VENTURE CAPITAL IS A BIASED SYSTEM: HOW WOMEN OWNED BUSINESSES CAN BEAT IT

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BACKGROUND

Women-owned businesses are growing **2X faster** than all businesses nationwide, and yet, they **only receive 2.8%** of venture capital (VC) funding.

Our goal is to help female entrepreneurs understand the VC funding landscape by producing a model to predict success of raising funds while also investigating gender bias and providing recommendations.

DATASET & PRE-PROCESSING

Target Dataset: Crunchbase, Industry Research

1. Sample Crunchbase Companies (110K records)
2. Crunchbase Investors (57.3K records)
3. Crunchbase 2019 Funding Rounds (15.3K records)

Qualitative Surveys:

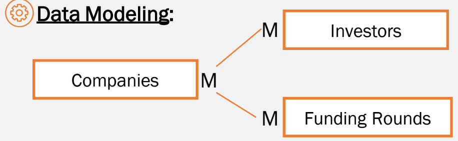
Met with 5 Investors from different genders and 3 founders to discuss their experience with funding and biases that exist

Cleansing Effort: Python, Tableau

1. Replaced nulls, splitting fields and transposing data
2. Created Boolean fields for Women Led/Founded companies
3. Added additional fields for tree model to support
4. Removed fields and encoding data

DATA MODELING

Data Modeling:

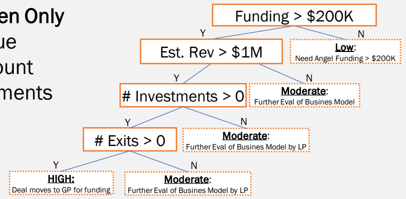


*Data was extracted and modeled using SQL and Tableau Prep

CLASSIFICATION METHOD (ML)

Decision Tree: Women Only

1. Estimated Revenue
2 Total Funding Amount
3. Number of Investments
4. Number of Exits



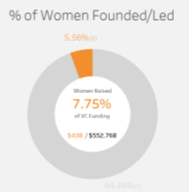
Possible Outcomes:

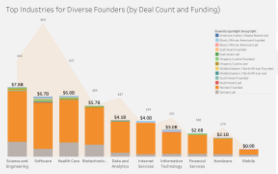
1. Low, Moderate, High

INSIGHTS

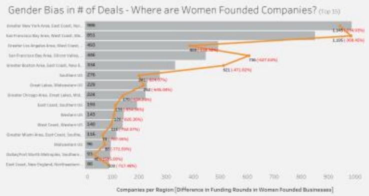
IS THERE A BIAS IN VC FUNDING?

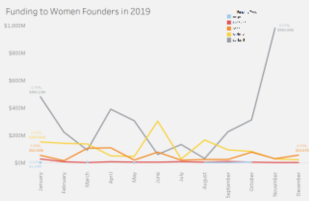
50.8%[1] of the US population is women. Yet women only make up 11 percent of investment partners (VCs) in the US and are only included in 17% of VC deals[2].





The lack of inclusion creates a clear bias. VC firms make minimum investments throughout all funding stages in W/O/F businesses resulting in **up to $3T** in missed opportunities. Organizations led by Women report 18-69% more profit in their industries[3] and the stock prices outperform men on average by 20%[4].





LIKELIHOOD OF CLOSING AN INVESTMENT DEAL

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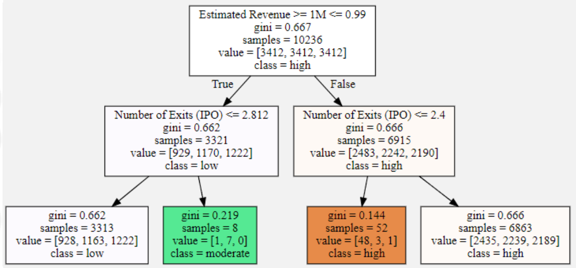
The model is designed to support women entrepreneurs...



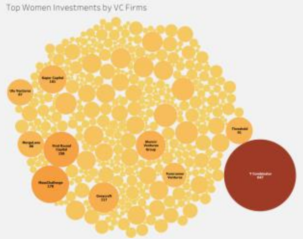
	Total Funding Amount	Est. Revenue Range	Number of Exits (IPO)	Number of Investments
Total Funding Amount	1.000	-0.173	0.131	0.209
Est. Revenue Range	-0.173	1.000	-0.127	-0.086
Number of Exits (IPO)	0.131	-0.127	1.000	0.906
Number of Investments	0.209	-0.086	0.906	1.000

Development of the Model Required:

- Encoding of Estimated Revenue Range to effectively fit and evaluate the model
- KNN Imputation (K nearest neighbor imputation) to handle the null values by predicting the missing values
- Decision Tree to clearly articulate the problem and analyze all possible outcomes of each decision and the probability that a user will achieve them
- Random Forest Classifier performed better than decision tree. Our best model was a Random Forest model with accuracy 78.6%
- The inputs to our model were number of investments, number of IPO exits, and estimated revenue. The Funding Amount was our target variable which was used to evaluate our model
- Correlation Matrix to understand the collinearity between variables

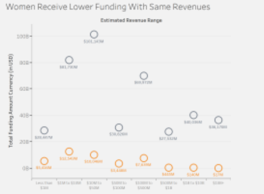
RECOMMENDATIONS

LOW OUTCOME



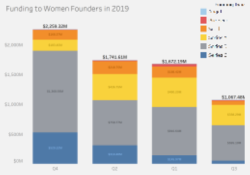
There is a disproportionately low number of deals received by women in comparison to men in several states. We suggest women-owned businesses headquarter their company in states where the ratio is higher, such as California, New Jersey, and New York. Some states like New Jersey also have startup incubator or accelerator programs. There are also ecosystem building programs to build networks and traction (Female Founders Collective, DivInc, etc.). This would increase the probability that the startup receives a higher amount of funding.

MODERATE OUTCOME



According to the order of decision criteria produced by the model, it is vitally important for women entrepreneurs to confidently and positively estimate their revenues instead of underestimating the expected revenue, especially when they pitch their startups before VC investors. The revenues should also be supported by any traction or momentum the company has gained over time to support the business model.

HIGH OUTCOME



Women-owned businesses with IPOs or Investments raise more funding, have more exits and a high probability of receiving additional funding. We would recommend pitching in the fourth quarter to generate a higher amount of capital. If you have not generated enough investments or exit opportunities. For venture capitalists, we recommend diversifying the venture partners by adding more women so that they can provide their unique perspectives in funding new startups

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