Your Connection to ICT Research

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Mickaël Tits, Dr Ir (PhD)

Senior R&D Engineer
Data Science Department (DSIDE)

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Summary

Dr Ir Mickaël Tits is senior research engineer at CETIC since 2018. He completed a Master's degree in Electrical Engineering specialized in Multimedia and Telecommunications at the University of Mons (UMONS 2014), and completed his master thesis at McGill University in Montreal. He then pursued a doctoral thesis under a FRIA grant (FNRS), at the University of Mons within the Numediart Institute, on the automatic evaluation of gesture expertise by motion capture and machine learning (UMONS 2018). He was also able to participate in the development of the MotionMachine framework, allowing the manipulation, interactive visualization and analysis of Motion Capture data. During his doctoral thesis, he participated in the supervision of various courses, including circuit theory, signal processing and C++ programming, and in various student projects. He then joined CETIC in October 2018 as a senior R&D engineer in the Data Science Department (DSIDE). His interests are in artificial intelligence, machine learning and deep learning, and their applications in many areas such as health and industry.

Major expertise

TECHNICAL SKILLS

- Languages: C, C++, Python, Matlab. Familiar with Java, C#, SQL, Apache Spark (PySpark).
- Tools: Anaconda, Jupyter Lab, Matlab, Zeppelin, Visual Studio, CodeBlocks, GIT, Redmine.
- Skills in machine learning techniques and tools, including Deep Learning (Scikit-learn, Keras, Matlab Deep Learning Toolbox, familiar with Pytorch, Tensorflow). Familiar with various application domains, including image processing, natural language processing, time series analysis, dataframe processing, and motion (Motion Capture) analysis.
- Familiar with big data management, and with distributed and cloud computing (e.g. Google Cloud, Amazon Web Services, Databricks, Yarn/Zeppelin), deployment tools (Varnish and Docker).

PERSONAL AND COMMUNICATION SKILLS

- Teamwork skills and ability to manage several projects simultaneously.
- Autonomous, analytical and innovative spirit, ability to deal with the various challenges of complex projects.
- Languages: English (full professional proficiency), French (mother tongue), Dutch (elementary proficiency).

DIDACTIC SKILLS

- Skills in student project coaching, scientific and didactic presentation.

Professional experience

CETIC, Senior R&D Engineer, Data Science Department (10/2018- Present)

- Technical leader and developer, involved in various regional and european research projects in the domain of Data Science.
- Technical consultant for various industrial research missions, including literature review, technical audits, feasibility assessment, and proof-of-concept development in various domains, including recommender systems, natural language processing, edge computing, time series forecasting, image processing and data monitoring.
- Involved in the Deep-Learning-Academy consortium in collaboration with UMONS (Numediart). Comparison and didactic presentation of various innovative open source technologies. E.G.:

- Github: open-image-restoration - A selection of State-ot-the-art, Open-source, Usable, and Pythonic techniques for Image Restoration
- Colab Notebook: A comparison of state-of-the-art image super-resolution algorithms
- Blog post (french) : Super-résolution d'images par intelligence artificielle
- Blog post (french) : Restauration d'images par réseaux de neurones profonds

University of Namur (09/2019 – Present)

- University lecturer.
  - Course: Introduction to Python for Data Science and Machine Learning Initially developed for my lectures at UNamur, I created a fully open source course support, fully in French, available on Github and on my website: http://mickaeltits.be/Python_Data_Science

FNRS, FRIA PHD Grant Holder at University of Mons (UMONS), Numediart Institute, Circuit Theory and Signal Processing Department (09/2014-09/2018)

- Participation, speaker and reviewer in various International Conferences:
  - MOCO, International Conferences on Movement computing (Thessaloniki, Greece, 2016 and London, UK, 2017)
  - eNTERFACE Workshops on Multimodal Intelligent Interfaces (Mons, Belgium, 2015, and Porto, Portugal, 2016)
  - ICMC, International Computer Music Conference (Denton, Texas, 2015)
- Speaker in a public conference at the Mundaneum Museum (Mons): "Voyage au coeur du mouvement - High tech, expérience intérieure et éthique – La voie du scientifique"
- Co-organization of the eNTERFACE 2015 Workshop on Multimodal Intelligent Interfaces.
- Co-developer and administrator of the C++ MotionMachine framework
- Teaching:
  - Signals and Systems (2nd Bach) - assistant
  - Circuit theory (3rd Bach) – practical exercises teacher
  - Ateliers Créactifs: Openframeworks - assistant

Education

2014 - 2018 **PhD in Engineering Sciences, Signal Processing** at Numediart Institute, University of Mons (UMONS), Belgium. TCTS Laboratory. MoCap/HCI research team with Dr Joëlle tilmanne and Dr Nicolas d'Alessandro. Thesis under the supervision of Pr. Thierry Dutoit: Expert Gesture Analysis through Motion Capture using Statistical Modeling and Machine Learning.

2009 - 2014 **Electrical Engineer, specialized in Multimedia and Telecommunication** from the University of Mons (UMONS), Mons, Belgium. Master Thesis at McGill University (Montreal, QC, Canada), under the supervision of Pr. Thierry Dutoit and Pr. Marcelo Wanderley: Development of an optical motion capture setup for feature extraction and statistical analysis of the pianist's expert gestures.

Some publications

Tits, Mickaël and Tilmanne, Joëlle and Dutoit, Thierry, "Robust and automatic motion-capture data recovery using soft skeleton constraints and model averaging", PLOS ONE 13, 7 (2018), pp. 1-21.

Tits, Mickaël and Laraba, Sohaïb and Caulier, Eric and Tilmanne, Joëlle and Dutoit, Thierry, "UMONS-TAICHI: A Multimodal Motion Capture Dataset of Expertise in Taijiquan Gestures", Data in Brief (2018).

Tits Mickaël, Tilmanne Joëlle, Dutoit Thierry, "Morphology Independent Feature Engineering in Motion Capture Database for Gesture Evaluation" in "4th International Conference on Movement Computing", London, United Kingdom (2017), ACM.

Tits Mickaël, Tilmanne Joëlle, D'alessandro Nicolas, "A Novel Tool for Motion Capture Database Factor Statistical Exploration" in "3rt International Symposium on Movement and Computing", Thessaloniki, Greece (2016), ACM.

Grammalidis Nikos, Dimitropoulos Kosmas, Tsalakanidou Filareti, Kitsikidis Alexandros, Roussel Pierre, Denby Bruce, Chawah Patrick, Buchman Lise, Dupont Stephane, Laraba Sohaib, Picart Benjamin, Tits Mickaël, Tilmanne Joëlle, Hadjidimitriou Stelios, Hadjileontiadis Leontios, Charisis Vasileios, Volioti Christina, Stergiaki Athanasia, Manitsaris Athanasios, bouzos Odysseas, Manitsaris Sotiris, "The i-Treasures Intangible Cultural Heritage dataset" in "IEEE Workshop on Movement and Computing" , Thessaloniki, Greece (2016), ACM.

Tits Mickaël, Laraba Sohaib, Tilmanne Joëlle, Ververidis Dimitrios, Nikolopoulos Spiros, Nikolaidis Stathis, Chalikias Anastasios-Papazoglou, "Intangible Cultural Heritage Indexing by Stylistic Factors and Locality Variations - FP7 i-Treasures Deliverable 4.5", 2016-03-13 (2016).

Tilmanne Joëlle, D'alessandro Nicolas, Barborka Petr, Bayansar Furkan, Bernardo Francisco, Fiebrink Rebecca, Heloir Alexis, Hemery Edgar, Laraba Sohaib, Moinet Alexis, Nunnar Fabrizio, Ravet Thierry, Reboursiere Loic, Sarasua Alvaro, Tits Mickaël, Tits Noe, Zajega Francois, "Prototyping a New Audio-Visual Instrument Based on Extraction of High-Level Features on Full-Body Motion" in "Proceedings of the 10th International Summer Workshop on Multimodal Interfaces - eNTERFACE'15", Mons, Belgique, (2015).

Tits Mickaël, Tilmanne Joëlle, D'alessandro Nicolas, Wanderley Marcelo, "Feature Extraction and Expertise Analysis of Pianists' Motion-Captured Finger Gestures" in "International Computer Music Conference (ICMC 2015)", 19, 102-105, Denton, Texas (2015).

Lourenco Sofia, Martins Luis Gustavo, Wanderley Marcelo, Tits Mickaël, Megre Ricardo, "Towards a Multimodal Analysis of European Piano Schools of Music Performance" in "Conference on Interdisciplinary Musicology" , Berlin, Germany (2014).