ENCQOR 5G Technology Development Program [SME Stream]

Anchor Firm	**ciena**
Challenge Statement	**Forecasting product reliability using Machine Learning**

Challenge Launch Date	August 11, 2020
Challenge Deadline	September 15, 2020
Challenge Statement	5G is the next generation of mobile networks that can unleash the full potential of emerging technologies notably autonomous vehicles, Internet of Things (IoT), and Virtual Reality (VR). Ciena's mission is to provide solutions that facilitate multi-vendor automation, reliable and flexible implementation of 5G networks. To keep pace with the demand for implementing effective solutions, Ciena is looking to collaborate with a Ontario based SME to develop a platform to forecast product reliability, and to identify the units that are prone to malfunction by leveraging state-of-the-art Machine Learning algorithm(s). The information provided by this platform is particularly important for capacity planning, inventory management, and production planning. This platform will shed light on possible root causes of defects in the product units.
Project Partner	Ciena Canada
Timeline	up to 18 months [NOTE: Projects must be completed by March 31, 2022, no extensions will be available beyond this timeline]. Project expected to start in Fall 2020
Available funding	Up to $390,000 CDN
Applicant Type	Ontario based SME Scale company
Location	Ontario

Project Details	Reliability is a characteristic of a product and is the probability that the product will perform its intended function without failure for a specific period of time. This project aims to leverage the power of Machine Learning for reliability prediction analysis. This platform is specifically useful for identifying root causes of defects, improving designs as well as aiding in business decisions (e.g. budget allocation, spare provisioning, and scheduling).
	
	The specifications of the project are as follows:
	• Ciena will provide the required datasets
	• Key deliverables include the following:
	    o For a given subset of product units (specified by a hardware product, product line, customer, defect type, etc.), predict and/or extrapolate the following items:
	        ▪ The number of product units that may be returned or require repair

	- Mean Time To First Failure (MTTFF) for each product unit. - Mean Time Between Failures (MTBF) for each product unit. o Calculate the probability that a product unit will not function properly due to certain defect(s).
Project Goals/ Outcomes	The expected outcome is as follows: - All source and test codes/scripts to reproduce the full solution - Clear technical presentations, guidelines, architectural diagrams, and notes as well as all key items to facilitate understanding the solution implementation. - Exported trained ML model (e.g. in ONNX format) or any parameters/weights that can be used to reproduce the same ML model. This is part of knowledge transfer to ensure that Ciena staff can reproduce the results from the code. - Any known limitations in the algorithms or software code - Test results to validate functionality and performance The software solution is expected to have at least 70% test coverage.
Applicant Capabilities	- Advanced knowledge in Big Data Analytics, Data Analysis and Modeling, Artificial Intelligence, Data Modelling, trending/extrapolation - Software architecture and hands-on software development experience - Experience with REST APIs - Technical background and the ability to understand a wide variety of technologies, standards, and product applications - Experience with software and complex systems test - Ability to work in an Agile environment, define sprints, run scrum meetings, and drive a rapid demo-based environment