SHARK TANK
PROJECT REPORT
(Girish Pandey - M22CS056, Divya Mahendia – M22CS006)

ABSTRACT

Our Machine Learning is based on emulating a show named ‘Shark Tank’ which works in 2 phases. In the first phase, our model predicts the Shark’s reaction (whether they want to invest) to an entrepreneur’s offer. Another is estimating the equity and funds proposed by the Sharks in case they want to counter the entrepreneur’s offer.

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INTRODUCTION

Shark Tank is a show where entrepreneurs make business presentations to a panel of five investors or "sharks," who decide whether to invest in their company or product. The sharks often find weaknesses and faults in an entrepreneur's product, business model or valuation of their company. The entrepreneur then makes a handshake deal (gentleman's agreement) on the show if a panel member is interested. However, if all of the panel members opt out, the entrepreneur has to leave empty-handed. Our Machine Learning model works on predicting each Sharks' reaction (whether they want to invest) to an entrepreneur coming from a particular domain. Another feature of our model is to estimate the equity and funds proposed by the Sharks in case they want to counter the entrepreneur's offer.

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DATASET DETAILS

Category – Type of niche in which the Client or the Entrepreneur is working .

Company Evaluation(in lakhs) – Company Valuation is the total economic value of a company/business and its assets. All aspects of a business are evaluated in order to determine the current worth of an organization.

Client equity – Equity, in simple words means shares or stakes. In client's case equity refers to the percentage of stakes the client is offering to Sharks in exchange of their funds for his business. When the sharks invest in a company, they are essentially taking a risk that the company/start-up will grow, and so will their invested money.

Client estimated funds – It is the investment the client wants from the sharks in exchange of the shares in his company.

Pre Revenue - client haven't actually made any money from his/her product or service yet in a significant ratio.

B2B_B2C - Type of Business model used in client

Number of current investors – It is the number of investors that are currently associated with the client's business.

Yearly revenue – It refers to the gross annual income before subtracting any expenses. It includes Profits and total earnings over the year.

Gross_margin - amount of money a company retains after incurring the direct costs associated with producing the goods it sells and the services it provides.

Sharks(in/OUT) - They are potential investors who listen to entrepreneurs' pitch ideas for their business. These are self-made multi-millionaire judges who decide whether to invest their own money to help market and mentor each contestant.

Shark_estimated_valuation - The company valuation estimated by sharks

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Sharks' equity - In sharks' case equity refers to the percentage of stakes sharks offer (either individually or combined) to the client which they are willing to exchange for their investment in client's business. Sharks' equity is a counter offer to what Client has already made. Sharks make counter offers because when they invest in a company, they are essentially taking a risk that the company/start-up will grow, and so will their invested money. Sharks' estimated investment - It is the investment a Shark offers (either
individually or combined with another shark) to the entrepreneur/client in exchange of the shares in his company

No of shark team during proposal : The sharks who are interested to propose an offer to client either individually or in team

No_of_shark_with_confirmed_deal : The shark team whose offer got accepted by the client

Client acceptance : it represents whether the client accept the sharks offer or not

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METHODOLOGY

The whole implementation is divided in two phases,
Behavior prediction (phase 1) - For predicting the reaction of each shark to the entrepreneur's offer, we are using a Decision tree.
Input features

1. One hot encoding for category
2. One hot encoding for b2b_b2b
3. One hot encoding for pre revenue(yes/no)
4. Company Evaluation
5. Client's equity
6. Client's estimated fund
7. Number of current investors
8. Yearly revenue
9. Gross Margin

Target feature
We have built classifier corresponding to each shark(in/out)

1. Aman_gupta(in/out)
2. Anupam_mittal(in/out)
3. Ashneer_grover(in/out)
4. Namita_Thapar(in/out)
5. Vineeta singh(in/out)

Estimated equity and investment prediction (phase 2) In case a shark chooses to invest in the client's business (shark's IN) we
use Linear Regression / Decision Tree Regressor to estimate company valuation .
Input features

1. Domain Company Evaluation
2. Client's equity
3. Client's estimated funds
4. Number of current investors Present competitor
5. Yearly revenue
6. Gross Margin

Target feature : shark_estimated_valuation

EXPERIMENT AND RESULT

Phase 1

Best train test split(137 tuples)

Anupam
Training Data Size 98 Test Accuracy 0.717948717948718

Vineeta
Training Data Size 45 Test Accuracy 0.6521739130434783

Ashneer
Training Data Size 90 Test Accuracy 0.7021276595744681

Aman
Training Data Size 89 Test Accuracy 0.7291666666666666

Namita
Training Data Size 100 Test Accuracy 0.6216216216216216

Phase 2

LinearRegression

mean_absolute_error 248.08483680971617

Decision Tree Regressor

Mean_absolute_error 245.91044776119404

CONCLUSION

FUTURE SCOPE

In future the project can be extended and improved by including each shark's characteristic domain or expertise (such as in marketing, in B2B, in B2C, tie-ups) to predict which shark's offer the client/entrepreneur will go for