

REPORT: BANKNOTE AUTHENTICATION

1. PURPOSE:

To determine whether the given Bank note is real or forged by analyzing its digitized image.

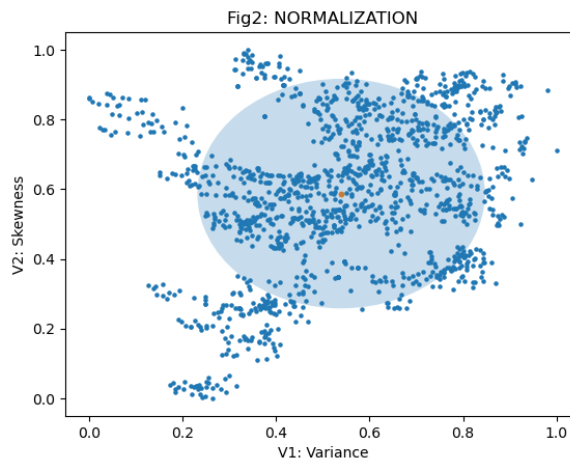
2. DESCRIPTION OF DATASET:

- For digitization, an industrial camera usually used for print inspection is used. The final images have 400 x 400 pixels. Due to the object lens and distance to the investigated object, grey-scale pictures with a resolution of about 660 dpi are gained. Wavelet Transform tool is used to extract features from images.
- The image judged on the basis of 5 parameters, namely, variance, skewness, curtosis, entropy and class.
- The parameters of the image are in the form of numerical, continuous values arranged in a table form of size 1372 X 5. This data is then read, analyzed and graphed to track inferences.

3. DATA ANALYSIS:

- Analysis of the data is done by plotting 2-D graphs of any 2 parameters.
- For this the data is first standardized, i.e. all the values are minimized to their corresponding fractional values and thus we obtain a graph with x and y values ranging from [0,1].
- Now the graph is plotted.

Here, a Variance Vs Skewness graph is provided for your reference.



- Distribution is analyzed according to numerical features like mean, standard deviation and variance. Inferences help track validity of test cases and hence classification of a particular test case as **real or forged**.
- Training of our model has been done by performing a stable K-Means algorithm over our model which identifies patterns and hence clusters data into 2 groups.

Here are the steps in the process, for further explanation:

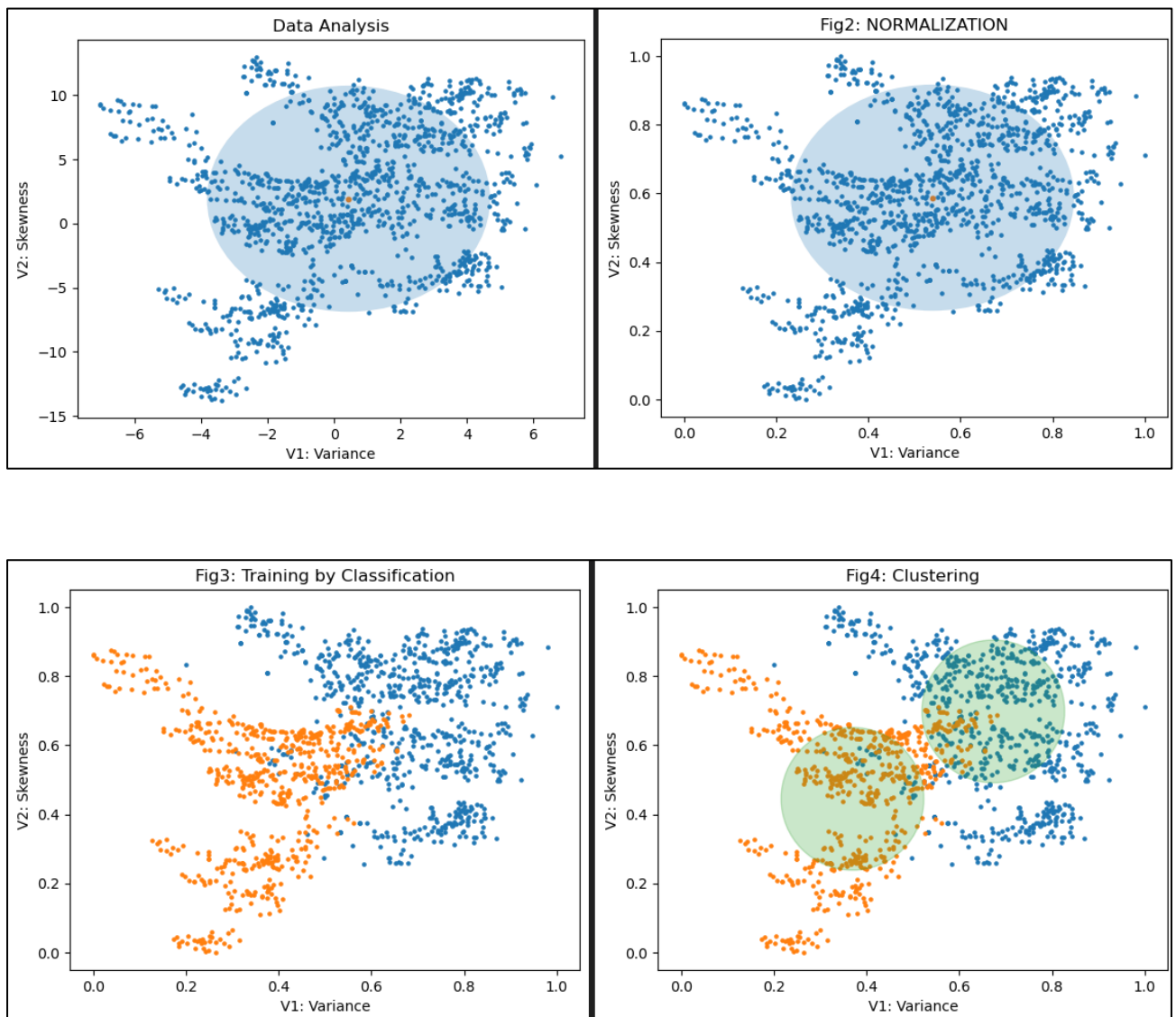
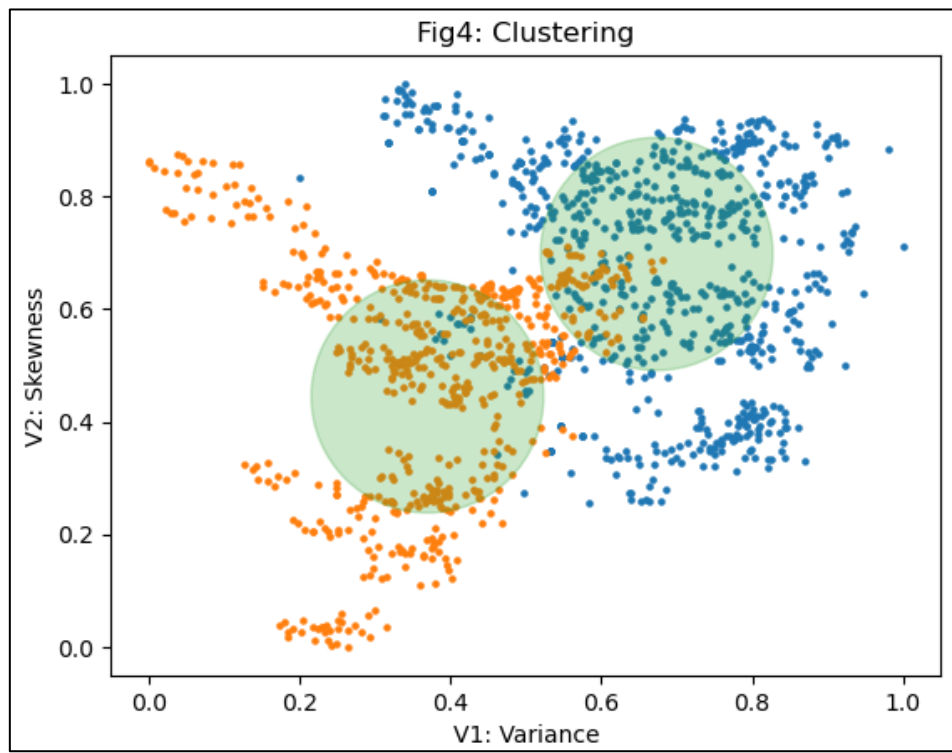


Fig 4 shows 2 clusters highlighted in green, signifying real and forged notes. Hence, the performed algorithm is stable helps classify banknotes.

4. SUMMARY:



Graph shows result of training model.

To summarize, by using Data Analytics and Data Science algorithms, our model successfully determines whether the banknote is authentic or not, with **an accuracy of 83.568%**

5. RECOMMENDATIONS: (for client)

To have better results, please consider having a better resolution image capture to increase parameters of judgment.

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