**SPE Machine Learning Bootcamp 2020**

**Project 3: Deep Learning - DNN & CNN**

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***Business Value:***

OCT imaging is a commonly employed imaging technique used in retinal disorder diagnostics. With this dataset, we will try and develop deep neural networks capable of accurately distinguishing between healthy patients and the retinal disorders choroidal neovascularization (CNV), diabetic macular edema (DME), and multiple drusen present in early Age-related macular degeneration. By establishing a deep learning model for pathology, it is possible to automatically identify the problem of new patients.

***Data preparation and Analysis:***

* Create dataframe containing filename and class
* Convert images into 3d arrays
* Visualize the data to observe distribution
* Evaluate classification models
* Tune hyperparameters
* Generate confusion matrices
* Compare model performance using F1-score

***Hypothesis:***

This project focuses on developing a model that can help in identifying healthy vs unhealthy patients using an imaging technique to capture high-resolution cross sections of the retinas of living patients. Training images have been gone through a tiered grading system consisting of multiple layers of trained graders such as undergraduate/medical students, four ophthalmologists, and two senior independent retinal specialists. By deep learning approach (convolutional neural network) where the method involves layers to develop a concept of generating a simple model from a complex model. We import TensorFlow library to work on our dataset. It is challenging to decide the architecture of our model, however we may need to validate our approach by defining training and validation loss. Also, we will try using larger or smaller layers, and various hidden layers to attain the best model prediction.