The study focuses on unsupervised deep learning algorithms for patch-wise anomaly detection in brain MRI, specifically on those employing Generative Adversarial Networks (GANs). The author assumes that the existing methods have a potential limitation of not accounting for inter-patient and inter-patch variability. To overcome it, an approach that utilizes a controllable StyleGAN2 is proposed. The paper modifies the image projection technique and uses the obtained style vectors, external attributes, and reconstruction errors to assign anomaly scores to the images.

The method's performance is evaluated in two independent experiments. In the first one, the GAN is trained on 64x64 images of chairs, providing control of generated chairs' type and angle of rotation. In the second experiment, 32x32x32 3D patches from T1 weighted brain scans are used to train the GAN with patients' identity, age, and patch position as controllable attributes.

The approach performs well in the tasks original to the controllable StyleGAN2, allowing for reconstructing unseen samples and modifying their attributes.

Nonetheless, in the task of patch-wise anomaly detection, the approach achieves an accuracy of 88.4% on the chair images and only 64.3% on the brain patches. It is considered inefficient when applied to 3D MR data and cannot be used in clinical practice in the proposed form.

The author discusses the potential causes of the failed experiment and suggests possible avenues for improving the proposed approach.