# Mammographic Image Processing Application for Detecting and Classifying Breast Cancer Using Deep Learning

Kikkisetti, Shreeja (School: Chantilly High School)

Research shows that mammograms can be 80-90 percent accurate in detecting breast cancer in women without dense tissue, however the accuracy of this metric drops drastically down to nearly 50% for those with dense tissue. Fibroglandular breast tissue is radiodense and appears as white areas on a mammogram which is confused with actual cancer cells and leads to misdiagnoses. Computer-Aided Detection (CAD) was developed to help radiologists analyze screening mammograms, however, existing CAD models are slow, costly, and inaccurate for detecting breast cancer in naturally dense breast tissue, thus increasing the false positive and negative rates. To address this issue, I developed a fully autonomous, computationally efficient and robust CAD model using deep learning techniques, such as 2D convolutional neural networks and the TensorFlow framework in order to increase the accuracy at which radiologists can diagnose cancer in mammograms. This model successfully detects and classifies malignant, calcified, or benign lesions on a mammogram for both dense and non-dense tissue while also using the novel approach of highlighting important regions of malignant tissue, making it easier for surgeons to remove afflicted tissue with higher precision. The model accuracy of 96%, exceeds the current golden standard accuracy of 78% of the typical radiologist aided by a CAD system. In addition, my product platform is agnostic since it is available on the web and therefore easily accessible to radiologists and hospitals.