Machine vision and deep learning specialist: application for healthy, sustainable cities

Campus location	McGill University, downtown Montreal
Key Working Relationships (internal):	Institute for Health and Social Policy; Epidemiology and Biostatistics, Geography, Computer Science
Key Working Relationships (external):	Multiple leading universities in the UK, USA, Canada, and other countries
Time frame:	Full-time position (1-2 years), to start upon candidate selection
Academic qualifications:	All levels considered
Salary range:	Approx $40k - $85k/year depending on experience

Description

This is an exciting opportunity for a highly-motivated computer scientist to join a dynamic research consortium and contribute to innovative research through the application of computer vision and deep learning techniques to street and satellite imagery from diverse global cities to further a global environment and health agenda. The position can be tailored into a Postdoctoral Fellowship or a Research Staff depending on the applicant.

The research involves a consortium of leading universities as well as policy agencies throughout the world, and is highly interdisciplinary (equitablehealthycities.org/partners). We plan to use methods and tools from a range of disciplines to model the impacts of policy scenarios on the environment and health in cities in high- and low-income countries. We have a particular focus on using emerging data and novel methods to characterise cities' environment and health, with emphasis on within-city variations and inequalities. The person appointed to this important post will have a key role in identifying and implementing the consortium's data and analytical strategy for using multiple street-level and satellite imagery sources to build new datasets that complement existing administrative and other authoritative data.

The position will be based at McGill's Institute for Health and Social Policy and work closely with researchers in several departments at McGill, as well as at our partner institutions, including Imperial College London, University of Chicago and the University of Ghana. The group is highly interdisciplinary and the post holder will work closely with a range of backgrounds and disciplines in an international group based at McGill and at other leading global universities. The successful Research Associate or Postdoc will benefit from opportunities to collaborate with world-class investigators in Canada and abroad, attend technical workshops and yearly international team meetings, and participate in domestic and international research exchanges.

Candidates must have an exceptional aptitude for analytical and critical thinking about scientific

problems, data, and analytical methods; superb programming skills; strong communication capabilities; motivation for problem solving; aptitude for interdisciplinary research and teamwork; and ability to work and learn independently. For postdoctoral appointees, there will be scope for the post holder to transition from mentored research to an independent research agenda.

Qualifications

- **PhD (for Postdoctoral Fellowship) or MSc or possibly BSc** in computer science or related subject: there is flexibility in the nature of the appointment
- Knowledge of probabilistic modelling, machine learning and deep learning methods
- Knowledge of computer vision techniques
- Preferable: Familiarity with deep learning frameworks (e.g. TensorFlow/Keras/PyTorch) and/or machine learning frameworks (e.g. scikit-learn)
- Track record of technical and scholarly excellence as demonstrated by completed projects and academic experience and, for postdoctoral appointees, publications and methods development and application

Main Duties

1. To apply existing methods or developing new ones for analysing individual and multiple image sources to characterise the social, natural and physical environment of cities and the health of its people
2. In particular / initially, **to develop and apply deep learning and image analysis algorithms to street-view and satellite imagery for several global cities**
3. To implement and test algorithms and models
4. To report and discuss the inputs, methods, and results of the analyses to audiences in different fields and disciplines
5. To take initiatives in the planning of research
6. To participate in reports for publication in peer-reviewed journals, conferences and submission to research sponsors
7. To attend research group meetings and other relevant meetings
8. To attend relevant workshops and conferences as necessary
9. Any other duties commensurate with the grade of the post as directed by supervisor

Additional duties for postdoctoral appointees

- To effectively manage research projects
- To lead papers and reports for publication in peer-reviewed journals, conferences and submission to research sponsors
- To provide guidance to students and more junior researchers

Desired attributes

- Programming in key languages/software such as Python, C, C++, R
- Data science skills and experience in exploring, preparing, and transforming real-world datasets
- Ability to write research reports and manuscripts
- An interest and willingness to learn new skills quickly
- Superior ability to understand and effectively present complex concepts and data, especially for scientific data
- Superior critical thinking
- Ability to prioritise tasks and organise work effectively to meet deadlines, including in the presence of competing demands on time
- Ability to communicate effectively and work successfully in interdisciplinary teams and environments
- Ability to work well independently as well as part of a team
- Excellent organisational skills
- A meticulous approach and attention to detail

Application procedure

Application details: Interested candidates should email admincoord.ihsp@mcgill.ca (with subject: Image Machine Learning Position) with a single PDF containing (in order):

1. A cover letter describing your skills, experience, and research interests and qualifications. Please mention how you learned of this position. For postdoctoral applicants, please describe your own research direction for the postdoc.
2. A full curriculum vitae
3. A copy of all university graduate transcripts
4. For near-completion PhD students, a letter from your Department Chair specifying the date of your dissertation defense;
5. A list of 3 references.
6. One or two samples of your work

Review of applications will begin immediately. Shortlisted candidates will be contacted. We welcome applications from indigenous peoples, visible minorities, ethnic minorities, persons with disabilities, women, persons of minority sexual orientations and gender identities, and others who may contribute to further diversification.

For questions about the research, contact Professors C Barrington-Leigh or J Baumgartner at McGill