Forecasting product reliability using Machine Learning

Sponsor

Anchor Firm: Ciena Canada [1]

OCE's ENCQOR 5G Technology Development Program (TDP) delivered in partnership with Innovation ENCQOR on behalf of the Ontario Ministry of Economic Development, Job Creation and Trade and the Federal Government through Innovation, Science and Economic Development Canada.

Program

ENCQOR 5G Technology Development Program

For More Information

For more information please visit the program guidelines [2] and the challenge statement [3].

Description

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 an 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 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, with Ciena providing the required datasets.

Key deliverables include the following:

- 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.
- 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

Eligibility

Ontario-based SME Scale company. Please review ENCQOR 5G SME Technology Development Program guidelines [4] and eligibility criteria before initiating an application.

Maximum Project Value

Up to $390,000 CDN

Indirect Costs

40%

Project Duration

Up to 18 months.

Expected start date in fall 2020 and projects must be completed by March 31, 2022 (no

extensions will be available beyond this timeline).

Special Notes

Please note that research activities carried out in the context of COVID-19 need to adhere to the University of Guelph COVID-19 research principles, policies, guidelines and processes as they may be updated from time to time and communicated on the Office of Research web-page [5].

Deadlines

If College-level review is required, your College will communicate its earlier internal deadlines.

Type	Date
External Deadline	Tuesday, September 15, 2020 - 11:59pm

How to Apply

If you are ready to start an application for the ENCQOR 5G Technology Development Program, the applicant (from the eligible Ontario-based SME) should submit an OCE Program Enquiry form [6] (note: completion of this form does not constitute an application for funding).

An OCE Business Development and Commercialization Manager [7] will contact you within two business days to discuss the opportunity. If you are already working with an OCE BD, please indicate this in the form.
For Questions, please contact
Jennifer Moles at Jennifer.Moles@oce-ontario.org [8] or an OCE Business Development and Commercialization Manager [7].

Alert Classifications**Category:**
Funding Opportunities and Sponsor News

Disciplines:
Information and Communications Technology

Source URL:https://www-research.uoguelph.ca/research/alerts/content/forecasting-product-reliability-using-machine-learning

Links
[1] https://www.ciena.ca/
[2] https://oce-ontario.us12.list-manage.com/track/click?u=5b889b564c40a6263883775a4&amp

;id=8d20c98b9b&e=60cdd4a6da
[3] https://www.oce-ontario.org/docs/default-source/default-document-library/ENCQOR/cs014_forecasting-product-reliability-using-machine-learning.pdf?sfvrsn=4
[4] https://oce-ontario.org/programs/encqor/5g-(encqor)-sme-technology-development-program
[5] https://www.uoguelph.ca/research/
[6] https://crm.oce-ontario.org/custom/forms/ClientIntakeForm/
[7] https://oce-ontario.us12.list-manage.com/track/click?u=5b889b564c40a6263883775a4&id=09efb13e78&e=60cdd4a6da
[8] mailto:Jennifer.Moles@oce-ontario.org