
Type de contrat : CDD de la fonction publique
Niveau de diplôme exigé : Bac + 5 ou équivalent
Fonction : Doctorant

Contexte et atouts du poste

Team

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Mission confiée

Scientific Context: The problem of visual localization within large environments using objects as features is the subject of this PhD thesis. Targeted applications are about augmented reality, especially in urban or industrial context. In recent years, research in pose estimation tasks has been dominated by convolutional networks (CNNs). Thanks to these methods, pose of an object can now be directly inferred from the appearance of objects instead of identifying individual surface points [1,4]. These approaches however require an accurate and textured 3D model for the learning stage. On the other hand, using objects as features for pose computation instead of the traditional key-points has emerged recently [1,2].

The objective of the thesis is to extend these methods to the case of real large environments where models are known with a limited accuracy and relatively small image datasets are available. We will mainly focus in this work on techniques for rough re-localization, without any knowledge on the camera pose. This is a common practical case in geo-denied environments.

Principales activités

Our aim is to design robust object-base localization methods for real environments, either at a local level (i.e when the pose is computed from one object) or at a global level, when a set of approximated objects are used for pose computation.

The following lines of research will be addressed:

- at the local level when one object is considered: a recent and promising trend in pose computation is to predict 2D projections of the corners of a 3D bounding box (BB) of the object [3,4] using convolutional networks. In practice, accurate models are required during the training stage to generate images of the object with various backgrounds, thus avoiding being influenced by the scene context. Extending such works to real datasets requires first to study the influence of the choice of the BB on the results and to define appropriate way for defining the BB. Second, methods have to be defined to generate synthetic images and combine them with real images for training. At an intermediate level, methods allowing to take advantage both from object detection and from classical key-point matching will be designed. A key difficulty there is that the accuracy of the two kind of features are not the same. In the case of objection detection, defining the accuracy of detection is in itself a problem.

Currently, image model association is based on a set of predefined class of objects. Procedures for automatic detection and reconstruction of prominent objects able to contribute to the robustness of pose computation will be another focus of this work.

Bibliography


Compétences

Required qualifications

MSc in computer science. Good skills in machine learning and/or computer vision will be appreciated

Language

French or English.

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.)

Informations générales

- Thème/Domaine : Vision, perception et interprétation multimedia
- Statistiques (Big data) (BAP E)
- Ville : Villers-lès-Nancy
- Centre Inria : CB Nancy - Grand Est
- Date de prise de fonction souhaitée : 2019-09-01
- Durée de contrat : 3 ans
- Date limite pour postuler : 2019-05-01

Contacts

- Equipe Inria : MAGRIT
- Directeur de thèse : Berger Marie-odile / marie-odile.berger@inria.fr

A propos d'Inria

Inria, l'institut national de recherche dédié aux sciences du numérique, promeut l'excellence scientifique et le transfert pour avoir le plus grand impact. Il emploie 2400 personnes. Ses 200 équipes-projets agiles, en général communes avec des partenaires académiques, impliquent plus de 3000 scientifiques pour relever les défis des sciences informatiques et mathématiques, souvent à l'interface d'autres disciplines. Inria travaille avec de nombreuses entreprises et a accompagné la création de plus de 160 start-up. Institut d'efforce ainsi de répondre aux enjeux de la transformation numérique de la science, de la société et de l'économie.

L'essentiel pour réussir

Application deadline May 1st, 2018 (Midnight Paris time)

How to apply

Upload your file on jobs.inria.fr in a single pdf or zip file, and send it as well by email to Marie-odile.berger@inria.fr and Gilles.simon@loria.fr.

Your file should contain the following documents:

Your CV.

A cover/motivation letter describing your interest in this topic.

A short (max one page) description of
• Possibility of teleworking (after 6 months of employment) 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
• Social security coverage

Rémunération

1982€ gross/month for 1st and 2nd year. 2085€ gross/month for 3rd year.

Monthly salary after taxes: around 1596,05€ for 1st and 2nd year. 1678,99€ for 3rd year. (medical insurance included).

your Master thesis (or equivalent) or of the work in progress if not yet completed.

Your degree certificates and transcripts for Bachelor and Master (or the last 5 years).

Master thesis (or equivalent) if it is already completed and publications if any (it is not expected that you have any). Only the web links to these documents are preferable, if possible.

In addition, one recommendation letter from the person who supervises(d) your Master thesis (or research project or internship) should be sent directly by his/her author to marie-odile.berger@inria.fr.

Applications are to be sent as soon as possible.

Consignes pour postuler

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.

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