Project Proposal

1 Project Title

Handwritten signature verification system with Siamese neural networks.

2 Team Members

- Lucas Sorge
- Kenny Jia Hui Leong

3 Project Details

3.1 Project Objective

Please describe your project objective in this part.

- What is the project Objective?
  To develop a system that verifies handwritten signatures with only one reference sample.
- What problem to solve?
  To prevent signature forgery which is common in banking, legal and financial activities.
- Why the problem is important?
  Many authentication systems still rely on signatures and traditional Machine Learning(ML) models require large labeled datasets.
- Why machine learning can help to solve the problem?
  Siamese neural networks can compare a new signature against a stored reference with high accuracy, even if only one sample is available (Koch et al., 2015).

3.2 Datasets

Please describe your dataset in this section.

- What is the data and where you obtain it?
  Pashkin, Zack. Image dataset for handwritten signature verification. Kaggle.
  https://www.kaggle.com/datasets/tienen/handwritten-signature-verification/data
- How the data is collected?
  Crowdsourcing.
- What will be the features and labels you will use?
  Features: Original unique IDs, original signatures, forged unique IDs, forged signatures.
  Labels: Original signature, forged signature.
- How many examples for training, validation, and testing?
  Total: 5626 signatures (2913 original, 2713 forged)
  Train-validation-test split: 60-20-20 ratio

3.3 Machine Learning Algorithm

Please describe the machine learning algorithm you want to use for your project.
Please justify your selection.

Siamese neural network. Siamese neural networks are well-suited for matching different instances of same signature.

3.4 Expected Outcomes

What is your expected outcome for this project?

A signature verification system for banking, legal and financial authentication. Potential use for fraud prevention.

3.5 References

Koch, G., Zemel, R., Salakhutdinov, R. (2015). Siamese neural networks for one-shot image recognition. *ICML deep learning workshop*, vol. 2., https://paperswithcode.com/paper/siamese-neural-networks-for-one-shot-image