

# APPLICATION FORM (JOINT RESEARCH) HIGH POTENTIAL INDIVIDUALS GLOBAL TRAINING PROGRAM)

## AGREEMENT

As stated above, I submit this application form to IITP that conducts “High Potential Individuals Global Training Program” supported by Ministry of Science, ICT in South Korea. IITP may disclose the information below to the public for the purpose of providing information and matching a research partnership between your institute and a Korean university.

\* IITP : Institute for Information & communications Technology Planning & Evaluation

Printed Name of  
Chief of Research

Shahram Shah Heydari

Date(mm-dd-yyyy)

01-30-2020

Signature of  
Chief of Research

*(Note) This application is to identify the willingness to participate in this research and to find a research partnership for research institutes in Korea. Therefore, in its sole discretion, it is acceptable to contain only minimal information. (max. 3 pages)*

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<b>1. Research Title</b>	Applications of Deep Reinforcement Learning in Intent-based Network Management						
<b>2. Research Area</b>	<b>A.I.</b>	<b>Big Data</b>	<b>Cloud Computing</b>	<b>Block Chain</b>	<b>AR/VR</b>	<b>ICT/SW Convergence</b>	<b>Other ICT /SW</b>
	X		X			X	
<b>3. Chief of research</b>	<b>Title</b>	Associate Professor		<b>Contact</b>	<b>E-mail</b> : shahram.heydari@ontariotechu.ca		
	<b>Name</b>	Shahram Shah Heydari			<b>Tel</b> : +1-905-721-8668		
<b>4. Affiliation</b>	<b>Name</b>	University of Ontario Institute of Technology		<b>Classification</b>	(X) University ( ) Research Institute ( ) Industry ( ) ETC.		
<b>5. Capacity for students (5 or less)</b>	3 (three)		<b>Support for students (all necessary)</b>		( X ) Visa support ( X ) Research Mentoring ( X ) Research Space ( X ) Accessibility to Research equipment		



<b>6. Research Objective</b>	<ol style="list-style-type: none"><li>1. Develop a framework for collection and analysis of network key performance indicators (KPI) in relation to network-level intents (one student)</li><li>2. Applying Deep Reinforcement Learning (DRL) techniques to optimize network resources and operations for maximizing the performance (two students)</li></ol>
<b>7. Research Summary</b>	<p>This project focuses on establishing a framework for using AI techniques in management and operation of Intent-based Software-Defined WANs, data centres and cloud networks. Specific goals of this project include the following:</p> <ol style="list-style-type: none"><li>1. Design a scalable architecture to collect QoE feedback from the user side and QoS performance indicators from network devices/hosts, and store them for analysis at a central SDN controller. In particular we are interested in evaluating and comparing various options for collecting this information, including but not limited to: Southbound protocols (e.g. OpenFlow), programmable switch interfaces (e.g. P4), end-user TCP statistics etc.</li><li>2. Develop a mechanism to map service-level intents into specific QoE/QoS requirements.</li><li>3. Apply Deep Reinforcement Learning for adjusting network parameters in order to maximize a reward function based on the QoE/QoS data. An example would be a controller function that would adjust flow routes, flow priorities or even TCP windows in order to satisfy service-level intent in case of network congestion or node failures.</li></ol>
<b>8. Need for funding from Korean government</b>	<p>\$75000 total as following:</p> <p>\$25000/Student to cover the university overhead, cost of equipment and space, and personnel salaries.</p>
<b>9. Request for Korean Universities</b>	<p>The selection of students studying abroad should be conducted through mutual consultation. Intellectual property and publication rights to be negotiated between the institutions.</p>