Deep Learning Module Write up- Snizhana Kurylyuk

Abstract

Among all the skin cancer types, melanoma is the least common skin cancer, but it is responsible for 75% of deaths. While it is a less common skin cancer type it spreads very quickly to other body parts if not diagnosed early. Melanoma can be cured if diagnosed and treated in the early stages. Digital skin lesion images can be used to make a teledermatology automated diagnosis system that can support clinical decisions.

The approach was to use deep learning data science to analyze a collection of determined images to later predict potential Melanoma cases.

Design

The overarching goal is to support the efforts to reduce the death caused by skin cancer. The primary motivation that drives the project is to use the advanced image classification technology to help catch skin lesions early and seek medical treatment. Successful completion of the project with higher precision on the dataset could better support the dermatological clinic work. The improved accuracy and efficiency of the model can aid to detect melanoma in the early stages and can help to reduce unnecessary biopsies. I explored a few neural network architectures to find the best model.

Data

The International Skin Imaging Collaboration (ISIC) is facilitating skin images to reduce melanoma mortality. Melanoma can be cured if diagnosed and treated in the early stages.The project dataset is openly available on Kaggle (SIIM-ISIC Melanoma Classification, 2020). It consists of around thirty- three thousand images from patients sampled over different weeks and stages.

- Total images of NV : 12875
- Total images of BCC : 3323
- Total images of AK : 867
- Total images of BKL : 2624
- Total images of DF : 239
- Total images of VASC : 253
- Total images of SCC : 628
- Total images of MEL : 4522
- Total images of UNK : 0

Algorithms

Featured Techniques

- Feature Engineering & Selection
- Transfer Learning Models Explored: MobileNet, Resnet
- Data Augmentation to reduce overfitting
- Dropout to reduce overfitting
- Early stopping to reduce overfitting

- Model Hyperparameter tuning

Tools

- Python, pandas, NumPy, SciPy, scikit-learn
- CNN, MobileNet, ResNet
- Tensorflow Keras
- Matplotlib, Seaborn

Communication

My project was completed in line with time requirements.