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Preface (Trustworthy AI in medical imaging)

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Preface

The potential of artificial intelligence (AI) in medical imaging is vast. It promises to revolutionize healthcare delivery by augmenting clinicians' capabilities and improving patient outcomes. Through its demonstrated performance across a myriad of medical image analysis tasks, AI stands to speed up diagnosis and treatment planning, as well as to enable early disease detection, ushering in a new era of precision medicine and personalized care.

However, alongside its remarkable potential, AI in medical imaging carries many risks and challenges. Given that AI systems heavily rely on data for training, there is a concern regarding the emergence of algorithmic biases, which can potentially exacerbate existing healthcare disparities and compromise the quality of patient care. Moreover, the sensitive nature of medical images underscores the critical importance of privacy and governance, necessitating robust safeguards to prevent the occurrence of malicious attacks or inadvertent leakage of personal information. Furthermore, persistent concerns regarding the interpretability and accountability of AI algorithms have given rise to ethical dilemmas surrounding the dependence on opaque, black-box systems for making critical medical decisions. In response to this rising number of challenges, researchers and practitioners in academia and industry have focused on developing methods and guidelines to guarantee AI's reliable and trustworthy use.

These efforts are timely and greatly needed to promote the adoption and acceptance of AI in our healthcare. Indeed, Trustworthy AI addresses the important needs to deploy AI in real-world clinical applications by fostering confidence among clinicians, patients, stakeholders, and society at large. By developing trustworthy principles, researchers and developers can mitigate the risks associated with AI deployment, such as bias, discrimination, opacity, and security vulnerabilities. Moreover, trustworthy AI promotes collaboration between interdisciplinary fields, including computer science, ethics, law, and social sciences, fostering a comprehensive approach to AI aiming at a broader societal impact. Ultimately, advancing trustworthy AI enhances the reliability and effectiveness of AI systems and ensures that these technologies contribute positively to human well-being and societal progress.

As editors of the Medical Image Analysis journal, we are pleased to present this seminal work on Trustworthy AI in Medical Imaging. This book, a timely addition to the MICCAI/Elsevier book series, aims to provide a holistic perspective on the fundamental principles of trustworthy AI to a diverse audience comprising researchers, practitioners, clinicians, and industrial stakeholders engaged in the realm of AI-driven medical imaging.

Signed,

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