

Journée scientifique

Vendredi 29 novembre 2019

Amphithéâtre Euler

9h15

Accueil et présentation de la journée

Par Anissa MOKRAOUI

9h30

Classification Using Sparse Representation and Applications to Skin Lesion Diagnosis

Par Hai Long NGO

Doctorant équipe « multimédia »

10h00

TLS ou la sécurité des échanges applicatifs

Par Ahmed SERHROUCHNI

Telecom Paris

11h-11h15 : Pause café

11h15

Multichannel Signal Processing: Sparsity Approach for Audio Signal, Physics Signal and Natural Image Processing

Par Fangchen FENG

Equipe « multimédia »

12h00

On Demand Cluster Head Formation with Inherent Hierarchical Clustering and Reliable Multipath Routing in Wireless Sensor Networks

Par Nouman BASHIR

Doctorant Equipe « réseaux »

12h30-14h00 : Pause déjeuner

14h00

Robust Deep Learning in Real World

Par Nicolas THOME

Conservatoire national des arts et métiers

Equipe MSDMA, CEDRIC Lab

15h00

Efficient Collaborative Data Dissemination Schemes for UAVs for Real Time Surveillance on Highways

Par Saadi BOUDJIT

Equipe « réseaux »

15h45-16h00 : Pause café

16h00 Présentation des doctorants/stagiaires
(10 minutes suivies de 5 minutes de questions)

Compression d'images basée sur l'apprentissage profond

Par Tasnim DARDOURI

Doctorant équipe « multimédia »

**A Survey on Unmanned and Automated Vehicles in Warehouse on Indoor
Inventory and Localization**

Hector Alejandro GALVEZ LOPEZ

Doctorant invité équipe « réseaux »

Signaux sur graphe

Par Childerick ENMOGNE

Stagiaire « multimédia »

16h45

Clôture de la journée

Par Anissa MOKRAOUI

Résumé des exposés

Hai Long NGO

Classification Using Sparse Representation and Applications to Skin Lesion Diagnosis"

Over the last few decades, sparse representation modeling has undergone a tremendous expansion with extensive applications in many specialties such as machine learning and computer vision, especially in image processing. In this study, we focused on highly accurate classification methods using the sparse representation framework to enhance the performance of existing methods. Further, our objective is to enhance the classification performance for computer-assisted melanoma diagnosing, performed on dermoscopic images. During this research effort, we have been proposing two novel sparse representation-based methods in the transformed domain, namely Sparse Representation Wavelet-based Classification (SRWC) and Sparse Representation Quaternion Wavelet-based Classification (SRQWC). Our proposed methods outperformed many contemporary methods in terms of classification accuracy.

Ahmed SEHROUCHNI

TLS ou la sécurité des échanges applicatifs

TLS (Transport Layer Secure) est probablement la solution de sécurité des échanges des plus déployés. TLS fait suite au protocole SSL (Secure Socket Layer), ce même protocole qui est obsolète. TLS est porté par un groupe de travail de l' "Internet Engineering Task Force" (IETF) organisme qui élabore et promeut des standards Internet. TLS a été "optimisé" tout en ayant un niveau de sécurité supérieur aux versions précédentes. Il a été notamment augmenté de nouvelles fonctionnalités pour répondre aux exigences de plus en plus élevées des applications. La nouvelle version TLS1.3 pour laquelle il a fallu quatre pour aboutir est actuellement présente sur un grand nombre de serveur (Apache, Nginx, IIS, etc.) et de clients (Chrome, Firefox, Opera, Safari, etc.).

Cette présentation a pour objectif dans un premier de situer le protocole TLS au travers de ses différentes versions et de bien établir son fonctionnement en mettant l'accent sur ces forces et ses faiblesses. Dans un second temps on présentera TLS1.3, cette dernière version qui a peiné a émergé. On mettra l'accent sur les apports de cette version par rapport aux versions précédentes.

Fangchen FENG

Multichannel Signal Processing: Sparsity Approach for Audio Signal, Physics Signal and Natural Image Processing

Multichannel signal processing has numerous applications for the audio signal, natural image, as well as physics signal processing. Based on the harmonic analysis and the optimization tools that are rapidly developed, I present an efficient framework for the multichannel scenario via the example of the audio signal and the gravitational wave signal processing. I then present some preliminary results on the natural image decomposition problem.

Nouman BASHIR

On Demand Cluster Head Formation with Inherent Hierarchical Clustering and Reliable Multipath Routing in Wireless Sensor Networks

This work presents a novel on demand cluster head formation with inherent hierarchical clustering and reliable multipath routing (HMR) protocol. In HMR, on demand primary and secondary paths are formed. Nodes involved in the path announce themselves as cluster heads within their region of transmission forming natural clusters. HMR provides a fast path failure

recovery mechanism while ensuring data transmission on the alternate path. The proposed HMR performs well in high-density network scenarios due to the availability of node-disjoint multiple paths

Nicolas THOME

Robust Deep Learning in Real World

Deep learning is currently witnessing a huge success due to the outstanding performances reached by neural networks in various application fields, eg image classification, audio recognition or natural language processing. In this talk, I focus on two methodological aspects of deep models, which have an important impact for their widespread use in real world applications.

Firstly, deep neural networks are commonly trained using gradient descent optimization methods, which requires the design of a differentiable loss function. From the perspective of time series forecasting for non-stationary signals and multiple future steps prediction, I introduce DILATE (DIstortion Loss including shApe and TimE), a new objective function for training deep neural networks. DILATE aims at accurately predicting sudden changes, and explicitly incorporates two terms supporting precise shape and temporal change detection. I highlight that DILATE corresponds to a differentiable loss function suitable for training deep neural nets, and detail a custom back-prop implementation for speeding up optimization. I also introduce a variant of DILATE, which provides a smooth generalization of temporally-constrained Dynamic Time Warping (DTW). Experiments carried out on various non-stationary datasets reveal the very good behaviour of DILATE compared to models trained with the standard Mean Squared Error (MSE) loss function, and also to DTW and variants. DILATE is also agnostic to the choice of the model, and we highlight its benefit for training fully connected networks as well as specialized recurrent architectures, showing its capacity to improve over state-of-the-art trajectory forecasting approaches. A second limitation of deep models is related to their inability to produce reliable uncertainty estimates. This is, however, mandatory for using such models in context where public security is involved, eg healthcare or autonomous steering.

I introduce a new target criterion for model confidence, corresponding to the "True Class Probability" (TCP), and show how using the TCP is more suited than relying on the classic "Maximum Class Probability" (MCP), in the context of failure prediction. Since the true class is by essence unknown at test time, I explain a solution to learn TCP criterion on the training set, introducing a specific learning scheme adapted to this context. Extensive experiments are conducted for validating the relevance of the proposed approach: across various network architectures, small and large scale datasets for image classification and semantic segmentation, I show that the approach consistently outperforms several strong baselines, from MCP to Bayesian uncertainty, as well as recent approaches specifically designed for failure prediction.

Efficient collaborative data dissemination schemes for UAVs for real time surveillance on highways

Saadi BOUDJIT

Unmanned Aerial Vehicles (UAVs) or aerial drones have a very encouraging future owing to the flexibility of their use in plenty of applications and the provision of less costly solutions in comparison to fixed infrastructure networks. Realizing a collaborating end-to-end solution for a dynamic UAV network is a very challenging task. In this work, we will present two efficient routing schemes for UAVs for a real time data transmission for highways surveillance. These two schemes take advantage of well known ad hoc routing protocols for on-demand and proactive route computation respectively. Moreover, the Boids of Reynolds mechanism is used for connectivity and route maintaining.

Compression d'images basée sur l'apprentissage profond

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Doctorant équipe « multimédia »

A survey on Unmanned and Automated vehicles in warehouse on indoor inventory and localization

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