Data set: -

Images of Kecimen and Besni raisin varieties grown in Turkey were obtained with CVS. A total of 900 raisin grains were used, including 450 pieces from both varieties. These images were subjected to various stages of pre-processing and 7 morphological features(Area, Perimeter, Major Axis Length, Minor Axis Length, Convex Area, Eccentricity, Extent) were extracted.

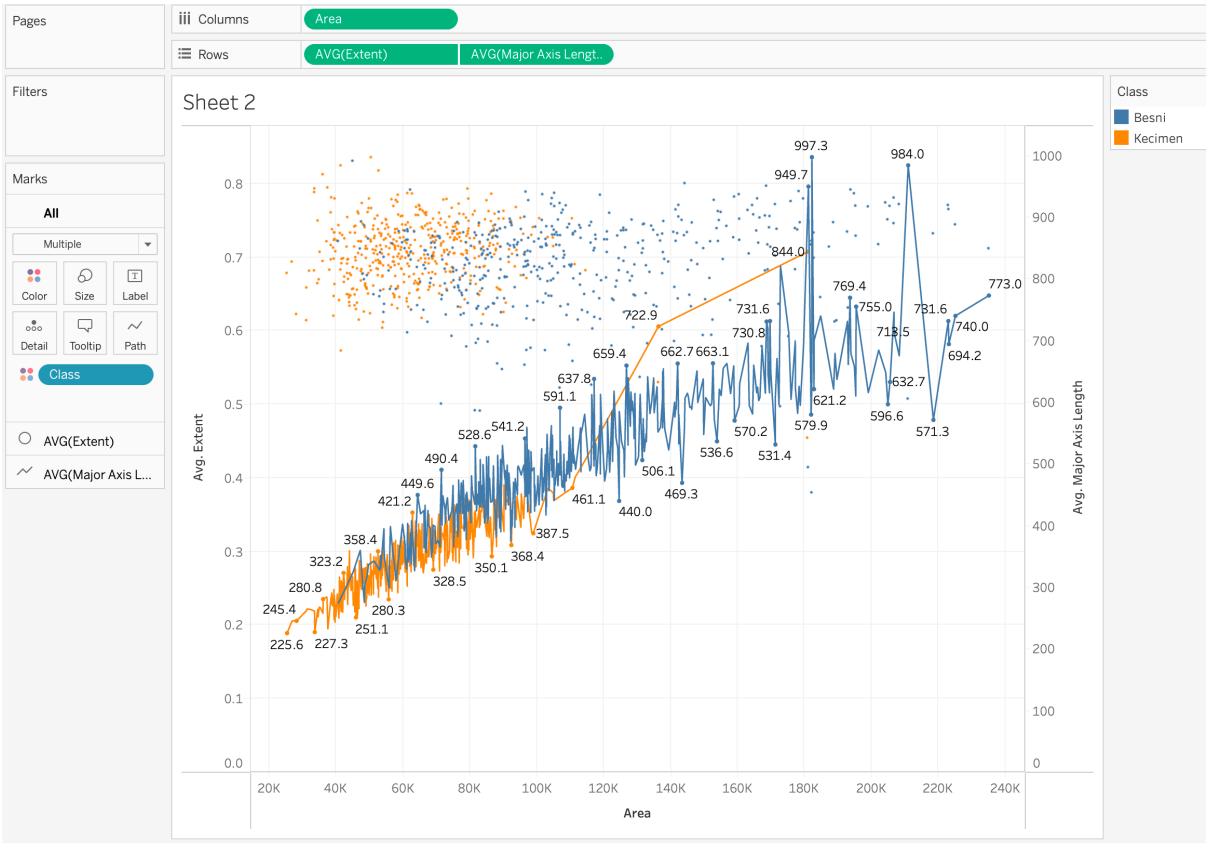
User's demand: -

- Making the client know how the 2 raisins are depended on the important attributes collected from the images provide in the data.

Data Description: -

http://archive.ics.uci.edu/ml/datasets/Raisin+Dataset

Prototype 1



This prototype shows the relation between the area of pixel of the image and the extent of the it and the major axis length at the same time of the 2 different raisins. In a single graph you can read the data of the image and classify that how the relation of area- extent (circle representation) and the relation of area-major axis length (line chart) vary in determining the raisins. Most important reason of choosing these attributes was that it includes all the essential parameters of the raisins like number of pixels in the image, length of the major axis of the eclipse and the ratio of the region formed by the raisin to the total pixels in the bounding box. This prototype has the 900 data sets comprising of 450 images of each raisin which is Kecimen and Besni. As the area has a range of 20k pixels to 240k pixels for both the raisins, it can clearly be seen that the

area of the Kecimen is less than the area of Besni, with a slight exception of 2 images of Kecimen whose area is 136k and 182k. Few deductions can be made like the average number of pixels in the images are of Kecimen is less than that of Besni. And the same deduction can be made with the help of extent-area, like average extent of Kecimen is less than Besni. Here, the extent gives the ratio of the region formed by the raisin to the total pixels in the bounding box. But the catch here is the data of both the raisins can be read very easily. This prototype is interactive, if you want to see the data of just one raisin you can do that too just by selecting one class and it will show you the graph of one class. Also, if you want to see only one relation out of two, you can do that also by de-selecting the other. This prototype would be effective for the user as they can easily identify the detail of any point as when the user hover on any data point be it circle or the line point, it will show all the details on that image of the raisins. As the prototype is developed on the tableau, we can use lots of build-in functions of it as well as the analytical function, which can help the user to interact more efficiently with the design and makes they land to the conclusion. Few of the analytical tools would be to get the average line over the design, getting the trend line (which tells what trend both the raisins follow in their attributes). This attribute is easy to read and understand that's what was kept in mind before designing this prototype.

Prototype 2

This prototype also shows the relation between the area of pixel of the image and the extent (gives the ratio of the region formed by the raisin grain to the total pixels in the bounding box) of it and the major axis length at the same time of the 2 different raisins. Here also, A total of 900 images of raisins were obtained from both types of raisins used in the study, including 450 pieces. But in this graph instead of points and line we represent it with density of the points and the polygon. The graph of the area-extent is represented by density of the nodes and the graph of area-major axis length by polygon. The density plot shows the places where the node would be maximum and, in this graph, it is clearly visible how the maximum of extent and area is.

But the issue with this would be that you won't be able to classify between the raisins, as which density define which raisin. The light area in the density shows that there are more nodes as compared to the area where the shade is dark. The polygon graph represents the chart between the area and major axis length, the continuous polygon's peak shows the mark of the major axis length. And here, we can easily classify between the raisins. When you hover on any data point, you will get the details of that with the data of the other graph also. This chart is also interactive. As the prototype is developed on the tableau, we can use lots of build-in functions of it as well as the analytical function, which can help the user to interact more efficiently with the design and makes they land to the conclusion. Few of the analytical tools would be to get the average line over the design, getting the trend line (which tells what trend both the raisins follow in their attributes). This attribute is easy to read and understand that's what was kept in mind before designing this prototype. The major task every designer should keep in mind is 'USER, TASKS, EVALUATION'. After knowing the user's demand, the task was designed through tableau with the inclusion of interaction.

Data Interaction

The 2 graphs of 3 attributes are interactive and highly meets the goal of the user. If the user wants to see the data of only raisins, they can easily do that by selecting the bar graph. Also, if they hover on any data point it will give them the exact data information. The user can also zoom in and zoom out, if they want to distinguish between the two raisins in any graph or wants to locate the exact location of the data point in the graph. This implementation is directly related to what prototype was all about. So, the project meets all the requirements of interaction between "goal, data and user".

Conclusion

The varieties of raisins used in the study are among the products produced and exported in Turkey. Benefiting the Machine Learning techniques used in this study, data sets can be created using the derived feature inferences and the models created, as well as for other products produced in our country. In this way, automatic systems can be designed by using the created data sets for classification, calibration of the products or to be used in different processing stages.

Bibliography

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