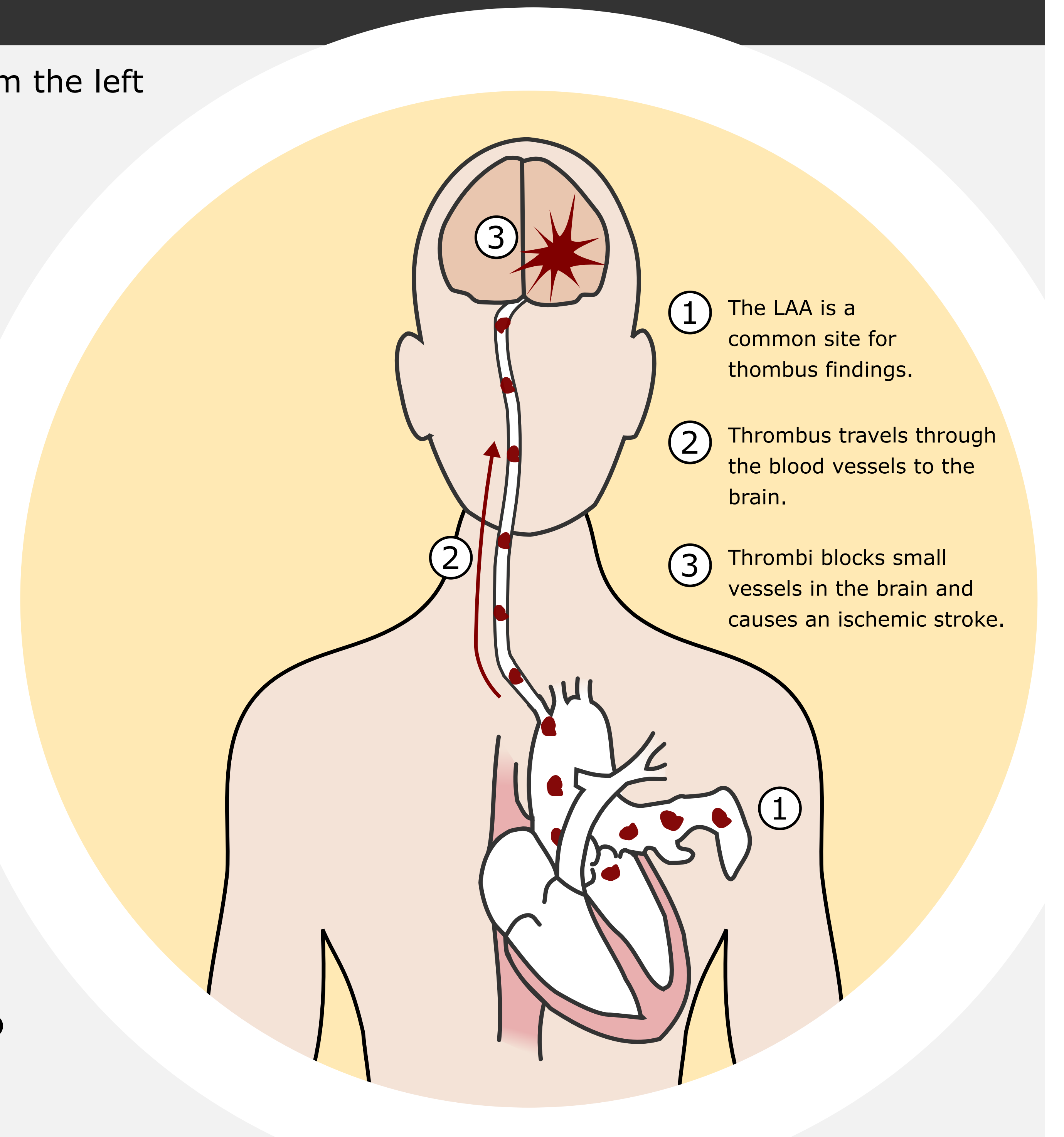


1. Introduction

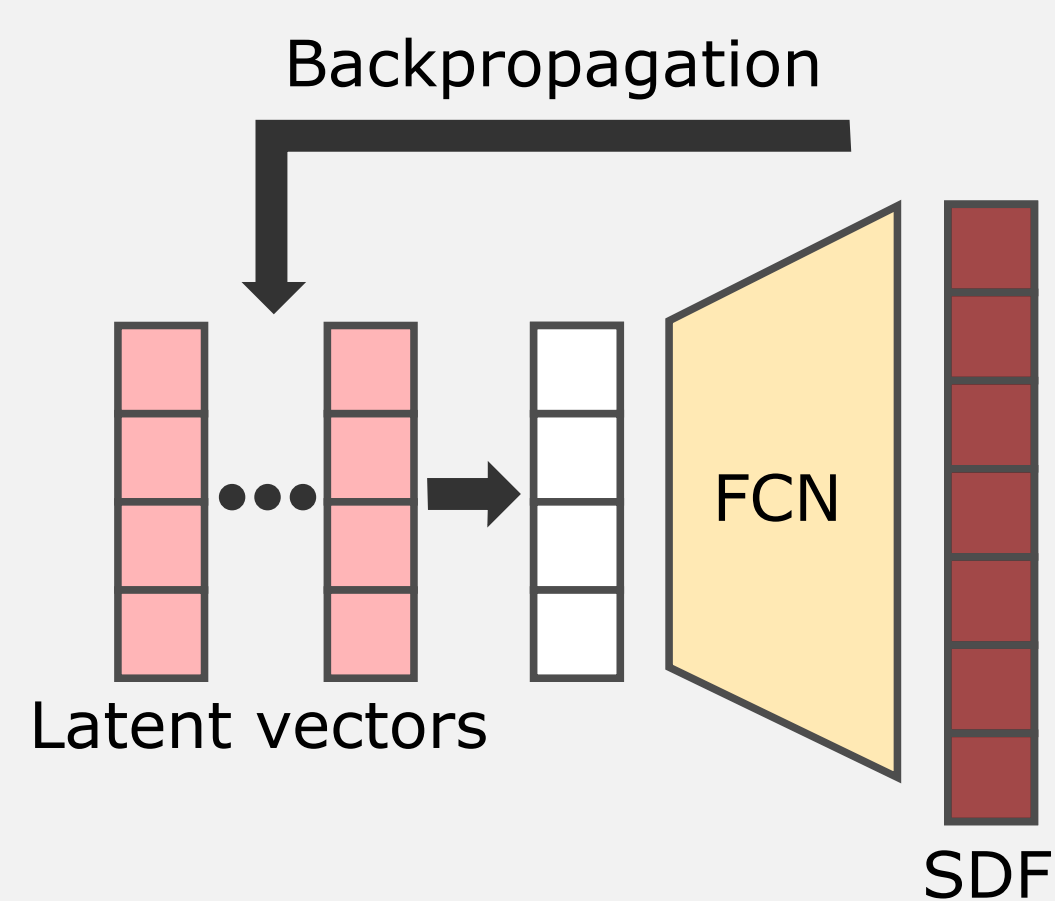
The Left Atrial Appendage (LAA) is complex tubular structure originating from the left atrium. The LAA is a common site of thrombus formation, causing increased stroke-risk for atrial fibrillation patients. The LAA is known for its large shape variability, and clinical studies reveal a correlation between shape and stroke risk. This correlation is however difficult to quantify due to the lack of reliable shape descriptors.

We propose an unsupervised method to derive a latent space representation of the LAA shape using implicit signed distance fields (SDFs).



2. Methods

An auto-decoder architecture is used to implicitly represent the SDF of a group of shapes [1].

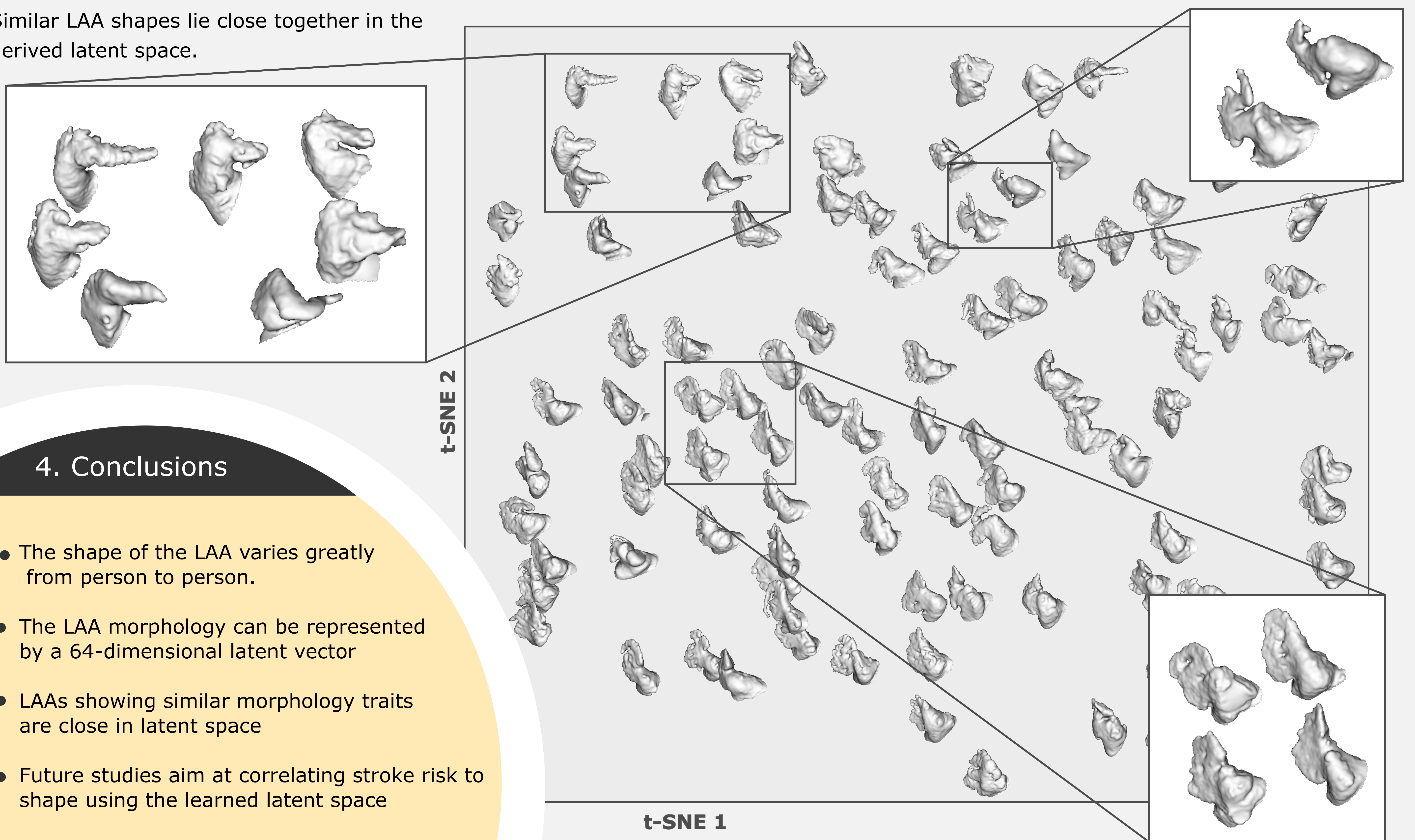


The latent space vectors are optimized jointly with the Fully Connected Network (FCN) using backpropagation.

The 64-D latent space is visualized using 2-D tSNE [2].

3. Results

Similar LAA shapes lie close together in the derived latent space.



4. Conclusions

- The shape of the LAA varies greatly from person to person.
- The LAA morphology can be represented by a 64-dimensional latent vector
- LAAs showing similar morphology traits are close in latent space
- Future studies aim at correlating stroke risk to shape using the learned latent space