Huron Digital Pathology partners with the University of Toronto and Ontario Hospitals to build transformative, AI-powered tools for Province's pathology infrastructure.

While scientists rapidly develop our understanding of gastrointestinal (GI) and neurological disorders, these advances can make diagnoses more complex and time intensive. Given the overall burden of these diseases, how can healthcare providers leverage the power of Artificial Intelligence to reduce turnaround times for testing and ultimately improve patient outcomes?

Huron Digital Pathology (Huron) is helping to address this question with a group of researchers at the University of Toronto (U of T) in collaboration with researchers from the University Health Network (UHN), St. Michael's Hospital, Queen's University, and the University of Waterloo.

The group will scale an existing Atlas of Digital Pathology database, jointly developed by Huron and U of T, to include a range of healthy and diseased GI and neurological tissues. It will then train Artificial Intelligence (AI) and Machine Learning (ML) algorithms on image recognition and annotation and engage pathologists from the participating hospitals to verify results. From there, the project aims to develop a suite of Computational Aided Diagnostic (CAD) tools that can be efficiently deployed in hospitals in Ontario and worldwide.

In September 2022, the group was awarded $1,477,381 (approx. $1.5 million) by the Ministry of Colleges and Universities Ontario Research Fund - Research Excellence (ORF-RE) program.

"The project delivers innovation and addresses current challenges by synergistically integrating pathology domain knowledge with cutting-edge AI research. It builds on, adapts, extends, and scales up AI methodologies for digital pathology developed and successfully demonstrated by the group. It will help build a cost-effective workflow for Ontario hospitals." says Professor Konstantinos N. Plataniotis, the principal investigator of the study and Director of the Multimedia Lab and Professor at U of T's Department of Electrical and Computer Engineering.

The project ensures that new tools are suited for clinical environments. For example, screening technology may identify quality issues with slide preparation or imaging. At the same time, a triage tool will help identify initial assessments and gather similar cases to reduce turnaround times for reports, reducing hospital stays. Ultimately, the project aims to create a universally intelligent diagnostic system that can classify the type and severity of a disease based on tissue presentation.

"To uncover the potential of AI in the clinical realm, it is crucial to develop its understanding of the range of 'normal' so that it can learn to differentiate normal from the 'abnormal' regions on any tissue biopsy. We are undertaking this mammoth task using clinical patients' GI and Neurological tissue samples. This is like training AI as you would start with a 1st-year pathology resident doctor. Bringing AI into routine clinical practice has implications for making healthcare more efficient and broadly accessible and providing expert care to remote locations. This has never been more imperative than in the current healthcare climate with increasing workloads, burn-out and limited resources." says Sonal Varma MD, Associate Professor at Queen's University School of Medicine, Department of Pathology and Molecular Medicine.

Huron Digital Pathology, a provider of digital pathology solutions, will contribute funds and expertise to the project by focusing on how AI can offer novel applications and services for clinicians. As Canada's only manufacturer of digital scanners for pathology, this project represents a significant opportunity for the country's participation in global healthcare technology. *"Huron is very excited to participate in this project. Huron's mission is to use its advanced technology to develop scanners and AI software tools to help pathologists identify cancerous diseases and increase efficiency in their diagnosis. This project advances Huron's mission."* Savvas Chamberlain, Chairman of the Board of Huron Digital Pathology.