

LITHUANIAN COMPUTER SOCIETY

VILNIUS UNIVERSITY, INSTITUTE OF DATA SCIENCE AND DIGITAL TECHNOLOGIES

LITHUANIAN ACADEMY OF SCIENCES



16th Conference on

DATA ANALYSIS METHODS for Software Systems

November 27–29, 2025

Druskininkai, Lithuania, Hotel "Europa Royale"

<https://www.mii.lt/DAMSS>

VILNIUS UNIVERSITY PRESS

Vilnius, 2025

Co-Chairs:

Dr. Saulius Maskeliūnas (Lithuanian Computer Society)

Prof. Gintautas Dzemyda (Vilnius University, Lithuanian Academy of Sciences)

Programme Committee:

Dr. Jolita Bernatavičienė (Lithuania)

Prof. Juris Borzovs (Latvia)

Prof. Janusz Kacprzyk (Poland)

Prof. Ignacy Kaliszewski (Poland)

Prof. Božena Kostek (Poland)

Prof. Tomas Krilavičius (Lithuania)

Prof. Olga Kurasova (Lithuania)

Assoc. Prof. Tatiana Tchemisova (Portugal)

Assoc. Prof. Gintautas Tamulevičius (Lithuania)

Prof. Julius Žiliškas (Lithuania)

Organizing Committee:

Dr. Jolita Bernatavičienė

Prof. Olga Kurasova

Assoc. Prof. Viktor Medvedev

Laima Paliulionienė

Assoc. Prof. Martynas Sabaliauskas

Prof. Povilas Treigys

Contacts:

Dr. Jolita Bernatavičienė

jolita.bernataviciene@mif.vu.lt

Prof. Olga Kurasova

olga.kurasova@mif.vu.lt

Tel. (+370 5) 2109 315

Copyright © 2025 Authors. Published by Vilnius University Press.

This is an Open Access article distributed under the terms of the Creative Commons Attribution Licence, which permits unrestricted use, distribution, and reproduction in any medium, provided the original author and source are credited.

<https://doi.org/10.15388/DAMSS.16.2025>

ISBN 978-609-07-1200-9 (digital PDF)

© Vilnius University, 2025

Quantum Machine Learning for Image Classification in Healthcare: Algorithms, Applications, and Future Prospects

Sasan Ansarian, Remigijus Paulavičius, Ernestas Filatovas

Institute of Data Science and Digital Technologies
Vilnius University

sasan.ansarian@mif.vu.lt

One of the incentives for quantum machine learning (QML) is its potential to achieve significant computational advantages, such as exponential speedups and improved accuracy, over classical machine learning (ML) by using quantum phenomena. QML goals to solve problems too complex for classical computers, enabling richer data representations, more efficient algorithms, and the ability to tackle large, high-dimensional datasets. This could revolutionise in fields of medical image analysis, enabling through advanced simulations, improving the accuracy and speed of analysis, and creating more precise predictive models for disease spread and patient outcomes. In this work, we systematically review studies published between 2020 and 2025 that apply QML, identified through database searches and screened using PRISMA guidelines. The review analyses the evolution of QML datasets and evaluation strategies used in this field, highlighting their strengths and limitations. Preliminary findings illustrate that most applications remain at the proof-of-concept step and are constrained by limited quantum hardware and dataset availability. To advance the field toward clinical relevance, this work identifies key research priorities, including the development of standardised, quantum-ready image datasets, unified evaluation protocols, hybrid quantum-classical model optimisation, and the co-design of algorithms and hardware. Focusing on these areas will make it clear that QML provides valuable benefits for diagnostics, personalised care, and healthcare operations.

Acknowledgements. This research was funded by the Research Council of Lithuania under Grant Agreement No. S-ITP-25-5.