Ministry of Science and ICT

Institute of Information & Communications Technology Planning & Evaluation

APPLICATION FORM
(JOINT RESEARCH)
HIGH POTENTIAL INDIVIDUALSGLOBAL 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: Guennadi Saiko Date(mm-dd-yyyy): 01-31-2020 Signature of Chief of Research:    ☞***(Note)*** *This application is to identify the willingness to participate in this research and to find a researchpartnership for research institutes in Korea. Therefore, in its sole discretion, it is acceptable to contain only minimal information. (max. 3 pages)*

1. Research Title	Classification of Respiratory Sounds with Neural Networks						
2. Research Area	**A.I.**	**Big Data**	**Cloud Computing**	**Block Chain**	**AR/ VR**	**ICT/SW Convergence**	**Other ICT /SW**
	X	**X**	**X**			**X**	
3.Chief of research	Title	Chief Science Officer		Contact	E-mail: Gennadi@oxilight.ca		
	Name	Guennadi Saiko			Tel : +1-416-616-7820		
4. Affiliation	Name	Oxilight Inc		Classification	() University ( ) Research Institute (X) Industry ( ) ETC.		
5. Capacity for students (5or less)	3		**Support for students** ***(all necessary)***		(X) Visa support (X) Research Mentoring (X) Research Space (X) Accessibility to Research equipment		

6. Research Objective	Develop a classification algorithm capable of classifying different types of respiratory sounds
7. Research Summary	Respiratory diseases are currently among the most common causes of mortality and disability in the world. In particular, about 65 million people suffer from chronic obstructive pulmonary disease (COPD) and 3 million dies from it each year, making it the third leading cause of death worldwide. Thus, prevention and early diagnosis of respiratory diseases are essential in improving the quality of care. Respiratory sounds are important indicators of respiratory health and respiratory disorders. The sound emitted when a person breathes is directly related to air movement, changes in lung tissue, and position of lung secretions. A wheezing, for example, is a common sign that a patient has an obstructive airway disease such as asthma or chronic obstructive pulmonary disease. These sounds can be recorded using digital stethoscopes and other recording techniques. Digital data opens the possibility of using machine learning to automatically diagnose respiratory disorders such as asthma, pneumonia and bronchiolitis, among others. In particular, automated classification of respiratory sounds has the potential to detect abnormalities in the early stages of respiratory dysfunction and thus improve clinical outcomes. When performed by advanced computational methods, an in-depth analysis of these sounds may be of great support to the physician, which may result in improved detection of respiratory diseases. In this context, machine learning techniques have been shown to provide an invaluable computational tool for detecting disease-related anomalies in the early stages of respiratory dysfunction. We plan to develop a classification algorithm capable of classifying different types of breathing sounds (e.g., normal, crackles, wheezes). The algorithm development will include several different steps, including dataset preparation, manual feature extraction, automated feature extraction, construction of neural networks, including convolutional neural networks (CNN), and evaluation of the performance of various algorithms. We will pay particular attention to CNNs, which show that in addition to being very effective in image classification, they can also be used to classify soundtracks using particular CNN architectures.
8. Need for funding from Korean government	$10,000 per student to cover the costs of cloud infrastructure
9. Request for Korean Universities	- The selection of students studying abroad should be conducted after mutual consultation, and please cooperate as much as possible to prepare for VISA.