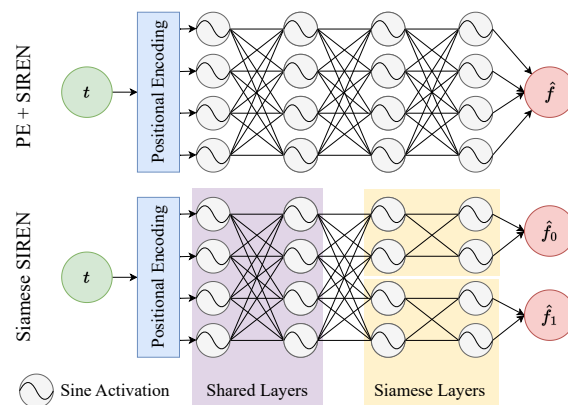




## Siamese SIREN: Neural Implicit Representations

Neural Implicit Representations (INRs) are an interesting way of representing data. Since data can be represented as a function (e.g. images as  $f(x, y) = (r, g, b)$  or audio as  $f(t) = a$ ), we are interested in training a neural network that learns to approximate  $f$ . A trained neural network, that approximates  $f$  well, can be used to store the data by storing the network weights. This implicit representation of data has some interesting properties, such as being resolution-invariant and not having a dependency on the size of the input. We can evaluate the neural network at any arbitrary point, allowing us to reconstruct the data with arbitrary resolution.

In a preliminary paper, we evaluated INRs on audio compression.<sup>1</sup> While it cannot yet compete with widespread compression methods, we believe there is more potential for INRs. In this thesis we want to build on top of Siamese SIREN, our extension to a wide-spread INR approach using sine activation functions. While we specifically experimented with audio compression, we want to extend the siamese approach to more general data representations. We will discuss details, related work, and ideas in a first meeting. The student should be highly motivated to publish their work in a renowned conference.



**Requirements:** Knowledge in Python and Machine Learning. Experience with Neural Implicit Representations and PyTorch is a plus.

We will have weekly meetings to address questions, discuss progress and think about future ideas.

### Contact

- Luca Lanzendörfer : [lanzendoerfer@ethz.ch](mailto:lanzendoerfer@ethz.ch), ETZ G93

<sup>1</sup><https://arxiv.org/pdf/2306.12957.pdf>