



**Islamic University of Technology**  
**Department of Computer Science and Engineering**

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**See It Learn**

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**Topic:** Machine Learning Project Proposal

**Course Code:** CSE 4622

**Course Name:** Machine Learning Lab

**Section:** 1

**Date of Submission:** 13 May, 2022

**Team Members**

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## Overview:

Humans are visual learners. The human brain is not well-equipped to process a large corpus of data, but are rather good at identifying changes and patterns visually. If you're given a large paragraph of text describing a scenario and a picture of that scenario for the same amount of time, then you would, obviously, retain more information from the visual object i.e., the picture. We believe, the learning system in engineering should also be fundamentally structured around visualizing the problem domain first, and then, if necessary, be supplemented by texts.

Emphasizing on the need for visualization, we envision to develop a software that would visualize learning algorithms specified by the users and serve as a learning aid to anyone interested in Machine Learning. We would primarily focus on the particular learning algorithms taught in the course CSE 4621, but are willing to extend the set of algorithms visualized. We also intend to deliver the best form of visualization for every algorithm; e.g., iterative algorithms like linear regression are best visualized using animations. For the ease of access, the project will be deployed as a responsive and interactive web-based application accessible to anyone with a standard internet connection.

## Problem Statement:

Students face a wide array of problem in learning complex topics like Machine Learning from large chunks of text and static images. Furthermore, such non-interactive and non-visual approaches do not make the students engaged in learning and thus, reduces the efficacy of the teaching method. We aim to solve this problem by developing a learning tool that will enrich the mind of the learners beyond texts and static images, and will also help them build robust concepts on those topics. The tool will have a form of interactivity to make the students get actively engaged with the learning process and will have the best form of visual representation to make the student conceptualize the model.

## Core Features:

- Best form of visualization for every learning algorithm
- Multiple randomly generated datasets of various shapes to test limitations of the models
- Comprised of 9 learning algorithms which can be extended modularly
- Interactive widgets to change hyperparameters and experiment with the learning algorithms
- Ease of access by deploying as a responsive web-based application

## Technologies:

- **Programming Language:** Python, Javascript
- **Platform:** Jupyter Notebook
- **Third Party Libraries:**
  - o Front-End: Ipywidgets, IPython, Matplotlib, Seaborn,
  - o Back-End: Numpy, Pandas, Scipy, Scikit-learn
  - o Deployment: Voila
- **ML Algorithms:**
  - o **Supervised:** Linear Regression, Logistic Regression, Neural Network, Linear SVM, Non-Linear SVM, Naïve Bayes, Decision Tree
  - o **Unsupervised:** K-Means Clustering, Principal Component Analysis (PCA)