Job Position

Singapore University of Technology and Design’s Meta Design Lab in collaboration with the Lee Kuan Yew Centre for Innovative Cities is calling for a Postdoctoral Fellow for a new project.

Project Description

This project aims to investigate the relationship between macro-urban configurations and its effect on the wellness of residents, focusing specifically on the elderly. It hypothesises that much of a resident’s ambient exercise and positive health aspects of a city are a product of how people navigate it on a data-to-day basis. However, the relationship between urban configurations and individual wellness has not been empirically correlated except in small scale studies or general correlations (e.g. average distance travelled against health). This research aims to take a significantly more analytical and spatially focused approach, considering and ideally correlating how an urban area affects users’ activity and decisions.

To do this it will integrate three concurrent areas of study;
1. An AI driven tracking approach to see where people go and what they do
2. An in-depth ethnographic study of resident residential activity and health
3. A design intervention into healthier residential spaces and development of design guidelines

This position focuses on supporting the first part of this and is intended to be develop a data driven approach to urban analysis, by providing insight into how people use space by using ethnical and anonymised image tracking of users of public spaces developing ML models to improve aggregate user route monitoring and identification of activity location. This will be correlated with spatial configuration of buildings, origin-destination modelling, and available route choice analysis (spatial network). Then using this empirical data as a source to do machine learning to predict space use, computing resultant health metrics, leading to automated appraisal of the wellness of the space. This work will be scaled to larger areas where possible to develop data for use in deriving more insight into user activity in tandem with the ethnographic study as data triangulation. Combing both these sources to allow for better informed developing of policy and design guidelines to improve future urban design and potentially building more user focused ML tools for urban planners.

The research is highly disciplinary but anchored in Architecture, Urban Planning and Applied A.I. and lead by, Belinda Yuen (LKYCIC), Sam Joyce (SUTD), Ngai-Man Cheung (SUTD), and Joshua Comaroff (Yale-NUS) each covering aspects of planning for wellness, applied computational design, A.I., and architectural design respectively.

Researcher Description

We are keen to take on someone who is enthusiastic about conceiving, implementing and testing technologies such as AI, ML, and computer vision to spatial problems, specifically urban analytics and design. The project is intended an investigation into the capability of ML to apply to measuring wellness and design effectiveness in the real world. It would suit someone who is more exploratory and curious about applying novel approaches. The job aims to give a motivated self-starter the
research freedom and space to explore new concepts, supported and guided within a group of
domain experts with strong academic and industrial backgrounds. The SUTD environment is that
of a start-up university and so well suited to those with initiative both professionally and socially.

The hire will be directly report to Sam Joyce and act as part of the Meta Design Lab but will
supported by Ngai-Man Cheung and his team for support in AI, ML, and image recognition
aspects. They will also work closely with LKYCIC in terms of understanding wellness and health
aspects and data needs for the user capture and monitoring. This project has support to capture
data from government agencies and for potential wider implementation based on findings. The
project will also collaborate with an industry leading company to leverage their image recognition
technology-pipeline to support our activities as well as supporting potentially translational efforts
if the technology is successful.

Domain Background (one of)
Computer Science, ML/AI, Data-Scientist, Computer Graphics, Computer Vision

Education
Relevant master’s degree or doctorate in one of the above fields. Alternatively, someone from the Engineering, Architectural or Geography background with strong demonstrable experience in the above domain areas specifically AI/ML.

Desired Skills
Experience in applied AI and a desire to try new ML and analytics on real problems
Ability to work individually, as well as collaborate in small teams
A project lead and outcome driven programming approach
Open to working in an interdisciplinary way
Interest in architecture, urban planning and design in general
Happy to explain and involve non-domain experts in ML and AI

Required Proficiency
Python
Data science and Analytics
Experience processing and cleaning data
Capability in coding TensorFlow, PyTorch or similar ML frameworks
Experience with AWS or similar server/could based systems

Desired Proficiency
Analytics and processing of images and/or video
Image Recognition
Web development frontend and/or backend.
D3.js and/or Node.js experience
3D modelling
  WebGL/three.js
  Rhino/Grasshopper/Dynamo
  Unity/Unreal Engine

Job Details
Initial two-year contract with potential to extend (the current project is planned 4 years)
Salary is competitive
The role is based primarily in SUTD Singapore
Partial remote work is acceptable based on performance
Workstation/laptop and other hardware and software for the role will all be provided

Benefits
  Health Insurance
  Time for publication
  Funding for international conferences
  Flexible hours

Requirements
  Letter of interest
  C.V.
  Recent publication (if any) or work portfolio (if relevant)
  Links to current online work / GitHub (if relevant)

Application Process
  Applications will be made on a first come basis until the position is filled
  Based on suitably of applications they will be asked for an interview
  The position can start from 1st November or later

For any research or position enquiries and questions please direct to sam_joyce@sutd.edu.sg