Discipline(s) desired: Engineering - Computer/Electrical, Engineering, Computer Science, Mathematical Sciences
Company: Ciena
Duration of the project: 2 years
Preferred start date: As soon as possible.
Location(s): Montreal, QC, Canada
Number of posts: 1
Educational qualification: PhD

Open position for Research project manager

You want to be part of a world-class multidisciplinary team and have access to state-of-the-art labs ?

Ciena is a network strategy and technology company known for its commitment to customer success. With 25 years of industry leadership, we support more than 1,300 of the world's largest, most reliable networks. Our technology is complemented with a high-touch consultative business model. We're committed to developing and applying technologies that facilitate openness, virtualization, automation, collaboration, and a common experience. Technologies that offer the greatest degree of choice deliver the most rewarding customer experiences and business outcomes.

As part of its ENCQOR 5G partnership, Ciena is creating an international research ecosystem with industry and academia to assess demand-side implications of fully-connected intelligent fabrics of the future. The results of these studies will inform new paradigms for planning, design, and operation of 5G era intelligence systems. In addition to Ciena, the founding members of this ecosystem include ÉTS University, Mitacs, and the Platform Lab at Stanford University.

The ecosystem will determine how to create and utilize a Self-Optimizing Fabric (SOF) to address the complexity of distributing intelligence across disparate, interconnected systems while maintaining any necessary separation of operational tasks. An example application of this would be mobile esports, wherein multiple mixed reality applications, edge delivery platforms, and network interconnectivity work in unison towards the common goal of delivering an optimal gaming quality of experience with seamless continuity across multiple mediums.

Specifically, through this collaboration, SOF will transform the ENCQOR corridor for discovery and verification of real-world use-cases by bringing together 5G technologies with AI and cloud assets, all underpinned by an adaptive network. Results from the explorations will help inform how distributed intelligence systems of the future will be planned, designed, and deployed for rapid service delivery and operational efficiency.

Please describe the project:
Key research objective of this project is to assess the associated complexity, explore novel techniques, e.g. new Machine Intelligence sciences to provide systems recommendations for new paradigms for plan, design and operations of

5G era systems. This project will require a collaboration between the interns. The goals of this project are to:

- Demand side research and requirements analysis for intelligence frameworks that will underpin the SOF.
- Evaluation and recommendations for novel techniques for effective implementation of the intelligence framework. This will include :
    - Investigation for a state-of-the-art methods for data collection, data pre-processing, model development, model deployment.
    - The candidate will work with AI/ML platforms like TensorFlow and scikit-learn to develop predictive models. Research includes the investigation of AI models applied in different fields like telecom, complex adaptive systems, collaborative agents etc.. using approaches such as RNN, CNN, ANN, Ant Swam Optimization, and evolutional algorithms (e.g., genetic).
    - An analytical framework will be recommended by the results of the studies, in which the whole lifecycle of a complex application made of many smaller components will be monitored and optimized
    - AI pipeline and machine learning flows for SOF elements
- Research, requirements analysis and recommendations analysis for latency critical communications of interactive AI components.
- Hands-on discovery and verification with concrete software artificats in the research labs; to include but not limited to:
    - Model driven service enablement AI pipeline for 5G mobility stack
    - Modeling approaches to represent the information of the federation framework, and then design test scenarios for the federation (taking into account of new requirements of 5G applications.)
- Traffic modeling and future traffic projections, use case analysis, software system requirements and recommendations, and KPI recommendations for AI driven multi-access edge systems

Expected expertise or competencies:

Management skills:
- 2-5 years of industry experience;
- Has training and/or experience in project management;
- Must have high emotional and relational intelligence and skills;
- Is teamwork-oriented;
- Must be able to manage a team of approximately 20 highly-skilled individuals ;
- Can run a group discussion (agile coach or group animation experience);
- Can coordinate relations between partners (Ciena, Stanford University, ETS, Concordia University, INRS, University of Ottawa, Mitacs and other industrial partners.)

Technical skills:
- Programming languages: Java, Python, Go, Scripting: required;
- Linux OS: required;
- Networking: Ethernet, IP: required;
- Architectures: SDN, NFV: required;

- Machine learning algorithms: Required;
- Machine learning tools: TensorFlow, Scikit Learn, Keras.io;
- Data Science, Artificial Intelligence: required;
- Deep Learning: required;
- Open Platforms: Openstack, Kubernetes: Basic knowledge;
- 5G control plane, data plane and management plane: Basic knowledge;
- 3GPP SON systems: Basic knowledge;
- Self-Optimizing systems design, models and algorithms: Basic knowledge;
- Autonomic systems design, models and algorithms: Basic knowledge;
- Complex Adaptive System (CAS): Basic knowledge;

Candidates will be supervised by a professor at ÉTS Montréal and an industrial researcher.

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