**Explainable AI for Histological Image Analysis in Aquatic Animal Health**

Hyperplasia is the proliferation of cells leading to an increase in the volume of tissue. Measuring the severity of hyperplasia in gills, alongside other lesions, can provide a valuable insight into the health of the fish, as well as environmental conditions such as water quality. This work proposes a new histology image (of salmon gills) classification technique to measure hyperplasia using a recent signal analysis method, Empirical Wavelet Transform (EWT). Due to its adaptive nature, it is hypothesised that EWT can better represent image texture which is used to form feature vectors. Subband statistics are extracted using a probability density function, which is used to train machine learning models. Additionally, a strong mathematical foundation of various components of feature engineering provides an explainable computer vision pipeline compared to generic CNN/deep learning based approaches. Furthermore, the approach has comparable accuracy to popular CNN approaches with a significantly reduced run-time.