# Skin Lesion Classification using HG-PSO

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## 1 Summary

One of the major applications of Computer Vision is Medical Image Computing. The accuracy of detection of diseases like cancer is increasing with newer tools being available at our disposal. Skin lesion classification is one such task which is being performed in this project into 7 classes- Bowen's disease, basal cell carcinoma, benign keratosis-like lesions, dermatofibroma, melanoma, melanocytic nevi and vascular lesions on HAM10000 dataset with 10015 images of skin lesions.

The state-of-art approach for lesion detection as of now - Skin lesion classification using HG-PSO and YOLOv7 based convolutional network in real time. Proc Inst Mech Eng H.(doi: 10.1177/09544119231198823) . In this project I first implemented ResNet18 architecture from scratch to understand the architecture as whole. Being untrained it gave an accuracy of only 30 % even after training for multiple epoches. Later for hyperparameter tuning HG-PSO was used on learning rate and batchsize. the optimal values found were 0.0047 and 58 respectively.

So then ResNet18 architecture was used from Fastai library with optimal lr of 0.005 and optimal bs of 64 achieved from HG-PSO resulting in 98.3 % accuracy with 30 epoch which is nearly equal to the State-of the-art approach in the 2023 paper.

Reference:

1. Shaheen H, Singh MP. Skin lesion classification using HG-PSO and YOLOv7 based convolutional network in real time. Proceedings of the Institution of Mechanical Engineers, Part H: Journal of Engineering in Medicine. 2023;237(10):1228-1239. doi:10.1177/09544119231198823

2. Tschandl, P., Rosendahl, C. Kittler, H. The HAM10000 dataset, a large collection of multi-source dermatoscopic images of common pigmented skin lesions. Sci Data 5, 180161 (2018). https://doi.org/10.1038/sdata.2018.161