Offre n°2025-08952

Post-Doctoral Research Visit F/M
Transfer Learning for Graph-linked Data

Niveau de diplôme exigé : PhD or equivalent

Fonction : Post-Doctoral Research Visit

A propos du centre ou de la direction fonctionnelle

The Inria centre at Université Côte d'Azur includes 42 research teams and 9 support services. The centre's staff (about 500 people) is made up of scientists of di?erent nationalities, engineers, technicians and administrative staff. The teams are mainly located on the university campuses of Sophia Antipolis and Nice as well as Montpellier, in close collaboration with research and higher education laboratories and establishments (Université Côte d'Azur, CNRS, INRAE, INSERM ...), but also with the regiona economic players.

With a presence in the fields of computational neuroscience and biology, data science and modeling, software engineering and certification, as well as collaborative robotics, the Inria Centre at Université Côte d'Azur is a major player in terms of scientific excellence through its results and collaborations at both European and international levels.

Contexte et atouts du poste

The work will be at Inria team **NEO** (https://team.inria.fr/neo/), located in Sophia Antipolis, under the supervision

of **Dr. Konstantin Avrachenkov** (https://www-sop.inria.fr/members/Konstantin.Avratchenkov/me.html).

Mission confiée

Topic:
The project is a cutting-edge research initiative funded by Université Côte d'Azur under
the DS4H "Idées 2025" program. It aims to push the boundaries of machine learning by
developing advanced techniques for transfer learning in graph-linked data. In

many
real-world scenarios—from electrical grids and transportation systems to blockchain
networks—data is naturally represented as graphs. However, most existing Graph Neural
Networks (GNNs) struggle to generalize across different graph topologies, especially
when those graphs are large, dynamic, or only partially labeled. We seeks to overcome
these limitations by creating novel GNN architectures that are invariant (i.e., their outputs do not change under graph isomorphisms) or equivariant (i.e., their outputs change in a predictable way when the input graph is transformed). The goal is to build and to analyse models that maintain high performance even when applied to graphs
that differ from those they were trained on. We shall be testing new methods on two high-impact use cases: predicting cascading failures in electrical grids and detecting fraudulent patterns in cryptocurrency networks.

Background references:

Avrachenkov, K., Mishenin, A., Gonc?alves, P. & Sokol, M. Generalized optimization framework
for graph-based semi-supervised learning. In Proceedings of SIAM SDM 2012.

Azizian, W., & Lelarge, M. Expressive power of invariant and equivariant graph neural networks.
arXiv preprint arXiv:2006.15646, 2020, also in Proceedings of ICLR 2021.

Gritsenko, A., Shayestehfard, K., Guo, Y., Moharrer, A., Dy, J. & Ioannidis, S. Graph transfer learning. Knowledge and Information Systems, 65(4), 1627-1656, 2023.

To apply: Submit an application containing CV, Research Statement with a connection to the
proposed project and two recommendation letters.

Principales activités

Main activities:

1. Conducting research;
2. Carrying out numerical experiments (in pyton or matlab);
3. Writing scientific articles

Compétences

Required skills:

We seek a candidate with PhD in Mathematics or Theoretical Computer Science/Machine Learning.
A candidate should have a solid knowledge in probability, statistics and a good knowledge in
graph theory. A candidate should be able to program in pyton or matlab.

Avantages

- Subsidized meals
- Partial reimbursement of public transport costs
- Leave: 7 weeks of annual leave + 10 extra days off due to RTT (statutory reduction in working hours) + possibility of exceptional leave (sick children, moving home, etc.)
- Possibility of teleworking and flexible organization of working hours
- Professional equipment available (videoconferencing, loan of computer equipment, etc.)
- Social, cultural and sports events and activities
- Access to vocational training
- Contribution to mutual insurance (subject to conditions)

Rémunération

Gross Salary: 2788 € per month.

Informations générales

- **Thème/Domaine :** Optimization, machine learning and statistical methods
- **Ville :** Sophia Antipolis
- **Centre Inria :** Centre Inria d'Université Côte d'Azur
- **Date de prise de fonction souhaitée :** 2025-10-01
- **Durée de contrat :** 12 months
- **Date limite pour postuler :** 2025-07-31

Contacts

- **Équipe Inria :** NEO
- **Recruteur :**
  Avrachenkov Konstantin / Konstantin.Avratchenkov@inria.fr

A propos d'Inria

Inria est l’institut national de recherche dédié aux sciences et technologies du numérique. Il emploie 2600 personnes. Ses 215 équipes-projets agiles, en général communes avec des partenaires académiques, impliquent plus de 3900 scientifiques pour relever les défis du numérique, souvent à l’interface d’autres disciplines. L’institut fait appel à de nombreux talents dans plus d’une quarantaine de métiers différents. 900 personnels d’appui à la recherche et à l’innovation contribuent à faire émerger et grandir des projets scientifiques ou entrepreneuriaux qui impactent le monde. Inria travaille avec de nombreuses entreprises et a

accompagné la création de plus de 200 start-up. L'institut s'e?orce ainsi de répondre aux enjeux de la transformation numérique de la science, de la société et de l'économie.

Attention: Les candidatures doivent être déposées en ligne sur le site Inria. Le traitement des candidatures adressées par d'autres canaux n'est pas garanti.

Consignes pour postuler

Applications must be submitted online on the Inria website. Collecting applications by other channels is not guaranteed.

Sécurité défense :
Ce poste est susceptible d’être affecté dans une zone à régime restrictif (ZRR), telle que définie dans le décret n°2011-1425 relatif à la protection du potentiel scientifique et technique de la nation (PPST). L’autorisation d’accès à une zone est délivrée par le chef d’établissement, après avis ministériel favorable, tel que défini dans l’arrêté du 03 juillet 2012, relatif à la PPST. Un avis ministériel défavorable pour un poste affecté dans une ZRR aurait pour conséquence l’annulation du recrutement.

Politique de recrutement :
Dans le cadre de sa politique diversité, tous les postes Inria sont accessibles aux personnes en situation de handicap.