results and Discussion
-- 3.1 Auditing Fairness with Respect to Model Performance -- 3.2
Auditing Fairness with Respect to Model Calibration -- 4 Conclusions
-- References -- Distributionally Robust Optimization and Invariant
Representation Learning for Addressing Subgroup Underrepresentation:
Mechanisms and Limitations -- 1 Introduction -- 2 Assessing
Debiasing Mechanisms -- 2.1 Methodology -- 2.2 Experiments and
Results -- 3 Improving the Debiasing of Spurious Correlations --
References -- Analysing Race and Sex Bias in Brain Age Prediction -- 1
Introduction -- 2 Materials and Methods -- 2.1 Bias Analysis -- 3
Results -- 4 Discussion and Conclusion -- A Appendix -- References
-- Studying the Effects of Sex-Related Differences on Brain Age
Prediction Using Brain MR Imaging -- 1 Introduction -- 2 Materials and
Methods -- 2.1 Brain MR Datasets -- 2.2 Pre-processing -- 2.3 Brain
Age Prediction Task -- 2.4 Grad-CAM Interpretability.
2.5 Experimental Setting -- 3 Results -- 4 Discussion -- 5 Conclusion
-- References -- An Investigation into the Impact of Deep Learning
Model Choice on Sex and Race Bias in Cardiac MR Segmentation -- 1
Introduction -- 2 Materials -- 3 Methods -- 3.1 Dataset Sampling --
3.2 Model Architecture and Implementation -- 3.3 Model Evaluation --
4 Results -- 5 Discussion -- References -- An Investigation into Race
Bias in Random Forest Models Based on Breast DCE-MRI Derived
Radiomics Features -- 1 Introduction -- 2 Materials -- 3 Methods -- 4
Experiments and Results -- 4.1 Race Classification -- 4.2 Bias Analysis
-- 4.3 Covariate Analysis -- 5 Discussion and Conclusions --
References -- How You Split Matters: Data Leakage and Subject
Characteristics Studies in Longitudinal Brain MRI Analysis -- 1
Introduction -- 2 Methods -- 2.1 Data Collection and Processing -- 2.2
Training Setup -- 2.3 Evaluation Scheme -- 3 Result -- 4 Discussion
and Conclusion -- References -- Revisiting Skin Tone Fairness in
Dermatological Lesion Classification -- 1 Introduction -- 2 Methods
and Materials -- 2.1 Dataset -- 2.2 Evaluation of Skin Lesion
Classification -- 2.3 Skin Tone Estimation -- 3 Experiments and

Results -- 3.1 Comparison of ITA Estimation Methods -- 3.2 Fairness Analysis -- 3.3 Simulated Data Shifts -- 4 Conclusions -- References -- A Study of Age and Sex Bias in Multiple Instance Learning Based Classification of Acute Myeloid Leukemia Subtypes -- 1 Introduction -- 2 Materials and Methods -- 2.1 Data -- 2.2 Multiple Instance Learning -- 3 Experiments -- 3.1 Sex Bias -- 3.2 Age Bias -- 4 Results -- 4.1 Sex Bias -- 4.2 Age Bias -- 5 Discussion -- References -- Unsupervised Bias Discovery in Medical Image Segmentation -- 1 Introduction -- 2 Related Work -- 3 Unsupervised Bias Discovery via Reverse Classification Accuracy -- 4 Experiments and Discussion. 4.1 Synthetic Experiment: Validating RCA for UBD.

Sommario/riassunto

This book constitutes the refereed proceedings of the 12th International Workshop on Clinical Image-Based Procedures, CLIP 2023, the First MICCAI Workshop on Fairness of AI in Medical Imaging, FAIMI 2023, held in conjunction with MICCAI 2023, in October 2023, and the Second MICCAI Workshop on the Ethical and Philosophical Issues in Medical Imaging, EPIMI 2023. CLIP 2023 accepted 5 full papers and 3 short papers from 8 submissions received. It focuses on holistic patient models for personalized healthcare with the goal to bring basic research methods closer to the clinical practice. For FAIMI 2023, 19 full papers have been accepted from 20 submissions. They focus on creating awareness about potential fairness issues that can emerge in the context of machine learning. And for EPIMI 2023, 2 papers have been accepted from 5 submissions. They investigate questions that underlie medical imaging research at the most fundamental level. .
