MULTIMEDIA COMMUNICATIONS RESEARCH LAB

APRIL 2018

CONSUMER HEALTH MOONSHOT

CALL TO COLLABORATE

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"I BELIEVE IN INNOVATION AND THAT THE WAY YOU GET INNOVATION IS YOU FUND RESEARCH AND YOU LEARN THE BASIC FACTS"

-BILL GATES

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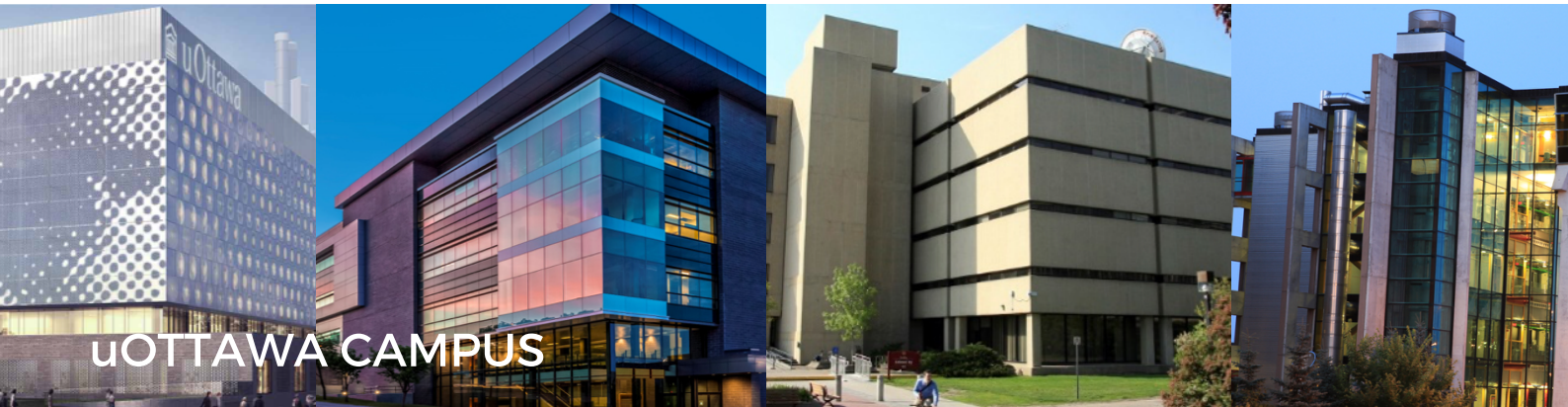


uOTTAWA CAMPUS

ABOUT

With the ubiquity of technology nowadays, we cannot deny the huge impact of artificial intelligence, haptics and social media in driving consumer behaviour. That's why companies both big and small tap digital innovations in a bid to capture market share. But being digital simply isn't enough—companies need to have insights of the latest advances in technologies and of their consumers' online behaviour, and use that data to drive revenue for their business.

This is where consumer health moonshot comes in. By tinkering with technologies like sensors, artificial intelligence, haptics and social media, we have created the next generation of smart consumer health products. More than just the gadgets, digital innovators must also create concise yet effective solutions which solve real world problems.

Our USP

The future of consumer health depends on developing products and systems that can deal with the computational demands of expanding digitized data and related advanced software solutions. Our Lab research focusses on the development, testing and deployment of algorithms, methods, and tools to enable healthcare personnel, citizens, and policy makers to interact with the ubiquitous computing infrastructure.

Distinguished University Professor El Saddik

WHERE WE'RE AT **TODAY**

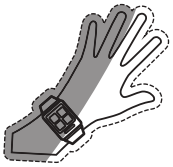
Number of Professors: 3
Number of Postdoctoral fellows: 2
Number of PhD students: 16
Number of Masters students: 17
Number of Publications: 600
Number of Patents: 6
Number of Years: 17
Total Funding Received since inception: $19 Million
Annual Budget: $1 Million
Number of Awards: 30

WHERE WE'RE **GOING**

Artificial Intelligence (AI) Driven Analytics
Adapt and expand knowledge extraction, data mining techniques and tools to fully exploit the content of soft or hard sensors and help fuse the generated data in immersive visual environments

Mixed Reality, Haptics & Seamless Interactions
Design and develop representations for effortless, anytime, anywhere human-machine interactions and communications (3D, AR, VR. Haptics, Serious Games, etc.)

Biometrics, Cyber-Security & Privacy
Develop multi-sensory biometric authentication methods to enhance access control and reduce security breaches



IoT, Wearables & Cyber-Physical Systems
Develop cyber-physical platforms to support the integration of various system components

MOONSHOT THINKING

Canada's health-care system is under massive strain. It faces the combined challenges of aging demographics, population growth, and design built for episodic care in a pre-computer age.

In 2017, the Commonwealth Fund released a report that compared health-care systems in 11 developed countries. Canada ranked ninth.

A moonshot, in a technology context, is an ambitious, exploratory and ground-breaking project undertaken without any expectation of near-term profitability or benefit and also, perhaps, without a full investigation of potential risks and benefits.

Here's Google's definition of a moonshot:
A project or proposal that:
1. Addresses a huge problem
2.Proposes a radical solution
3. Uses breakthrough technology

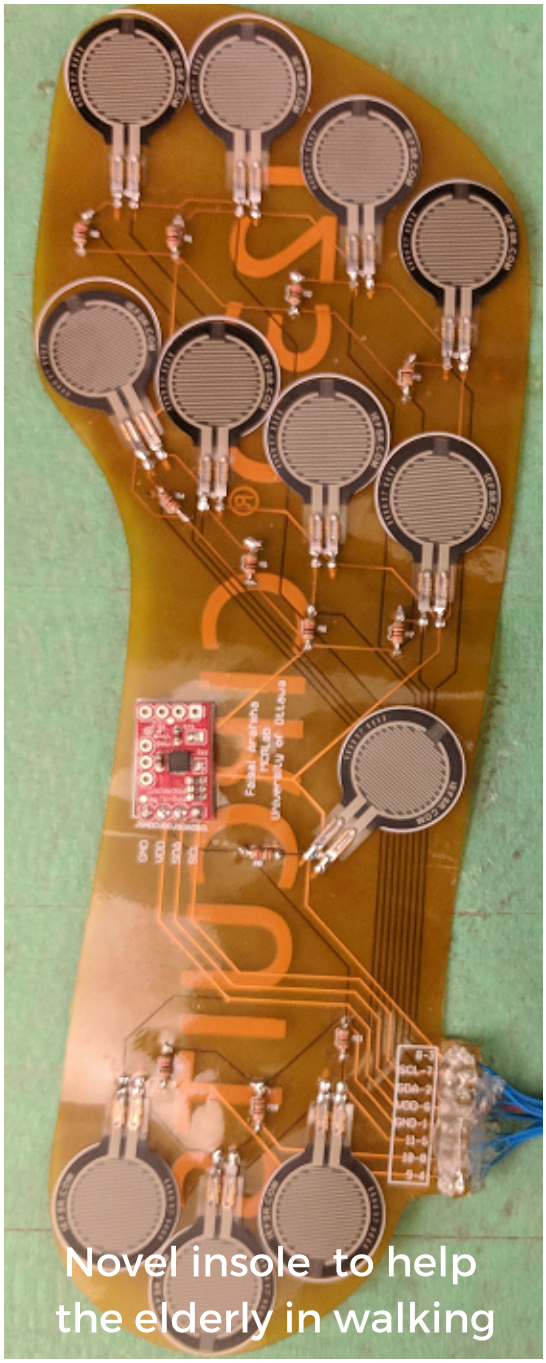
Four breakthrough technologies that are converging rapidly offer Canada a remarkable opportunity to transform its consumer health and healthcare system

They are:
1. Artificial Intelligence driven analytics
2. Mixed Reality, Haptics & Seamless Inteactions
3. Biometrics, Privacy & Cybersecurity
4. IoT, Wearables & Cyber-physical systems

Reference: http://nationalpost.com/opinion/canada-needs-a-health-care-moonshot-and-now-is-the-time
https://whatis.techtarget.com/definition/moonshot

WHAT WE **LACK**

HOW TO UP OUR MOONSHOT GAME



Novel insole to help the elderly in walking

In order to become a global leader in Consumer Health Moonshot, Canada needs:

1. Investments in diverse people and partnerships

2. Inter-disciplinary training and investing in next generation of engineers and digital health-care professionals

3. Strong financial incentives to invest in and adopt our technology.

4. To increase technology experimentation in non-traditional ways

5. Open access to health data

6. Concentrate our resources to build areas of excellence

7. Export our consumer health products and services internationally

Reference: http://nationalpost.com/opinion/canada-needs-a-health-care-moonshot-and-now-is-the-time

ABOUT OUR **INNOVATIONS**

CONSUMER HEALTH MOONSHOT

CANADA IS AT A CROSSROADS. IT CAN EITHER BE A LEADER OF THE MOONSHOT ECONOMY OR A FOLLOWER. THE TIME TO SEIZE THE OPPORTUNITY IS NOW

WEARABLES
- Smart shoes for visually impaired
- Smart gloves for diabetics with loss of touch
- Shoes to analyse how you walk
- E-Hugs Jacket

APPS
- To improve mental health and performance of athletes

INTERACTIVE GAMES
- Home based rehabilitation for stroke patients
- To improve physical activity in children

DEVICES
- Mobile phone based ECG for identity authentication

ANALYTIC TOOLS
- AI based social media based screening tool for psychological well-being

VIDEO BASED SOFTWARES
- Video software to detect human emotions and heart rate


Smart glove for diabetics with loss of touch

Reference: http://nationalpost.com/opinion/canada-needs-a-health-care-moonshot-and-now-is-the-time

DIGITAL **TWIN**

OUR STRATEGIC FOCUS AREA

A DIGITAL TWIN IS A DIGITAL REPLICATION OF A LIVING OR NON-LIVING PHYSICAL ENTITY. GARTNER IDENTIFIED DIGITAL TWINS AS ONE OF THE TOP 10 STRATEGIC TECHNOLOGY TRENDS OF 2018.

Professor El Saddik interacting with his digital twin

What is a digital twin?
A digital twin is a digital replication of a living or non-living physical entity. When data is transmitted seamlessly, it bridges the physical and virtual worlds, thus allowing the virtual entity to exist simultaneously with the physical entity.

Application of a digital twin:
A digital twin facilitates the means to understand, monitor, and optimize the functions of the physical entity, as well as it provides continuous feedback. Therefore, a digital twin can be used to improve quality of life and wellbeing of citizens in smart cities.

OUR COLLABORATION STRATEGY

UOTTAWA FOCUSES RESEARCH STRENGTHS AND EFFORTS IN FOUR STRATEGIC AREAS OF DEVELOPMENT IN RESEARCH (SADRS), CANADA AND THE WORLD; HEALTH; E-SOCIETY; MOLECULAR AND ENVIRONMENTAL SCIENCES.

FOCUS AREA 1: BASIC RESEARCH

Value of return of investment in research for industry $4 for every $1 investment

Industry Investment in cash

Industry Investment in kind

Dollars matched by government funds

Four times return on investment

FOCUS AREA 2: TRAINING

According to Market Research Future, it is expected that the digital twin market will reach $15B by 2023. We want to train well-rounded Highly Qualified Professionals who will become the next generation of industry leaders and build great products to better human life.

FOCUS AREA 3: ENTREPRENEURSHIP

According to Business Insider, the global market for Mixed Reality and Artificial Intelligence technology will top $400 billion in 2022. We want to collaborate with institutions to foster an entrepreneurship friendly ecosystem which enables our students to move from prototype to enterprise.

HUGE STEP FORWARD

Semi-Transparent Augmented-Reality System

CONSUMER HEALTH = HEALTH

Upcoming Projects

Digital Twins for Health & Well-being

Upcoming Events

Workshop and Panel on Digital Twin, uOttawa, Sep 2018

Upcoming Courses

- Tactile Internet
- Blockchain
- Artificial Intelligence
- Mixed Reality

MEET THE TEAM

PEOPLE BEHIND THE INNOVATION

Our vision is to be the Canadian leader in intelligent wellness systems and services' innovation, research and development, and training to enhance the wellbeing of citizens in Canada and around the globe.

Professors

- Distinguished Professor Abdulmotaleb El Saddik
- Professor Jiying Zhao
- Professor Hussein Al Osman

Postdoctoral Fellows

- Dr. Haiwei Dong
- Dr. Basim Hafidh

PhD Students

- Juan Sebastian Arteaga Falcone
- Fedwa Laamarti
- Longyu Zhang
- Rana Abalkhail
- Hawazin Badawi
- Abdulrhman Alshareef
- Majed Alowaidi
- Hikmat Adhami
- Samah Aloufi
- Amani Albraikan
- Rajwa Alharthy
- Mohamad AlJa'afrah
- Faisal Arafsha
- Fatimah Alzamzami
- Saeed Alharthi
- Hamzah Alghamdi

Masters Students

- Ying Qiu
- Yu Mia
- Yuxiang Jiang
- Yufan Zhou
- Jianquan Wang
- Xiaocong Ma

Research Associate

- Namrata Bagaria

CONTACT US

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"We would like to acknowledge the support of those funding sources, which is helping us achieve our renowned and distinct status as a leader in our various research areas."
— A. El Saddik

Prof. Abdulmotaleb El Saddik demonstrates a smart glove to senator, The Honourable Chantal Petitclerc