

2021 Projects

Version 1

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- **Computer-Assisted Strategies for Long-form Text Reading (*Funded by Natural Sciences and Engineering Research Council of Canada (NSERC)*):**

Located in Toronto, Quillsoft Ltd. is a leader in assistive technology software that helps people read and write. Founded by Dr. Fraser Shein in 2000, in partnership with Holland Bloorview Kids Rehabilitation Hospital, Quillsoft's products, including WordQ, are used by more than 2.5 million end users, primarily in the education field. While WordQ and other competing solutions primarily focus on writing, Quillsoft consistently hears from educators that students struggle with text comprehension. As a result, teachers have repeatedly requested a true comprehension solution at the discourse level (i.e. understanding cause-and-effect, argumentation, etc.) Quillsoft sees a business opportunity in developing a text comprehension technology that would address this market need.

The key characteristic of this solution is its broad range of tools that support various active reading strategies, making it truly unique. With its ability to extract, group/cluster, organize and visualize key concepts, this goes beyond facilitating copying, paraphrasing and referencing text that the student may or may not understand.

Building on the previous collaboration with Seneca, Quillsoft is partnering again with **Asma Paracha**, Professor, School of Software Design & Data Science, and her team to advance the technology to the point where the software can be deployed (Alpha-release) to a select number of outside users for early testing and feedback. Once fully developed, this new and unique text comprehension solution will enable Quillsoft to increase and diversify its revenue stream and increase market penetration.

- **Development of Decentralized Applications (DAPPS) and Smart Contract-Based Governance Workflows for Digital Agriculture Analytics (*Funded by NSERC*):**

Sightline Innovation (SI) is a privately held Canadian company with patented, DataTrust technology and an applied artificial intelligence platform that enables enterprises to control access to their data, derive value from data and gain better insight from existing

data sources in real-time, across multiple business units. The field of digital agriculture (the use of electronic data to support the agriculture supply chain) has recently produced a number of imperfect, data-backed solutions to reducing costs and improving agricultural yields and disease resistance. However, concerns about intellectual property (IP) and data ownership confound collaboration between companies, academics and farms.

SI will partner with **Seneca's School of Software Design & Data Science** to develop tools, which will facilitate collaborative, digital agriculture projects, by developing a blockchain-based governance structure to fund, manage, monetize, license and distribute value to digital agriculture stakeholders, while protecting their data and IP.

Led by **Tanvir Alam**, a professor in the school, student Research Assistants from **Seneca's Honours Bachelor of Data Science and Analytics degree program** will apply their academic knowledge and skills to understand the digital agriculture field and develop a blockchain-backed access system to integrate with SI's Datatrust platform (DTaaS). Ultimately, SI will utilize the system developed in the course of this project to attract customers and enable use of DTaaS in the digital agriculture field.

- **Developing a Deep-Learning Volunteer Computing Platform (*Funded by NSERC*):**

Established in 2017, Featuremine Corporation, is a Toronto-based financial technology company developing flexible digital tools utilizing the power of Machine Learning (ML). The company provides a comprehensive ecosystem for quantitative research and trading, enabling competitive efficiencies with deployment of Artificial Intelligence (AI) concepts into investment strategies. One of the barriers to market adoption of such tools that the company identified is the computing cost required to support ML-enabled products. As it is typical for AI-based solutions, algorithm training requires substantive computing power, making the development, deployment and operational maintenance of such products very costly, and increasingly prohibitive for new entrants and small-medium-enterprises (SMEs) in this market segment.

In order to reduce this barrier, Featuremine is partnering with **Mark Shtern**, Professor, Seneca's School of Information Technology Administration & Security, to research and develop a secure volatile computing framework that will enable the development and commercialization of Featuremine's new Deep Learning product for financial markets.

- **Development of a Universal Medical Form Reader (*Funded by NSERC*):**

Founded in 1994 and based in Markham, Ont., York Card Technology Inc. is a digital health service provider operating under the name YMS. The company supplies Ontario health-care practitioners with the Electronic Medical Record (EMR) software applications required to bill, schedule and manage patient information electronically.

YMS faces an automation challenge connected to creating and processing various forms used by medical professionals. The process for adding forms that are new to the YMS system is entirely manual and often takes days to complete, which negatively impacts the company's profitability. In order to address this challenge, YMS is partnering with Mufleh Al-Shatnawi, Professor, School of Software Design & Data Science, to develop a software solution to automate the process of new form digitization. The resulting proof-of-concept Universal Form Reader (UFR) will analyze new Portable Document Format (PDF) forms and extract attributes and keywords, such as patient name, age, etc. The UFR will have a significant impact on YMS' bottom line and, equally important, it will pave the way for advanced research and development activities supporting cost reduction and proactive patient care opportunities.

- **Robotic Process Automation of Workflows (*Funded by NSERC*):**

NTG Clarity Networks Inc. (NTG), founded in 1992 (Markham, Ont.), is a publicly traded software company offering products and solutions to telecom services providers, enterprises and governments. One of their products, "Smart2Go", is a comprehensive, digital workflow and application builder, which allows companies to build their own applications, workflow process and business rules using a simple drag and drop interface without the need to write any code. NTG's long-term goal is to extend Smart2Go's functionality by leveraging patterns existing in workflows and the form builder to predict potential process bottlenecks and inefficiencies. The underlying objective is to enhance the customer experience and shorten development cycles. The company views this as an important business opportunity that will allow them to increase their revenue and market adoption of Smart2Go. To that end, NTG is partnering with Seneca to develop the digital architectural design for this novel solution.

- **The Shopping Buddy App (*Funded by NSERC*):**

AbleDocs Inc., based in Oakville, Ont., is currently the global leader in document accessibility products and services for persons with print disabilities. They wish to broaden their market reach by addressing the everyday needs for persons with low-vision. In the case of this collaboration with Seneca, they are targeting digital accessibility in the context of the in-store shopping experience. AbleDocs' challenge in addressing this market need is to adapt their text accessibility technology to make retail and product information immediately accessible, in-store. The intention of the proposed collaboration between AbleDocs and Seneca is to develop an app, which can transform product packaging text into a barrier-free and accessible interface.

Tanvir Alam, Professor, Seneca's School of Software Design & Data Science, will co-lead the project with **Monica Fontana**, Professor, Seneca's School of Creative Arts & Animation. The proposed Shopping Buddy app will work as a retail ecosystem bringing together

content from manufacturers, distributors, retailers and consumer entities. This project is important to AbleDocs as its mission is to give access to all people with print disabilities throughout the world. The project will also provide an excellent experiential learning opportunity for the research assistants; they will develop a fundamental understanding of technology requirements for accessibility and inclusivity in design, visual and user experience. The resulting app and partnerships, which will follow the development of the initial prototype, will enable a worldwide virtuous cycle of inclusion within the retail environment.

- **Facilitating Text Comprehension of Long-Form Text (*Funded by NSERC*):**

Located in Toronto, Quillsoft Ltd. is a leader in assistive technology software advancing literacy skills – helping people read and write. In partnership with Holland Bloorview Kids Rehabilitation Hospital, Quillsoft's products, including WordQ, are used by more than 2.5 million end-users, primarily in the education field.

To that end, Quillsoft sees a business opportunity in developing long-form text comprehension technology to include in the next generation of its products. Building on a previous collaboration with Seneca, Quillsoft is partnering with **Asma Paracha**, Professor, School of Software Design & Data Science, to develop a proof-of-concept solution that provides readers with insight into multi-level relationships between concepts contained in long-form texts. Once fully developed, this new and unique text comprehension solution will enable Quillsoft to increase and diversify its revenue stream and increase market penetration. Quillsoft is planning to include such technology in the next generation of its products, scheduled for market release in 2022.