

SatCom Links Outage Prediction Algorithm (OPA) Development

Code: 21/45

Company: Atheras Analytics Limited

Location: Remote Working

Company Description:

Atheras Analytics is a UK-based company and was founded in August 2020 to commercialise research that has been conducted by STFC over several years into the effects of atmospheric/weather impairments (in particular rainfall) on Ka-band and Q/V-band satellite signal propagation.

The satellite telecommunications sector is about to enter a phase of major change in the delivery of consumer and enterprise broadband using High Throughput Satellites (HTS) and Very High Throughput Satellites (VHTS) which can deliver data rates of the order of 500 Gbps – 1 Tbps per satellite. In order to support these higher data rates it is necessary to employ higher frequency bands such as Ka-band and Q/V-band but these higher frequency bands are much more susceptible to atmospheric attenuation than those previously used (such as C-band or Ku-band).

Atheras Analytics is developing a suite of software tools for use by Ka-band and Q/V-band satellite operators to optimise both the design and operation of their networks taking into account atmospheric/weather impairments specific to the region(s) of operation. The software employs advanced machine learning techniques to “train” an Outage Prediction Algorithm (OPA) for multiple different operational scenarios. The software will be commercialised using a SaaS-based platform.

Project Description:

The applicant will work for a minimum of 8 weeks alongside a Machine Learning Engineer and a Software Engineer contributing to the development of the company’s software products and in particular incorporating the OPA into the SGD Design Tool which will be used for designing Smart Gateway Diversity (SGD) ground networks for use with High Throughput Satellite (HTS) systems. The SGD Design Tool will apply the OPA to multiple gateway locations and groupings of gateways to enable satellite operators to optimise the design of a network for maximum overall satellite service availability taking into account regional weather conditions and variations.

This will be done by selecting (i) gateways with the “best” historic weather link availability and (ii) groupings of gateways with the maximum weather independence between gateway locations to minimise the number of sites simultaneously affected by the same weather systems. A key activity to be undertaken by the development team, including the applicant, would be the improvement of the OPA Machine Learning (ML) models based on historical measured rainfall data records. Different ML algorithms will be developed for different frequencies, fade margins, data temporal resolution and for different weather data service providers. Finally, the ML algorithm will be productionized including the development of a simple REST API and unit testing of the code.

Applicant Specification:

We are looking for a self-motivated and enthusiastic student who is keen to work on the cutting edge of satellite system network design and is currently studying for a Bachelors or Masters degree in Physics or an Engineering discipline.

Minimum Requirements:

- Experience of Python programming
- Interest in Machine Learning
- Interest in software development

Preferred Additional Requirements:

- Use of automated machine learning tools
- Object-oriented programming skills
- Knowledge of satellite communications

Further details:

8 weeks minimum fixed term contract to be agreed with successful candidate. Virtual Induction Event to be held on 21 June 2021. Ideally to complete before the start of the next academic year. Salary is £2,000 per calendar month gross.

Closing Date for Applications: 5pm Monday 7 June

Applications should be made through the online form attaching a CV, before the closing date. Please note that elements of the form left incomplete will be deemed to render the application ineligible. They will be checked for eligibility and forwarded to the employer.