



***CAPSTONE PROJECT***

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Data Analytics Bootcamp

# Capstone Project Contents

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# ***Problem statement***

This case is about a bank (Thera Bank) whose management wants to explore ways of **converting its existing customers** to personal loan customers. A campaign that the bank ran last year for liability customers showed a healthy conversion rate of over 9% success. This has encouraged the retail marketing department to devise campaigns with better target marketing to increase the success ratio with minimal budget.

Based on the data, **explore which customer profile is more likely to accept** the personal loan offer and **devise strategy based on that.**

CSV dataset with 14 columns and 5000 lines of customer records from Kaggle used for analysis

<https://www.kaggle.com/datasets/teertha/personal-loan-modeling/data>

- |               |                        |
|---------------|------------------------|
| 1. ID         | 8. Education           |
| 2. Age        | 9. Mortgage            |
| 3. Experience | 10. Personal Loan      |
| 4. Income     | 11. Securities Account |
| 5. ZIP Code   | 12. CD Account         |
| 6. Family     | 13. Online             |
| 7. CCAvg      | 14. Credit Card        |

**Dataset**

# Dataset Column Description

Column	Type	Description	Hypothesis
ID	numerical	Customer id	Contains 5000 filled customer data and is used to measure existing customers behavior
Age	numerical	Customer's age in completed years	
Experience	numerical	Number of years of professional experience	
Income	numerical	Annual income of the customer (\$000)	To understand potentially the minimum income requirement that applied personal loan in the past
Zip Code	numerical	Home Address ZIP Code	Able to show geographic penetration of customers
Family	numerical	Family size of the customer	
CC Avg	numerical	Avg. spending on credit cards per month (\$000)	What range of spenders would most likely take up personal loan?

# Dataset Column Description

Column	Type	Description	Hypothesis
Education	categorical	Education Level 1:Undergrad; 2:Graduate; 3:Advance/Professional	
Mortgage	numerical	Value of house mortgage if any. (\$000)	
Personal Loan	categorical	Did the customer accept the personal loan offered in the last campaign?	Data can be used to analyze converted customers to understand their background and probable acceptance reasons
Securities Account	categorical	Does the customer have a securities account with the bank?	Measurable data on conversion rate from Securities Account
CD Account	categorical	Does the customer have a certificate of deposit (CD) account with the bank?	Measurable data on conversion rate from CD Account
Online	categorical	Does the customer use internet banking facilities?	Measurable data on conversion rate from Online customers
Credit Card	categorical	Does the customer use a credit card issued by this Bank?	Measurable data on conversion rate from Credit Card customers



# Data Preparation

	A	B	C	D	E	F	G	H	I	J	K	L	M	N
1	ID	Age	Experience	Income	ZIP Code	Family	CCAvg	Education	Mortgage	Personal Loan	Securities Account	CD Account	Online	CreditCard
2	1	25	1	49	91107	4	1.6	1	0	0	1	0	0	0
3	2	45	19	34	90089	3	1.5	1	0	0	1	0	0	0
4	3	39	15	11	94720	1	1	1	0	0	0	0	0	0
5	4	35	9	100	94112	1	2.7	2	0	0	0	0	0	0
6	5	35	8	45	91330	4	1	2	0	0	0	0	0	1
7	6	37	13	29	92121	4	0.4	2	155	0	0	0	1	0
8	7	53	27	72	91711	2	1.5	2	0	0	0	0	1	0
9	8	50	24	22	93943	1	0.3	3	0	0	0	0	0	1
10	9	35	10	81	90089	3	0.6	2	104	0	0	0	1	0
11	10	34	9	180	93023	1	8.9	3	0	1	0	0	0	0
12	11	65	39	105	94710	4	2.4	3	0	0	0	0	0	0
13	12	29	5	45	90277	3	0.1	2	0	0	0	0	1	0
14	13	48	23	114	93106	2	3.8	3	0	0	1	0	0	0
15	14	59	32	40	94920	4	2.5	2	0	0	0	0	1	0
16	15	67	41	112	91741	1	2	1	0	0	1	0	0	0
17	16	60	30	22	95054	1	1.5	3	0	0	0	0	1	1
18	17	38	14	130	95010	4	4.7	3	134	1	0	0	0	0
19	18	42	18	81	94305	4	2.4	1	0	0	0	0	0	0
20	19	46	21	193	91604	2	8.1	3	0	1	0	0	0	0
21	20	55	28	21	94720	1	0.5	2	0	0	1	0	0	1
22	21	56	31	25	94015	4	0.9	2	111	0	0	0	1	0
23	22	57	27	63	90095	3	2	3	0	0	0	0	1	0
24	23	29	5	62	90277	1	1.2	1	260	0	0	0	1	0
25	24	44	18	43	91320	2	0.7	1	163	0	1	0	0	0
26	25	36	11	152	95521	2	3.9	1	159	0	0	0	0	1
27	26	43	19	29	94305	3	0.5	1	97	0	0	0	1	0
28	27	40	16	83	95064	4	0.2	3	0	0	0	0	0	0

	A	B	C	D	E	F	G	H	I	J	K	L	M	N
1	ID	Age	Experience	Income	ZIP Code	Family	CCAvg	Education	Mortgage	Personal Loan	Securities Account	CD Account	Online	CreditCard
2	1	25	1	49	91107	4	1.6	1	0	No	Yes	No	No	No
3	2	45	19	34	90089	3	1.5	1	0	No	Yes	No	No	No
4	3	39	15	11	94720	1	1	1	0	No	No	No	No	No
5	4	35	9	100	94112	1	2.7	2	0	No	No	No	No	No
6	5	35	8	45	91330	4	1	2	0	No	No	No	No	Yes
7	6	37	13	29	92121	4	0.4	2	155	No	No	No	Yes	No
8	7	53	27	72	91711	2	1.5	2	0	No	No	No	Yes	No
9	8	50	24	22	93943	1	0.3	3	0	No	No	No	No	Yes
10	9	35	10	81	90089	3	0.6	2	104	No	No	No	Yes	No
11	10	34	9	180	93023	1	8.9	3	0	Yes	No	No	No	No
12	11	65	39	105	94710	4	2.4	3	0	No	No	No	No	No
13	12	29	5	45	90277	3	0.1	2	0	No	No	No	Yes	No
14	13	48	23	114	93106	2	3.8	3	0	No	Yes	No	No	No
15	14	59	32	40	94920	4	2.5	2	0	No	No	No	Yes	No
16	15	67	41	112	91741	1	2	1	0	No	Yes	No	No	No
17	16	60	30	22	95054	1	1.5	3	0	No	No	No	Yes	Yes
18	17	38	14	130	95010	4	4.7	3	134	Yes	No	No	No	No
19	18	42	18	81	94305	4	2.4	1	0	No	No	No	No	No
20	19	46	21	193	91604	2	8.1	3	0	Yes	No	No	No	No
21	20	55	28	21	94720	1	0.5	2	0	No	Yes	No	No	Yes
22	21	56	31	25	94015	4	0.9	2	111	No	No	No	Yes	No
23	22	57	27	63	90095	3	2	3	0	No	No	No	Yes	No
24	23	29	5	62	90277	1	1.2	1	260	No	No	No	Yes	No
25	24	44	18	43	91320	2	0.7	1	163	No	Yes	No	No	No
26	25	36	11	152	95521	2	3.9	1	159	No	No	No	No	Yes
27	26	43	19	29	94305	3	0.5	1	97	No	No	No	Yes	No
28	27	40	16	83	95064	4	0.2	3	0	No	No	No	No	No

5 categorical columns have been updated to display “Yes” for true or ‘1’ statement and “No” for false or ‘2’ statement namely Personal loan, Securities Account, CD Account, Online and Credit Card for easy read.

# Storyboard



Where – To pinpoint the location of existing customers for Thera Bank based on dataset



Who – Analyze accounts that had successfully converted to Personal Loan



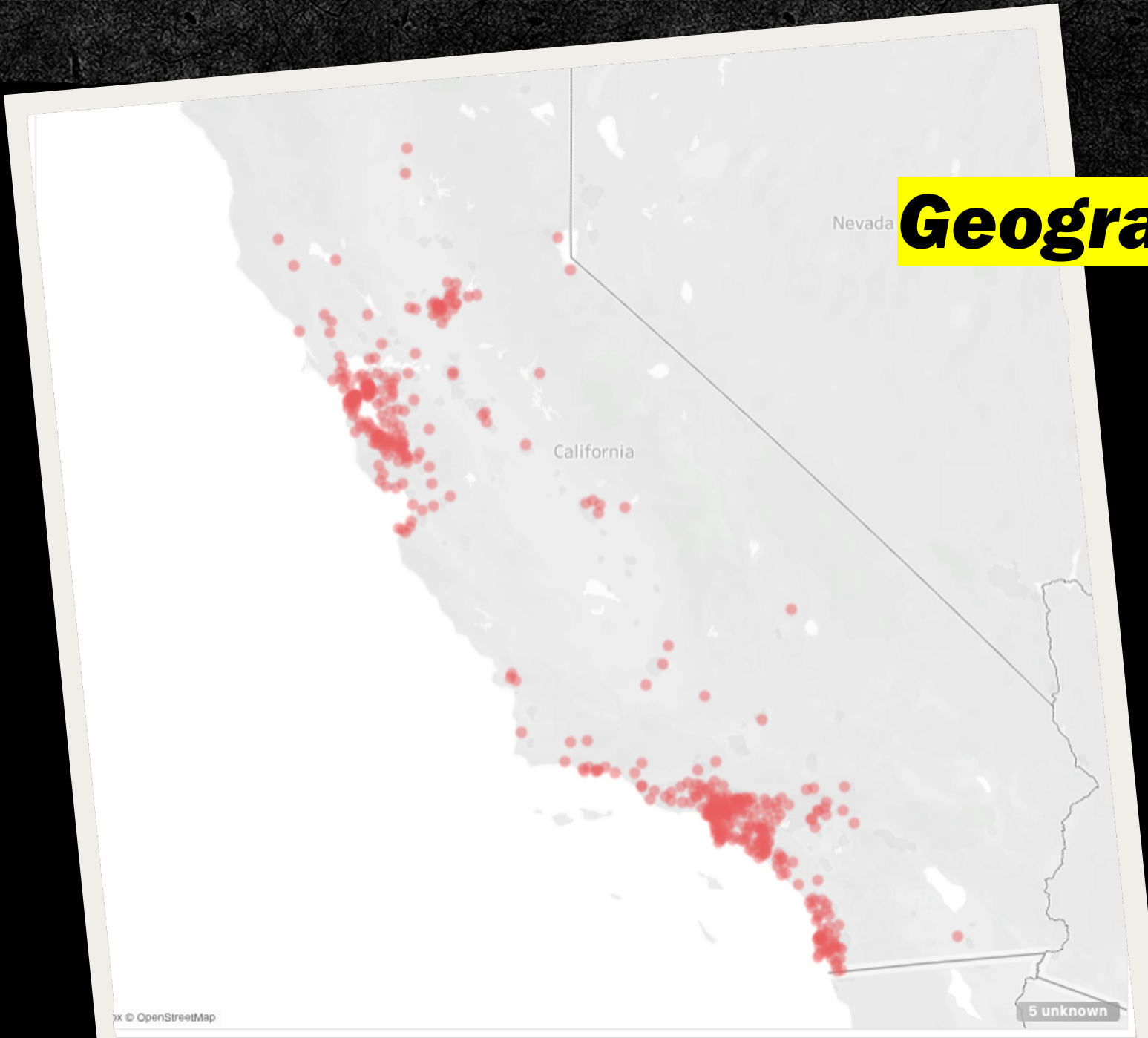
Where – Analyze potential existing accounts to convert to Personal loan



[https://public.tableau.com/views/Capstone-Abdul016C/Story?:language=en-US&publish=yes&:sid=&:display\\_count=n&:origin=viz\\_share\\_link](https://public.tableau.com/views/Capstone-Abdul016C/Story?:language=en-US&publish=yes&:sid=&:display_count=n&:origin=viz_share_link)



# Geographical Analysis

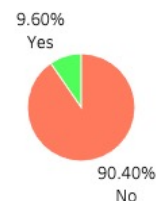


- There are customers in California primarily in Los Angeles and San Francisco.
- There are 5 dirty data on ZIP code which is minimal thus will not affect analysis.
- Potential acceptance is higher near city centers.
- [https://public.tableau.com/shared/8PPHHW58J?:display\\_count=n&origin=viz\\_share\\_link](https://public.tableau.com/shared/8PPHHW58J?:display_count=n&origin=viz_share_link)

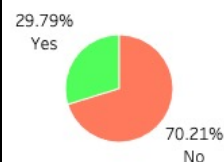
# Accounts Analysis

- Highest conversion in the past is from Online users and lowest conversion has an existing Securities account.
- Securities and CD Account customers have the highest count without a Personal Loan account.
- [https://public.tableau.com/views/Capstone-Abdul016C/Account?:language=en-US&publish=yes&:sid=:display\\_count=n&:origin=viz\\_share\\_link](https://public.tableau.com/views/Capstone-Abdul016C/Account?:language=en-US&publish=yes&:sid=:display_count=n&:origin=viz_share_link)

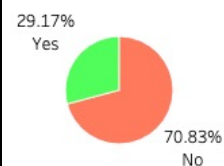
Personal Loan Account



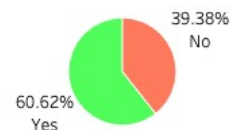
Conversion from CC Account



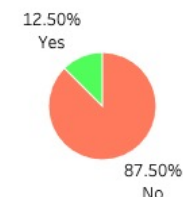
Conversion from CD Account



Conversion from Online users



Conversion from Securities Account



Accounts with & without Personal Loan

Online Users

Online	Personal Loan	
	No	Yes
Yes	2,693	291
No	1,827	189

CD Account

CD Acco..	Personal Loan	
	No	Yes
Yes	162	140
No	4,358	340

Credit Card Account

Credit ..	Personal Loan	
	No	Yes
Yes	1,327	143
No	3,193	337

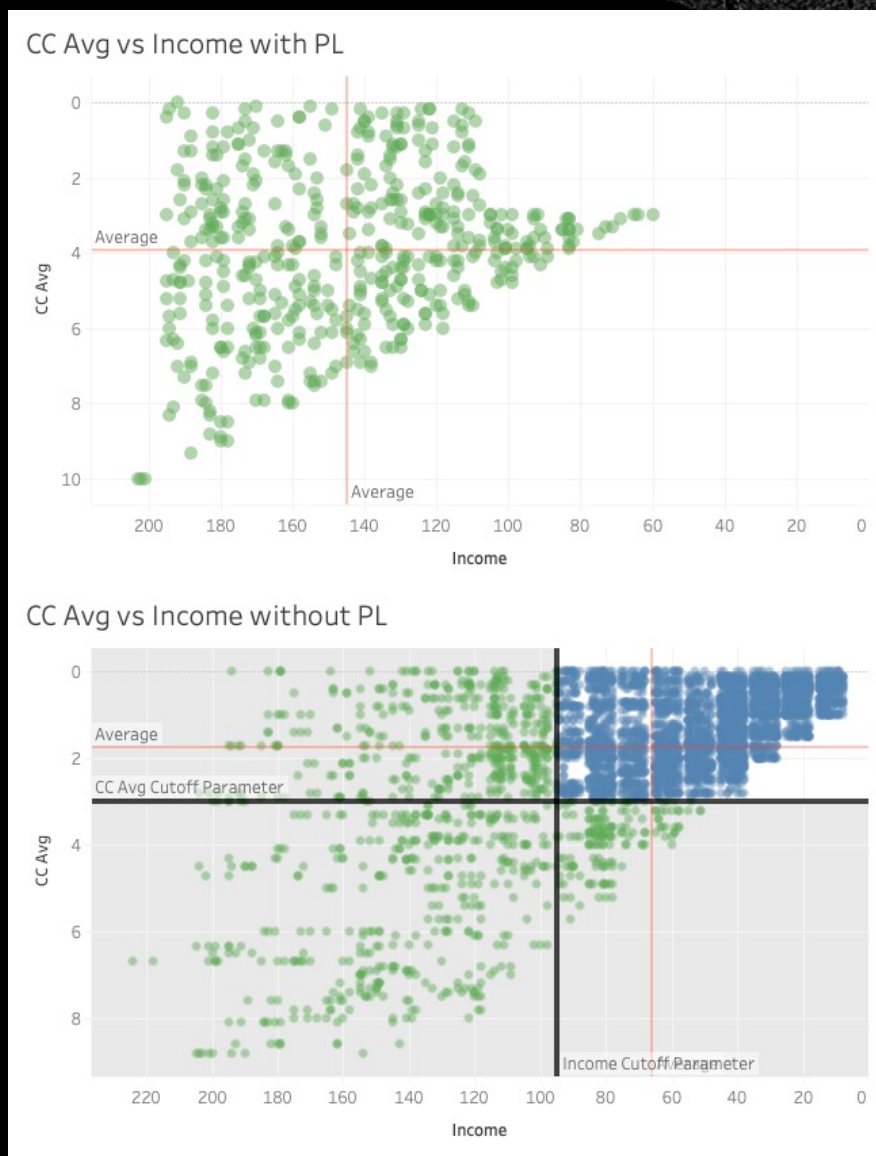
Securities Account

Securities Acc..	Personal Loan	
	No	Yes
Yes	462	60
No	4,058	420

Multiple Account View

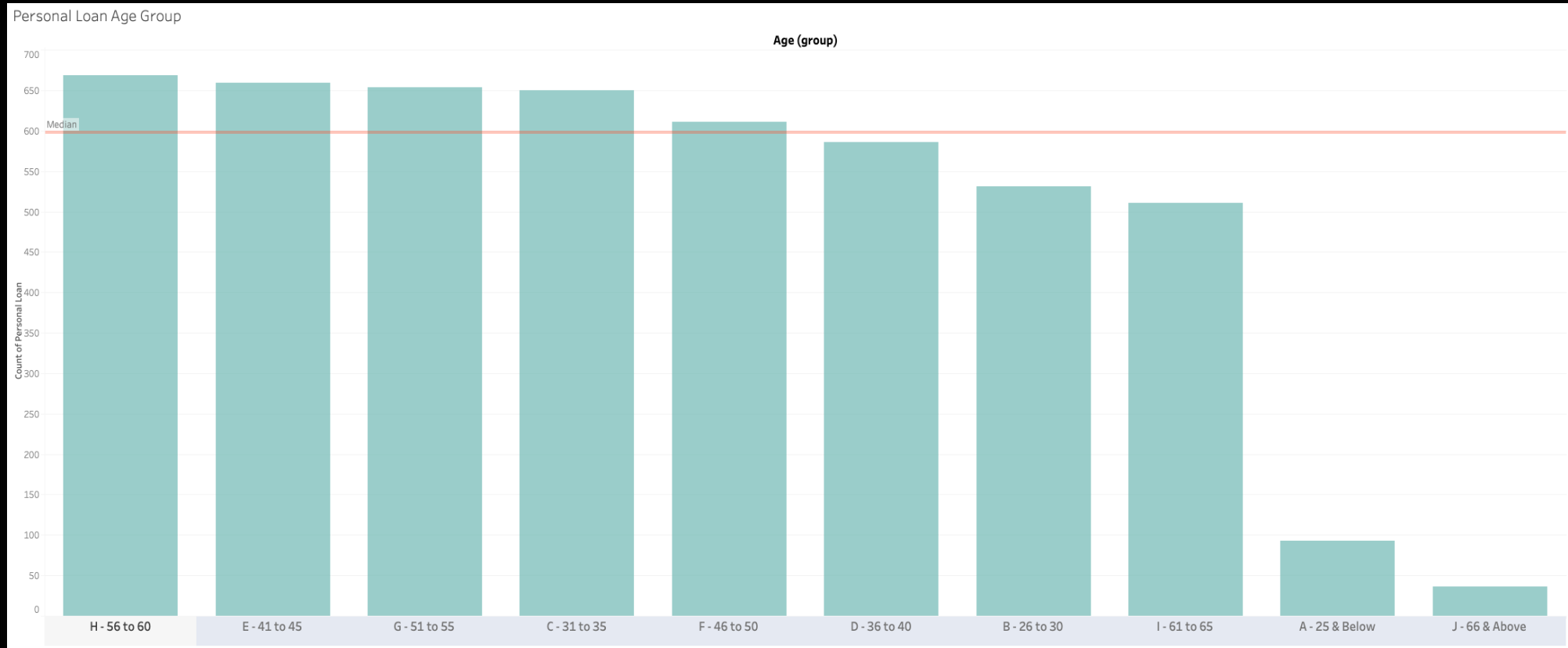
Personal Loan	Online	Credit Card	CD Account	Securities Account	
Yes	Yes	Yes	Yes	Yes	10
			Yes	No	72
			No	Yes	31
			No	No	13
	No	Yes	No	No	165
			Yes	Yes	7
			No	No	4
		No	No	No	50
			Yes	Yes	3
			No	Yes	9
No	Yes	Yes	No	No	116
			Yes	Yes	76
			No	No	66
			No	No	658
		No	Yes	Yes	15
			No	Yes	189

# Scatter Plot Analysis



- Customers with a Personal Loan account have an average Credit Card spending of 3.91k per month and an average income of 144k per annum.
- The highest density of Thera account holders without a Personal Loan account have a lower average Credit Card spending of 1.73k per month and a lower average income of 66k per annum.
- [https://public.tableau.com/views/Capstone-Abdul016C/CCAvgvsIncome?:language=en-US&publish=yes&:sid=&:display\\_count=n&:origin=viz\\_share\\_link](https://public.tableau.com/views/Capstone-Abdul016C/CCAvgvsIncome?:language=en-US&publish=yes&:sid=&:display_count=n&:origin=viz_share_link)





## **Personal Loan age group analysis**

- Age Group 'H' have the highest Personal Loan conversions.
- Age Group 'J' have the lowest Personal Loan conversions.
- Groups H, E, G, C & F are conversions above median age group.
- [https://public.tableau.com/views/Capstone-Abdul016C/PersonalLoanAgeGroup?:language=en-US&publish=yes&:sid=&:display\\_count=n&:origin=viz\\_share\\_link](https://public.tableau.com/views/Capstone-Abdul016C/PersonalLoanAgeGroup?:language=en-US&publish=yes&:sid=&:display_count=n&:origin=viz_share_link)

# Conclusion & Next Steps



To target on existing customers, it is ideal for Thera to market within L.A. and San Francisco.



Online users are most likely to apply Personal Loan with minimal costs on online ads and campaigns. It can be enhanced by establishing direct contact via push notifications, personal messaging or telephony services and guide online applications if needful.



Potentially customers with Securities Account will have a higher count on acceptance rate due to most of Thera customers belong to this account type. Thera will need to reach out to these clients for direct exposure to their personal loan services.



Existing Personal Loan accounts have higher than average annual income and average monthly credit card spend.

Lowering the annual income rate will increase chances of higher conversion.

Average monthly credit card spending does not have to be lowered as customers may not have spending power needs.



Ideally age group between 41 to 60 will bring in most conversions based on existing PL clients. This age group can be handpicked from the database to recommend to open a Personal Loan Account.

The image shows a collection of paper boats on a white surface. In the foreground, a single yellow paper boat is positioned on the right side. Behind it and to the left, there are several white paper boats, some of which are slightly out of focus. A bright yellow rectangular banner is overlaid on the right side of the image, containing the text "End of presentation" in a bold, black, sans-serif font.

***End of presentation***