

- To develop a pattern recognition system for handwritten digits {0, 1, ..., 9}
- Free-hand strokes digits
- The purpose is to recognise the hand-written digits based on the time series representing the 3-D location.
- Used python as a programming language for this project.



Data Processing and Feature extraction

- Read the dataset using the panda's data frame library.
- To label category from (0 to 9).
- Converted the dataset into two columns, instruction and label.
- Data processing- 80% train, 20% test.

For Classification

- Used a built-in python classifier Logistic Regression using Scikit.library
- Used it as a baseline for comparing our develop classifier.
- Run our developed own LR and NN classifier and compare the result with the baseline classifier.

In [12]: df

Out[12]:

		instruction	label
0	[-8.9283, 304.45, -18.469, -9.1475, 304.36, -1...		0
1	[5.216, 284.05, -31.627, 4.4335, 284.87, -31.4...		0
2	[-18.936, 532.37, -50.688, -18.736, 532.44, -5...		0
3	[34.544, 501.13, -101.53, 35.731, 502.84, -100...		0
4	[-37.598, 319.47, -19.287, -37.697, 319.39, -1...		0
...	
875	[-2.4289, 270.34, -31.89, -2.4386, 270.16, -31...		9
876	[3.7842, 341.6, -15.488, -1.6251, 348.81, -15...		9
877	[16.433, 282.77, -23.029, 15.942, 283.35, -22...		9
878	[23.074, 315.42, -12.243, 23.117, 315.42, -12...		9
879	[-30.774, 348.08, -18.696, -30.575, 347.99, -1...		9

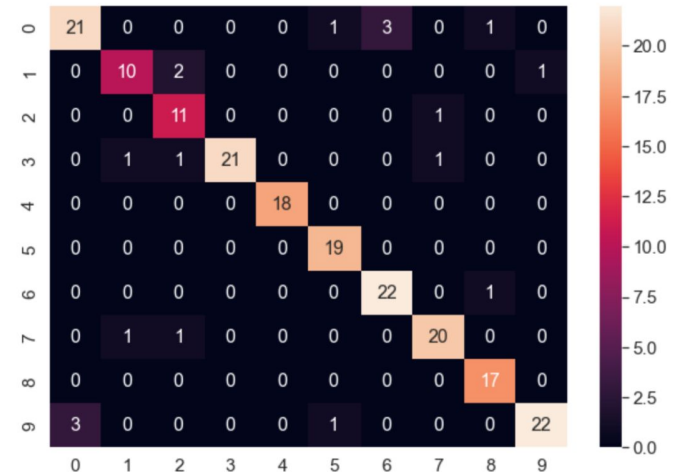
Build Own LR classifier from scratch

- Used Gradient Descent algorithm for optimum values of m and c of the LR.
- Get best-fit line using the values of m and c.
- Used Loss function .
- Ready to make predictions
- Error Analysis.

NN classifier development

- Used Two hidden and an output layer.
- Used Loss function to calculate the gradient by applying the chain rule.
- Used gradient descent for updating weights.
- Used Hyper-parameters for making better performance.
- Showed only **49% accuracy** compared to LR **88% accuracy**.

Classifier name	Accuracy
Scikit-learn building LR classifier	83%
Our develop LR classifier	88%





Any question???



Thank you for being with us