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STADIUS
Center for Dynamical Systems, Signal Processing and Data Analytics

STADIUS Newsletter

June 2022

NEWS ▪ AWARDS ▪ EVENTS ▪ PUBLICATIONS

Welcome

Welcome to the June edition of the STADIUS Newsletter!

This will be the last edition for this academic year.
If you are taking some holidays in the summer months: Have a safe trip and an enjoyable vacation!



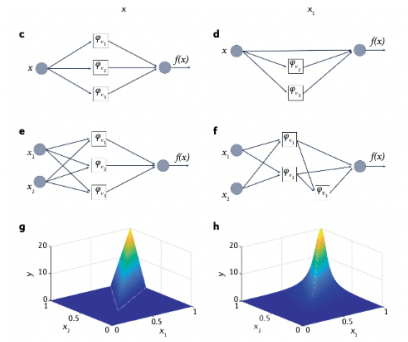
News

SeLMA closing event

On the 14th of June, the members of the EOS SeLMA



project came together to celebrate the end of this successful project. The collaboration included 8 professors from Flemish and Walloon universities from all over the country. With their large teams and other guests, this resulted in quite a large crowd at the ESAT building. Small didactical presentations were given on each subject that has advanced through this successful cooperation on Numerical Optimization-Based Algorithms and Applications for Structured Low-Rank Matrix/Tensor Approximation. Additionally, two guest professors, Philippe Toint and Rodolphe Sepulchre, came to give inspiring talks. These seemed to captivate the audience, judging by the number of questions afterwards. Posters were also presented, resulting in even more interactions and ideas. Finally, the members enjoyed a fancy dinner in the evening.



Article by STADIUS postdoc in Nature reviews methods primers

The paper co-authored by STADIUS postdoc Qinghua Tao, a former STADIUS postdoc Xiaolin Huang, and Johan Suykens was published in Nature Reviews Methods Primers.

The Rectified Linear Unit (ReLU) is a popular activation function in deep learning. It is a particular example of a Piecewise Linear (PWL) function. In this Primer, Piecewise linear neural networks and deep learning is systematically introduced, covering different model representations, learning algorithms, theoretical analysis, and representative applications together with discussions and outlooks.

Please click here to read the article.



AI for Time Series

This Thursday, STADIUS, VAIA and Flanders AI Research host the final seminar of the "AI for Time Series" Series. Join us for 'Semiparametric Time Series Modelling' with Kurt Barbé (VUB, Department Biostatistics and Medical Informatics), at Aula van de Tweede Hoofdwet, Thermotechnisch Instituut.

Did you miss a previous seminar? You can revisit the presentations and recording at each individual seminar page on the VAIA website.



Springer Nature adds statement on vulnerable groups to ethics guidelines

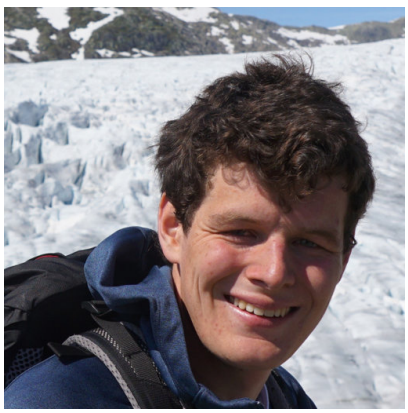
"For manuscripts reporting studies involving vulnerable groups where there is the potential for coercion or where consent may not have been fully informed, extra care will be taken by the editor. The manuscript may be referred to an internal editorial oversight group for further scrutiny. **Consent must be obtained for all forms of personally identifiable data including biomedical, clinical, and biometric data. Documentary evidence of consent must be supplied if requested**.".

These new lines in the Springer Nature ethics guidelines were joined by an important editorial in Nature that addresses research on vulnerable groups and provides **new guidance for such research in all of their 2,900 journals**. They were joined by the **American Society for Human Genetics** (8,000 members) who issued a formal position statement following the same lines. While formulated generically, these statements clearly relate to the abuses Yves Moreau has pushed back against for the last 2 years.

And more:

- Lots of Stadians participated in the Flanders AI Research Day on 21 June.
- Bart De Moor spoke at the Householder Symposium XXI in Bari on 22 June about Multiparameter Eigenvalue Problems, a lot of the talks were very relevant for Stadius researchers.

Awards



Best presentation award for Nicolas Heintz

Nicolas Heintz received the best student presentation award at the Symposium for Information Theory and Signal Processing in the Benelux (SITB 2022) for his presentation "Unsupervised neural decoding of auditory attention using a Binary Quadratic Program". This is joint work with the auditory attention decoding team (Simon, Iustina, and Iris) at STADIUS and ExpORL, under supervision of Alexander Bertrand and Tom Francart.

Congratulations!

Events @ STADIUS

For more information about STADIUS events please visit the STADIUS Event webpages.

AI for Time Series: Semiparametric Time Series Modelling

Speaker: Kurt Barbé (VUB, DWIS en GEWE)

When**: 30th June 2022,** 14:30 - 15:30

Where**: Aula van de Tweede Hoofdwet**

An AI for Time Series seminar, collaboration between

STADIUS, VAIA & Flanders AI Research

BACK TO THE ROOTS

30 Years professorship - Bart De Moor

When**: 8th July 2022,** 09:00 - 20:00

Where**: Quadrivium, Campus Arenberg,**

Celestijnenlaan 200H

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Publication Digest

Here's the monthly STADIUS Publications Digest, including new reports that have been added to the publications database.
Please remember to have your own reports added in the publications database and make sure your entries are kept up to date (status submitted/accepted/published) at all times.

Contact Ida for new additions and updates, do not add/update database content yourself.

22-54

Pandey A., De Meulemeester H., De Plaen H., De Moor B., Suykens J.A.K., "Recurrent Restricted Kernel Machines for Time-series Forecasting", Technical Report 22-54, ESAT-STADIUS, KU Leuven (Leuven, Belgium), 2022. Accepted for publication in *European Symposium on Artificial Neural Networks, Computational Intelligence and Machine Learning* (ESANN 2022).
Lirias number: 3762420.

22-55

Cao Z. Seeuws N. De Vos M. Bertrand A., "Change Point Detection in Multi-channel Time Series via a Time-invariant representation", Technical Report 22-55, ESAT-STADIUS, KU Leuven (Leuven, Belgium), 2022.

22-56

Orchel M., Suykens J.A.K., "Improved update rule and sampling of stochastic gradient descent with extreme early stopping for support vector machines", in *Proc. of the 7th International Conference on Machine Learning, Optimization, and Data Science (LOD), 1st symposium on Artificial Intelligence and Neuroscience (ACAIN)*, Electr, Network, Oct. 2021 *Machine Learning, Optimization, and Data Science*, Springer, pp. 147-161.
Lirias number: 3718628.

22-57

Birdi J., D'hooge J., Bertrand A., "A neural network approach for ultrasound attenuation coefficient estimation", Technical Report 22-57, ESAT-STADIUS, KU Leuven (Leuven, Belgium), 2022. Accepted for publication in*European Signal*

Processing Confference (EUSIPCO 2022).
Lirias number: 3745832.

22-58

Birdi J., D'hooge J., Bertrand A., "Regularized linear least-squares approach for spatially varying attenuation coefficient estimation", Technical Report 22-58, ESAT-STADIUS, KU Leuven (Leuven, Belgium), 2022. Accepted for publication in *International Sympoisum on Ultrasonic Imaging and Tissue Characterization 2022*.
Lirias number: 3745839.

22-59

Shi X., Nikolic G., Fischaber S., Black M., Rankin D., Epelde G., Beristain A., Alvarez R., Arrue M., Pita Costa J., Grobelnik M., Stopar L., Pajula J., Umer A., Poliwoda P., Wallance J., Carlin P., Paakkonen J., De Moor B., "System architecture of a European platform for health policy decision making : MIDAS", *Frontiers in Public Health*, vol. 10, Mar. 2022, pp. 1-13 (art nb 838438).
Lirias number: 3736811.

22-60

Passemiers A., Moreau Y., Raimondi D., "Fast and accurate inference of gene regulatory networks through robust precision matrix estimation", *Bioinformatics*, vol. 38, no. 10, May 2022, pp. 2802-2809.
Lirias number: 3749941.

22-61

Filtjens B., Ginis P., Nieuwboer A., Slaets P., Vanrumste B., "Automated freezing of gait assessment with marker-based motion capture and multi-stage spatial-temporal graph convolutional neural networks", *Journal of Neuroengineering and rehabilitation*, vol. 19, no. 48, May 2022, pp. 4-8.
Lirias number: 3747577.

22-62

Shim H.R., Lowet D., Luca S., Vanrumste B., "Synthetic data generation and multi-task learning for extracting temporal information from health-related narrative text", in *Proc. of the 7th Workshop on Noisy User-generated Text (W-NUT 2021)*, Nov. 2021, 14 p.
Lirias number: 3743306.

22-63

Kicken K., De Maesschalck T., Vanrumste B., De Keyser T., Shim HR., "Intelligent analyses on storytelling for impact measurement", in *Proc. of the 6th workshop on noisy user-generated text (W-NUT-2020)*, 2020, 10 p.
Lirias number: 3743308.

22-64

Vermeersch C., De Cock K., De Moor B., "Exploiting Shift-Invariant Subspaces", *Poster presentation at the SeLMA Closing Event*, Leuven, Belgium, Jun. 2022, 1 p.
Lirias number: 3762272.

22-65

Tao Q., Li L., Huang X., Xi X., Wang S., Suykens J., "Piecewise Linear Neural Networks and Deep Learning",*Nature Reviews Methods Primers*, vol. 2, no. 1, Jun. 2022, 43 p.
Lirias number: 3762274.

22-66

Pethick T., Latafat P., Patrinos P., Fercoq O., Cevher V., "Escaping limit cycles: Global convergence for constrained nonconvex-nonconcave minimax problems", Technical Report 22-66, ESAT-STADIUS, KU Leuven (Leuven, Belgium), 2022. *International Conference on Learning Representations*.
Lirias number: 3762279.

22-67

Ketcham R., Verdyck J., Moonen M., "Optimal Time-Switching for Simultaneous Wireless Information and Power Transfer", Technical Report 22-67, ESAT-STADIUS, KU Leuven (Leuven, Belgium), 2022.

22-68

Hermans B., Themelis A., Patrinos P., "QPALM : a proximal augmented lagrangian method for nonconvex quadratic programs", *Mathematical Programming Computation*, Mar. 2022, 45 p.
Lirias number: 3725415.

22-69

Simoes M., Themelis A., Patrinos P., "Lasry-Lions envelopes and nonconvex optimization : A homotopy approach", in *Proc. of the 29th European Signal Processing Conference (EUSIPCO)*, Dublin, Ireland, Aug. 2021, pp. 2089-2093.
Lirias number: 3725481.

22-70

Heintz N., Geirnaert S., Francart T., Bertrand A., "Unbiased unsupervised stimulus reconstruction for EEG-based auditory attention decoding", Technical Report 22-70, ESAT-STADIUS, KU Leuven (Leuven, Belgium), 2022.

22-71

Amoni M., Ingelaere S., Moeyersons J., Vandenberk B., Claus P., Lemmens R., Van Huffel S., Sipido K., Varon C., Willems R., "Temporal changes in beat-to-beat variability of repolarization predict imminent nonsustained ventricular tachycardia in patients with ischemic and nonischemic dilated cardiomyopathy", *Journal of the American Heart Association*, vol. 11, 2022, e024294 p.
Lirias number: 3762675.

22-72

Petsophonsakul P., Pirmani A., De Brouwer E., Van Der Aa F., Vermeesch J., Wuyts R., Moreau Y., Maes I., Vannieuwenhuyse B., "Augmenting THerapeutic Effectiveness Through Novel Analytics (ATHENA) - A Public and Private Partnership Project Funded by the Flemisch Government (VLAIO)", *Stud Health Technol Inform*, vol. 294, no. *, May 2022, pp. 829-833.
Lirias number: 3750775.

22-73

Raimondi D., Codice F., Orlando G., Schymkowitz J., Rousseau F., Moreau Y., "HPMPdb : A machine learning-ready database of protein molecular phenotypes associated to human missense variants", *Current Research in Structural Biology*, vol. 4, 2022, pp. 167-174.
Lirias number: 3757765.

KU Leuven, ESAT/STADIUS, Kasteelpark Arenberg 10, bus 2446, B-3001 Leuven
ida.tassens@kuleuven.be .