Literature Review

[Decomposing relief maps to detect counterfeit coins using a hybrid deep learning method ]

In this study deep learning algorithms were used for detecting counterfeit coins. They proposed a novel method to represent the relief map(height-map-image) in geometrical forms of Steep, Moderate, and Gentle slopes(SMG). And to compensate for the lack of fake coins they used Generative Adversarial Network(GAN) to create more fake coin images by feeding SMG maps. A hybrid CNN model used to detect counterfeit coins that also provides a rejection option. They fine-tuned state-of-the-art CNNs like VGG16, VGG19, and Resnet50 networks. VGG16 outperformed other networks so it was chosen. A new Structure of Two VGG16 pre-trained networks and three custom densely connected classifiers was proposed. VGG16 which was pre-trained on ImageNet dataset with millions of images with multiple dogs and cats classes. For counterfeit coin detection the top fully connected layers of these networks were truncated and replaced by the custom fully connected networks.

[Ancient coin classification based on recent trends of deep learning]

In this study Alex-Net is used for its significant computation and memory requirements. As Alex-Net delivers high performance on a variety of datasets and makes use of GPU efficiently for its convolutions and other processing. They used a classic comparable Alex-Net with five convolutional layers, three max-pooling, dropout and three fully connected layers. Convolutional layers with max-out functions, and for fully connected layers soft-max function. They used the Alex-Net model for multiple datasets to compare the accuracy of the labeled image data used for training. They used a large dataset of Roman Republican Coin Dataset (RRCD) with 17546 images and 100 different classes and smaller dataset Roman Coins 180 images. With their approach they achieved 96.3% accuracy on the RRCD dataset and on the Roman Coins dataset 100% accuracy.

[Using the Optical Mouse Sensor as a Two-Euro Counterfeit Coin Detector]

In this study Optical Mouse Sensor was used for detection of Counterfeit Two-Euro coins. Optical mouse sensor was used as an image acquisition device. The valid two-Euro coin was scanned by the sensor in (30X30 px) low resolution but the relief information is clearly revealed as it covers 1/14 of the two-Euro coin. The acquired image can be stored and used for counterfeit coin detection by template matching. This approach 100% rejects valid coins from other other countries that are visually different, local classes (bad copies). And fails to identify common classes(good copies) as counterfeit coins.