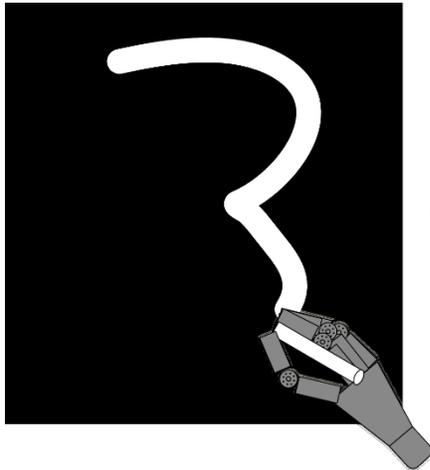


## BMVA Symposium: Generative Networks in Computer Vision and Machine Learning.



## Generating Data in Computer Vision and Machine Learning

One Day BMVA symposium in London Wednesday 29<sup>th</sup> November 2019

**Chair:** Nathan Olliverre

[www.bmva.org](http://www.bmva.org)

The one-day symposium took place at the British Computer Society in London, UK on the 27th November 2019 and was well attended by 47 researchers from both universities and industry. The symposium focused on recent advances in generative networks and their application in computer vision tasks, specifically the development of Generative Adversarial Networks (GAN's) and Variational AutoEncoders (VAE's).

Shortly after 9.30 am the first keynote speaker, **Thomas Kustner** from **Kings College London** discussed the use of GAN's for detection, localisation, classification, and post-processing within the field of Magnetic Resonance Imaging (MRI) and diagnosis. Kustner presented the challenge of reducing the time that patients spend within the scanner while still producing high-quality scans for diagnosis. Deep learning methods were introduced for the assistance in reconstructing and de-noising these medical images for analysis while reducing exposure for patients.

The morning session continued with two creative applications of generative networks, including the use of GAN's for generating optimal arrangements of 3D Models to assist artists in finding aesthetically pleasing compositions by **Guido Salimbeni**. He was followed by **Marc Goriz Blanch** from the **BBC** which presented their research in auto colourisation which implemented a

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novel generator architecture with mini-batch normalisation that reduced the over-saturated effect of existing techniques.

Following a coffee break, our second keynote speaker, **Guang Yang** from **Imperial College London**, presented an overview of some practical applications for GAN's in cardiovascular imaging and analysis including segmentation, highlighting scar tissue on the heart and data augmentation.

**Neil Campbell** from **The University of Bath** continued the discussion with a presentation of his research on improving data efficiency in unsupervised GAN's, reducing the amount of training data required by combining the benefits of a Gaussian Process Latent Variable Model with a trainable stochastic likelihood from a DBN. Then **Thu Nguyen-Phoc** from **The University of Bath** introduced HoloGAN, an unsupervised model for learning 3D representations from 2D images capable of generating high-quality renderings with disentangled pose and identity encodings.

After Lunch, **Matthew Vowels** from **The University of Surrey** gave the first talk on Variational AutoEncoders, presenting gated-VAE, a weakly supervised model incorporating gated back-propagation and partitioned representation embeddings to address issues with disentanglement.

Our third keynote speaker was **Alison Lowndes** from **NVIDIA Ltd** who provided an overview of recent advancements in NVIDIA's GPU's, software, and research projects followed by **Akin Caliskan** from **The University of Surrey** who introduced the Synthetic People Stereo Dataset (SP2P) alongside a data generation framework for stereo reconstruction.

Following a brief coffee break, **Victoria Fernandez Abrevaya** presented two generative methods for learning 3D face models with deep disentangled representations. One of which couples a 3D generator with a 2D discriminator via a UV geometry mapping layer and an alternative which builds on PCA to improve disentanglement. She was followed by **Chaozheng Wang** from **The University of Aberdeen** introducing SymbolGAN, a generative architecture for deep style transfer that prioritises structural consistency and allows for control of the positioning of shapes in the generation.

The final keynote was presented by **Emanuele Sansone** from **Huawei Technologies, Research, and Development Ltd** who introduced Coulomb AutoEncoders, a method for preventing posterior collapse while improving reconstruction in generative autoencoders by combining Maximum Mean Discrepancy (MMD) and a Coulomb Kernel.

At the end of the day, attendees were encouraged to support the BMVA by providing feedback and suggesting their own ideas for future one-day symposiums.

Thank you to all presenters and attendees for their contributions throughout the day.

# BMVA

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