MSc Project-User Interface Design for Multi-Role Breast Cancer Screening Workflows Based on Elastography

Record number : OPR-1456

Overview

RESEARCH DIRECTION

Jean-Baptiste Michaud, Professeur - Department of Electrical and Computer Engineering

INFORMATION

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ADMINISTRATIVE UNIT(S)

Faculté de génie
Département de génie électrique et de génie informatique

LEVEL(S)

2e cycle

LOCATION(S)

Centre de recherche du CRCHUS
Campus de Sherbrooke

Project Description

Contexte
Breast cancer is the most commonly diagnosed cancer among women worldwide, with approximately 2.3 million new cases each year. While early detection remains the most effective way to improve survival rates, current screening methods still face significant challenges related to cost, accessibility, and patient comfort.
BRAVE (BRA-based ViscoElastography) is an innovative technology developed at the University of Sherbrooke that generates three-dimensional breast stiffness maps using a conventional bra and an optical imaging system. This approach is non-invasive, free of ionizing radiation, does not require breast compression, and eliminates direct contact with the patient.

Research project
The research team led by Prof. Jean-Baptiste Michaud, in collaboration with Prof. Elijah Van Houten and Prof. Valérie Grandbois, has secured technology maturation funding to advance the BRAVE prototype toward a robust, scalable, and industry-ready software platform for clinical translation and future commercialization.
This initiative aims to modernize the platform's software architecture, incorporate advanced artificial intelligence methodologies, and ensure compliance with the regulatory and quality requirements governing medical device technologies.

Proposed activities
In close collaboration with end users, the technology development team, and patient partners, the student will contribute to the following activities:
• Elicit, analyze, and formalize requirements across multiple use cases through stakeholder engagement, considering cognitive and technological ergonomics, user needs, and varying levels of digital literacy.
• Design and develop graphical user interfaces tailored to different user roles, including technology developers, data acquisition personnel, patients, data managers, healthcare professionals, biostatisticians, and other stakeholders.
• Develop and manage real-time data streams from multiple sources, including images, videos, and other multimodal data.
• Design appropriate visualization tools and interface components for a variety of intermediate data formats and analytical outputs.
• Ensure effective communication and integration among the different software modules and intelligent agents within the system.
• Implement and manage authentication, authorization, and access control mechanisms.

• Conduct user testing and validation activities with stakeholders to evaluate and refine the interfaces, ensuring an optimal user experience and high adoption potential.

Supervision and research environment
The project will be carried out at the Université de Sherbrooke under the supervision of Prof. Jean-Baptiste Michaud, in collaboration with Prof. Elijah Van Houten and Prof. Valérie Grandbois. The selected candidate will join a multidisciplinary team spanning the Faculty of Engineering and the Centre de recherche du CHUS (CRCHUS), bringing together expertise in software engineering, artificial intelligence, biomechanics, medical imaging, and technological innovation.

Candidate Profile
• B.Sc. in Software Engineering, Computer Science, Computer Engineering, Artificial Intelligence, or a related field.
• Strong interest in medical technologies, artificial intelligence, data processing, and applied research environments.
• Experience in software architecture and the development of complex software systems.
• Knowledge of software lifecycle management practices.
• Excellent written and verbal communication skills in either French or English.
• Demonstrated ability to work independently, apply scientific rigor, and collaborate effectively within a multidisciplinary team.
• Assets: Experience working in regulated environments or in the development of software solutions for healthcare and medical device applications.

Application
Please submit a cover letter, curriculum vitae (CV), and the contact information of two references to Jean-Baptiste.Michaud@USherbrooke.ca.
Subject line: Application – BRAVE -MSc project
Duration: 12 to 15 months

Discipline(s) by sector

Sciences naturelles et génie

Génie informatique et génie logiciel

Funding offered

To be discussed

Partner(s)

Centre de recherche du CHUS - CRCHUS

The last update was on 19 October 2026. The University reserves the right to modify its projects without notice.