
GISEON HEO, University of Alberta

Diagnosis of Pediatric Obstructive Sleep Apnea via Face Classification with Persistent Homology and Convolutional Neural Network

Obstructive sleep apnea is a serious condition causing a litany of health problems especially in the pediatric population. However, this chronic condition can be treated if diagnosis is possible. The gold standard for diagnosis is an overnight sleep study, which is often unobtainable by many potentially suffering from this condition. Hence, we attempt to develop a fast non-invasive diagnostic tool by training a classifier on 2D and 3D facial images of a patient to recognize facial features associated with obstructive sleep apnea. In this comparative study, we consider both persistent homology and geometric shape analysis from the field of computational topology as well as convolutional neural networks, a powerful method from deep learning whose success in image and specifically facial recognition has already been demonstrated by computer scientists.