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| **TO WHOM IT MAY CONCERN** |  |

Oakville, 2021/Oct/06

**Reference for Mr. Yi Lin Gao**

Dear Sir or Madam,

Mr. Yi Lin Gao worked as a graduate research assistant under my supervision in the Department of Geography and Environment at the University of Waterloo, Ontario, Canada from Sep 2020- June 2021 working on multi-temporal semantic change detection for automatic land cover change detection and classification from a multi-temporal, multi-resolution and multi-spectral imagery perspective. Mr.Gao was quick to implement various change detection models using classical, deep-learning and hybrid models to establish a comparative benchmark. He has demonstrated exceptional out-of-the-box thinking to offer novel approaches to the problem at hand. Added to this, is his high proficiency in modeling and implementing using advance python/pytorch deep learning programming skills place him among the top 1% research candidates.

Mr.Gao had demonstrated the ability to work independently identifying the current state-of-the-art and the research gaps in the field of automatic land cover change detection. Within a span of 3 months, he effectively lead a team of 3 graduate search fellows for devising strategies to implement various change detection techniques and establishing a comparative benchmark.

Over the course of the year, he has successfully contributed to investigating and implementing region-based deep-learning approach for instance segmentation of aerial orthoimagery for building rooftop detection. A noted testimony of his scientific acumen and interest is to proactively engage with national and international research partners where he collaborated with three different ongoing research projects, apart from leading his own deep learning experiments to identify building rooftop. For each of these projects, Mr.Gao has contributed significantly in implementing conceptual ideas and designing deep learning experiments. He further demonstrated his scientific writing skills by writing and editing the manuscripts which are currently under review.

Mr.Gao aims to extract building footprint using deep learning techniques, which are currently expensive, time-consuming and not feasible at a large scale. Of interest, is to investigate the current state of the art on deep learning models which demand more investigation and provide a comparative benchmark against other traditional models.

In light of the above contributions to the state-of-the-art. I am completely convinced that Mr.Gao’s exceptional academic accomplishments, perseverance, exceptional analytical and problem-solving skills would help him in delivering the state-of-the-art research in the field of deep learning, graph convolution network and remote sensing at large. Investigating deep-learning models for building footprint extraction, boundary regularization using super resolution imagery is the need of the hour and would significantly benefit the remote sensing and geoscience scientific community.

Yours sincerely,

**Awase Khirni Syed, PhD**