

# Overview & Recent Publications

## Who We Are

A spin-out from Imperial College London, the R&D Group @ Cortexica has been operating for over 10 years, it now comprises of 30+ research scientists and engineers with a variety of backgrounds; from computer vision, machine learning, neuroscience to astrophysics and medical imaging.

The group has expertise in various Artificial Intelligence, Deep Learning, Machine Learning, Geometric and Statistical techniques. This drives sophisticated AI solutions for our clients and simply put; "World-class best-of-breed technology". This results in delivering the fastest, most-efficient and highest accurate capabilities for both image and video comprehension available today.

## Ecosystem - Partners & Grants

We believe no one party can solve this alone and have strategic partnerships with several industry and public sector partners. Our Global clients and partnership grants in affect steer a large portion of the group's research agenda.

## Publications

Cover well-known journals (PAMI, JOSA, Phys Rev E, PloS Computational Biology/Biology, Neuroimage, Royal society journals, etc.) and respected conferences such as NIPS, CoSyNe, AISTATS, ECCV, ICCV, etc. The group is structured into, i) Applied, and ii) Theoretical teams, with a commercial focus and support for our clients' AI roadmaps.

## Conferences

1. S Nazir, Y Qian, M Haroon Yousaf, S A. Velastin, E Izquierdo, E Vazquez "Human Action Recognition Using Multi-Kernel Learning for Temporal Residual Network" VISSAP 2019  
<http://www.visapp.visigrapp.org/Home.aspx>
2. N Nida, M Haroon Yousaf, A Irtaza, and S A. Velastin "Bag of Deep Features for Instructor Activity Recognition in Lecture Room" MMM 2019  
<http://mmm2019.iti.gr/conference-program/>
3. R Zakizadeh, Y Qian, M Sasdelli, E Vazquez "Instance Retrieval at Fine-grained Level Using Multi-Attribute Recognition" MIRA workshop at SITIS 2018  
<https://arxiv.org/pdf/1811.02949.pdf>
4. M Emambakhsh, A Bay, E Vazquez "Deep recurrent neural network for multi-target filtering" MMM 2018  
<https://arxiv.org/pdf/1806.06594.pdf>
5. L González, S Velastin, G Acuña "Silhouette-based human action recognition with a multi-class support vector machine" ICPRS 2018  
[https://cortexica.com/ICPRS-18\\_multi-class-support-vector-machine](https://cortexica.com/ICPRS-18_multi-class-support-vector-machine)
6. J Espinosa, S Velastin, J Branch "Motorcycle detection and classification in urban scenarios using a model based on faster R-CNN" ICPRS 2018  
<https://arxiv.org/pdf/1808.02299.pdf>
7. M Belloc, S Velastin, R Fernandez, M Jara "Detection of people boarding / Alighting a Metropolitan Train using Computer Vision" ICPRS 2018  
[https://cortexica.com/ICPRS-19\\_ComputerVision](https://cortexica.com/ICPRS-19_ComputerVision)
8. A. Bay and B. Sengupta "GeoSeq2Seq: Information Geometric Sequence-to-Sequence Networks" ICLR2018  
<https://openreview.net/forum?id=rJ4dWt6HM>
9. A. Bay and B. Sengupta "Approximating meta-heuristics with homotopic recurrent neural networks" Theory of Deep Learning at ICML 2018  
<https://arxiv.org/pdf/1709.02194.pdf>

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10. B Sengupta, E Vasquez, Y Qian "Deep Tensor Encoding" KDD 2017  
<https://arxiv.org/pdf/1703.06324.pdf>
11. G Cooray, R Rosch, T Baldeweg, L Lemieux, K Friston, B Sengupta Bayesian belief updating of spatiotemporal seizure dynamics" ICML 2017  
<http://hdl.handle.net/10016/27820>
12. A. Creswell, T. White, V. Dumoulin, K. Arulkumaran, B. Sengupta and A. Bharath "Generative Adversarial Networks - An Overview" IEEE Signal Processing Magazine (in press, 2017)  
<http://arxiv.org/abs/1710.07035>
13. A. Bay and B. Sengupta "StackSeq2Seq: Dual Encoder Seq2Seq Recurrent Networks" (HeteroNAM in WSDM2018)  
<https://arxiv.org/abs/1710.04211>
14. M Emambakhsh, A Bay, E Vazquez "Convolutional Recurrent Predictor: Implicit Representation for Multi-target Filtering and Tracking" 2018  
<https://arxiv.org/pdf/1811.00313.pdf>
15. B. Sengupta and K.J. Friston "Approximate Bayesian inference as a gauge theory" Proceedings of ICML 2017 (Computational Biology workshop) – spotlight presentation  
<https://arxiv.org/abs/1705.06614>
16. B. Sengupta and Y. Qian "Pillar networks for action recognition" Proceedings of IROS (Workshop on Semantic Policy and Action Representations for Autonomous Robots), Canada 2017  
<https://arxiv.org/abs/1707.06923>
17. B. Sengupta and Y. Qian Pillar Networks++: distributed non-parametric deep and wide networks"PAIR in AAAI 2017  
<https://arxiv.org/pdf/1708.06250.pdf>
18. B. Sengupta and Y. Qian "Multi-kernel deep learning of deep convolutional features for action recognition" LSMDC (Video and Language Understanding Workshop) ICCV 2017  
<https://arxiv.org/abs/1707.06923>
19. B. Sengupta and Y. Qian "Pillar Networks for action recognition" SPAR in IROS 2017  
<https://arxiv.org/pdf/1707.06923.pdf>
20. V Simaiaki, A Mirabile, E Vazquez "Flower identification on species level with uneven classes and few images" BMVA Workshop 2017  
<https://www.jiscmail.ac.uk/cgi-bin/webadmin?A2=bmva;9a1e35a3.1609>
21. B Gajic, E Vazquez, R Baldrich "Deep representations for texture description and retrieval" BMVA Workshop 2017  
<https://static1.BMVC2017PocketProgrammeGuide.pdf>
22. Y. Qian, P. Giaccone, M. Sasdelli, E. Vazquez and B. Sengupta "Algorithmic clothing: hybrid recommendation, from street-style-to-shop" Proceedings of KDD 2017 (Machine learning meets fashion workshop)  
<https://arxiv.org/abs/1705.09451>
23. B Sengupta, K Friston "Sentient self-organization: minimal dynamics and circular causality" Nurons and Cognition 2017  
<https://arxiv.org/pdf/1705.08265.pdf>

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25. B Sengupta, K Friston "Approximate Bayesian inference as a gauge theory" ICML 2017  
<https://arxiv.org/pdf/1705.06614.pdf>
26. Y Qian, E Vazquez, B Sengupta "Differential geometric retrieval of deep features" ICDM HDM workshop 2017  
<https://arxiv.org/pdf/1702.06383.pdf>

## Journals

1. H Pham, L Khoudour, A Crouzil, P Zegers, S A. Velastin "End-to-End Temporal Action Detection using Bag of Discriminant Snippets (BoDS)"  
<http://hdl.handle.net/10016/27820>
2. F Murtaza, M Haroon Yousaf, A A. Velastin, Y Qian "Learning to Recognize 3D Human Action from A New Skeleton-based Representation Using Deep Convolutional Neural Networks" IET Computer Vision 2018  
<https://digital-library.theiet.org/content/journals/iet-cvi>
3. R Zakizadeh, M Sasdelli, Y Qian, E Vazquez "FineTag: Multi-attribute Classification at Fine-grained Level in Images" 2018  
<https://arxiv.org/pdf/1806.07124.pdf>
4. M Emambakhsh, A Bay, E Vazquez "Convolutional Recurrent Predictor: Implicit Representation for Multi-target Filtering and Tracking" 2018  
<https://arxiv.org/pdf/1811.00313.pdf>
5. B Sengupta, E Vazquez, M Sasdelli, Y Qian, M Peniak, L Netherton, G Delfino "Large-scale image analysis using docker sandboxing" 2017  
<https://arxiv.org/pdf/1703.02898.pdf>