The objective of this project is to build a predictive model that helps UPS identify potential companies that will yield positive results for the company. To accomplish this, our team took on the responsibilities to perform research by reading books outlining the complexities of private equity firms, looking into individual companies to learn more about them, and reading through multiple articles about different types of machine learning models. In preparation of building the model, we cross referenced and condensed the data set and selected certain variables to use for the model. We built and tested several (supervised and unsupervised) models to determine which ones gave the most accurate results. Analysis of the model results indicated that the Random Forest model gave us the best result of 83% accuracy. Moreover, we were able to identify the correlations between companies based on the unsupervised models we created, namely KMeans++ and Dendrograms. Ultimately, to display results of our work, we decided to create a web app that better connects the user to our predictive model. Our future goals aim at improving the data, exploring more complex models and creating a web app containing more functionalities.

REFERENCES

KMeans:
Consider uploading data set to be given to team, which will ultimately enhance prediction. Random Forest models based on cross reference of unique PE firms and return.

KMeans++ and Dendrograms:
Our end goal is to predict the revenue a new portfolio company would be able to generate for UPS through their partnership. The Random Forest algorithm constructs a multitude of decision trees at training time and outputs the mean/median values of the trees, allowing it to predict the revenue generated for UPS. (Figure 2.2)

Figure 2.1 – Terms

Figure 2.2 – Terms

WEB APP DEVELOPMENT

WHAT DOES THE WEB APP DO?
• The web app provides an interface to the users to predict their model.

HOW WAS THE APP CREATED?
• The web app provides an interface to the users to use our predictive model.

WHAT FEATURES DOES THE APP HAVE?
• Solicits existing and numerical input.
• Displays the revenue the company will generate for UPS.
• Displays the accuracy of the model and a graph showing the comparison between how close the predicted values are to the actual graph.

Figure 2.3 - WebApp

CONCLUSIONS

• Started with a data set with the goal of creating a model.
• Conducted market research.
• Created a model that provides an 83% accuracy and can only be improved with more data being added.
• Delivered a web app to UPS encoded with the model so they could input a company and get an estimate.
• Determined that the model was as accurate as we could make it given the data set

FUTURE GOALS/RECOMMENDATIONS

• Consider analyzing the additional data that will be given to team, which will ultimately enhance the model.
• Consider uploading data set and return information for the whole data set.
• Add more columns of information to the database.

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MARKET ANALYSIS

• 4 Companies contribute for 84.52% of the Net Amount Revenue Generated.
• Researching those PE Firms indicated importance of company size, and industry group/sector.
• (See Figure 2.4) (See Figure 2.5)

Figure 2.4

Figure 2.5

Dendrogram Interpretation

The dendrogram basically shows how close companies within a cluster are related to each other. In the example above, Company 0 and 2 are under the same family and so are Company 3 and 4 which means they are related. However, the height of Company 0 and 2 family is less, indicating a strong relationship between them. (See figure 2.7)