



# CUSTOMER ANALYSIS

INCOME PREDICTION RESULT

01 JULY 2021

# EXECUTIVE SUMMARY



# RESEARCH BACKGROUND

Although there are significant evidences showing that, younger customers tend to trade more aggressively by carrying higher margin and higher turnover (result from version 1), this report reveals that older customers, usually have greater NAV:

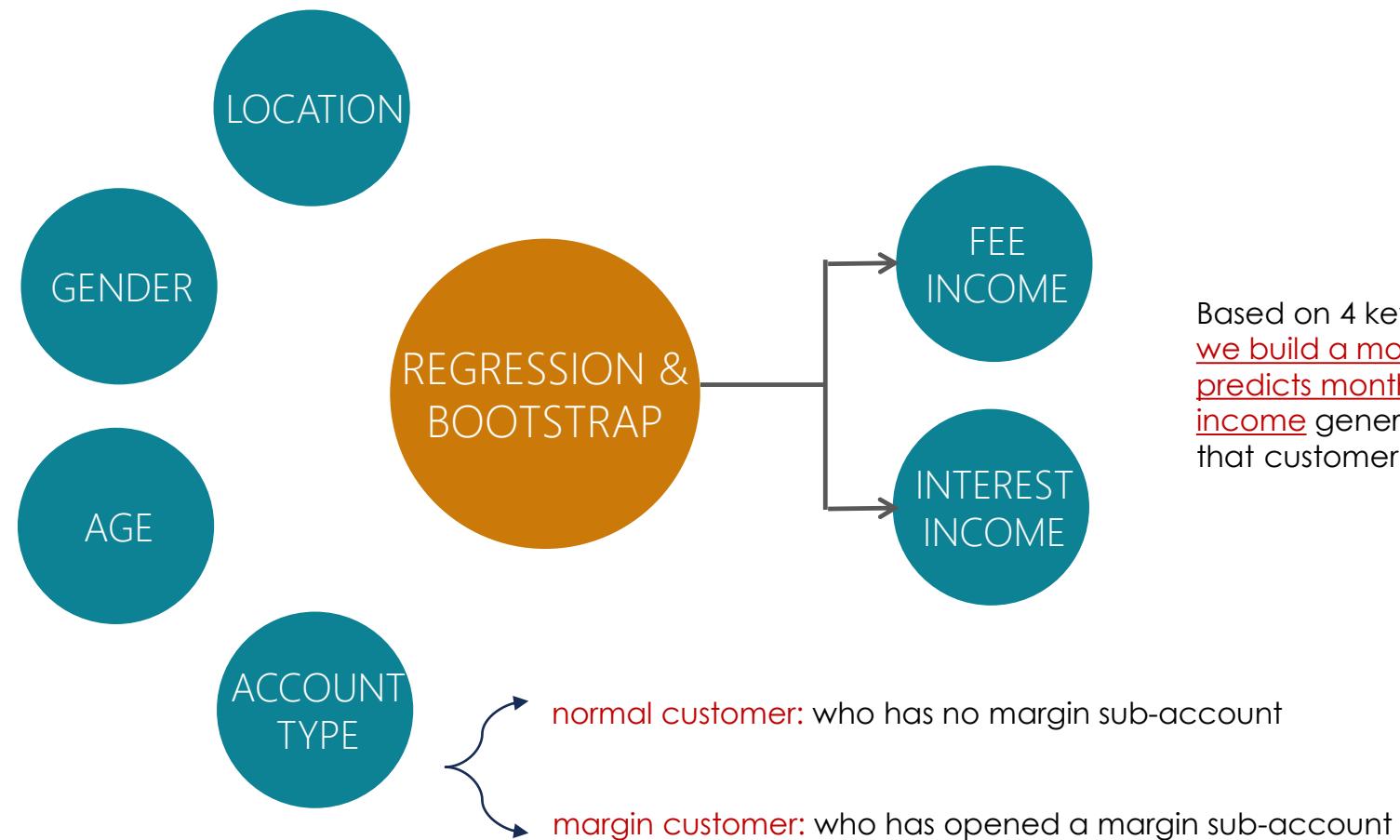
	Young	Old
Margin usage ratio & Trading turnover	High	Low
NAV	Low	High

Because NAV directly determines how much income one customer could generate to PHS. We attempt to develop a model that takes into account both relative aspects (margin usage ratio & trading turnover) and absolute aspect (NAV) to predict the expected income one new customer could yield over a month.

# METHODOLOGIES

## PREDICTIVE TOOL

When a new customer opens an account, there are 4 types of information provided: location, gender, age, and account type (whether or not the customer registers for margin).



## KEY FINDINGS: HO CHI MINH CITY

In Ho Chi Minh City, although older customers usually trade less frequently and carry less margin in relative to their NAV, the model indicates that they are still a potential group.

In fact, male normal customers aging from 35 to 55 are predicted to yield approximately 150,000VND monthly trading fee per capita [\[detail\]](#). Male margin customer in this age group are also predicted to generate 500,000VND-1,100,000VND trading fee per capita [\[detail\]](#), highest over other age groups. Compared to trading fee, interest income apparently follows the same pattern [\[detail\]](#).

In contrast, the pattern is completely different for female customers. The model predicted that either young or old female customers create highest trading/interest income whereas the middle-age falls short behind [\[detail\]](#) [\[detail\]](#).

In general, the oldest groups that age more than 55 are expected to have greatest NAV and hence predicted to produce highest income. However, there is a lot of uncertainties surrounding this expectation because it derives from just a few number of customers who fall in this age group [\[detail\]](#).

## KEY FINDINGS: HA NOI

In Ha Noi, the model produces great uncertainties in young, female, normal customers due to the lack of customers. However, the expectation of monthly trading fee of this group is predicted to be highest, ranging from 170,000VND to 200,000VND among the group of age 18-25. The male counterpart, in contrast, is predicted to generate highest fee income in the oldest group (age 45-60) [\[detail\]](#).

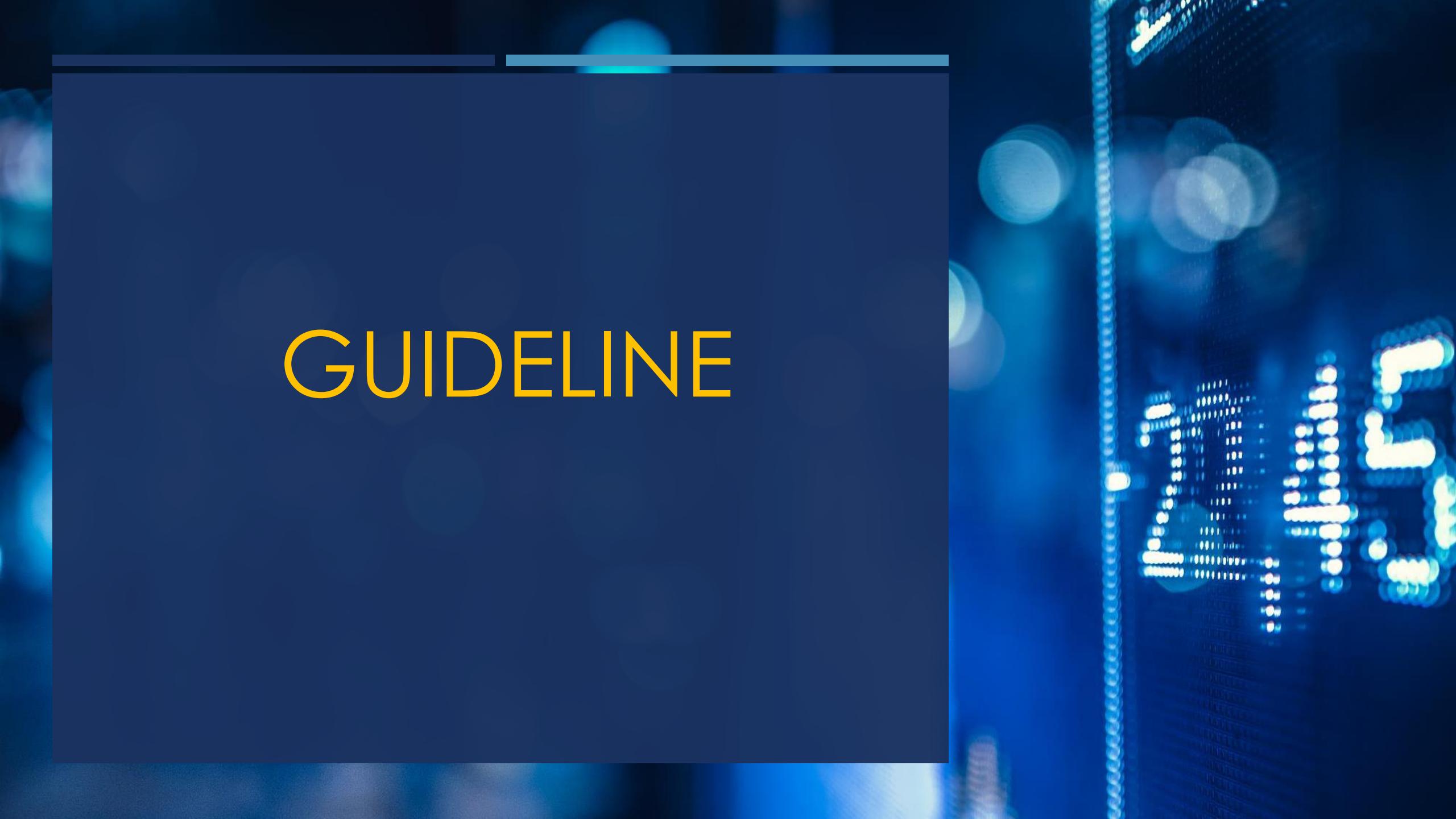
For margin customers, there is little difference between male and female, the model predicted that customers in their middle age (40-55) generate highest fee income, and females slightly surpass males [\[detail\]](#). Their monthly trading fee is expected to fluctuate around 800.000VND.

Predicted interest income on each customer also exhibits almost the same pattern which varies from 400.000VND to 500.000VND per month in that age group [\[detail\]](#). However, as seen clearly in the case of Ho Chi Minh City, older age groups in Ha Noi also imply greater uncertainties [\[detail\]](#) [\[detail\]](#)

## KEY FINDINGS: HAI PHONG

In Hai Phong, for those of male customers who have not opened a margin sub-account, there are great uncertainties surrounding our prediction. Despite that, the model suggest that a typical male customer in 35-45 age group has highest expected trading fee, approximate at 170,000VND per month. Male customers are expected to far surpass female customers who are predicted to generate 50,000VND at most in monthly trading fee per capita [\[detail\]](#).

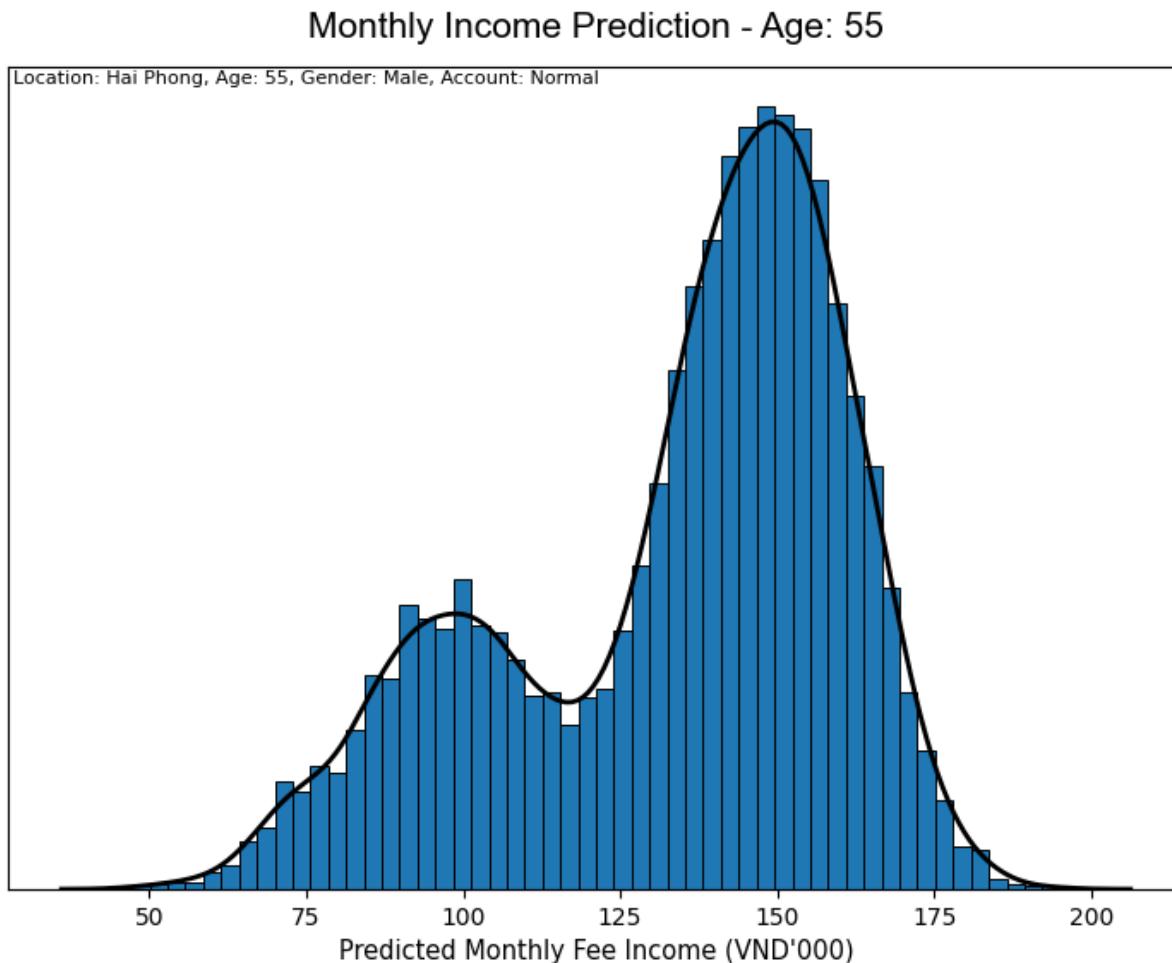
For margin customers, we are quite certain about male customers. The best performers are male customers who age 35-50. This group is predicted to generate 500,000VND-600,000VND in monthly fee income and 300,000VND-400,000VND in monthly interest income. Whereas female customers in the same age group are also expected to generate the same income, the youngest females (age 21-27) and oldest females (age over 55) present higher expected monthly fee/interest income but also expose to a great deal of prediction uncertainties [\[detail\]](#) [\[detail\]](#).



# GUIDELINE

# HOW TO READ THE RESULT:

## DISTRIBUTION PLOT ON PREDICTED FEE INCOME



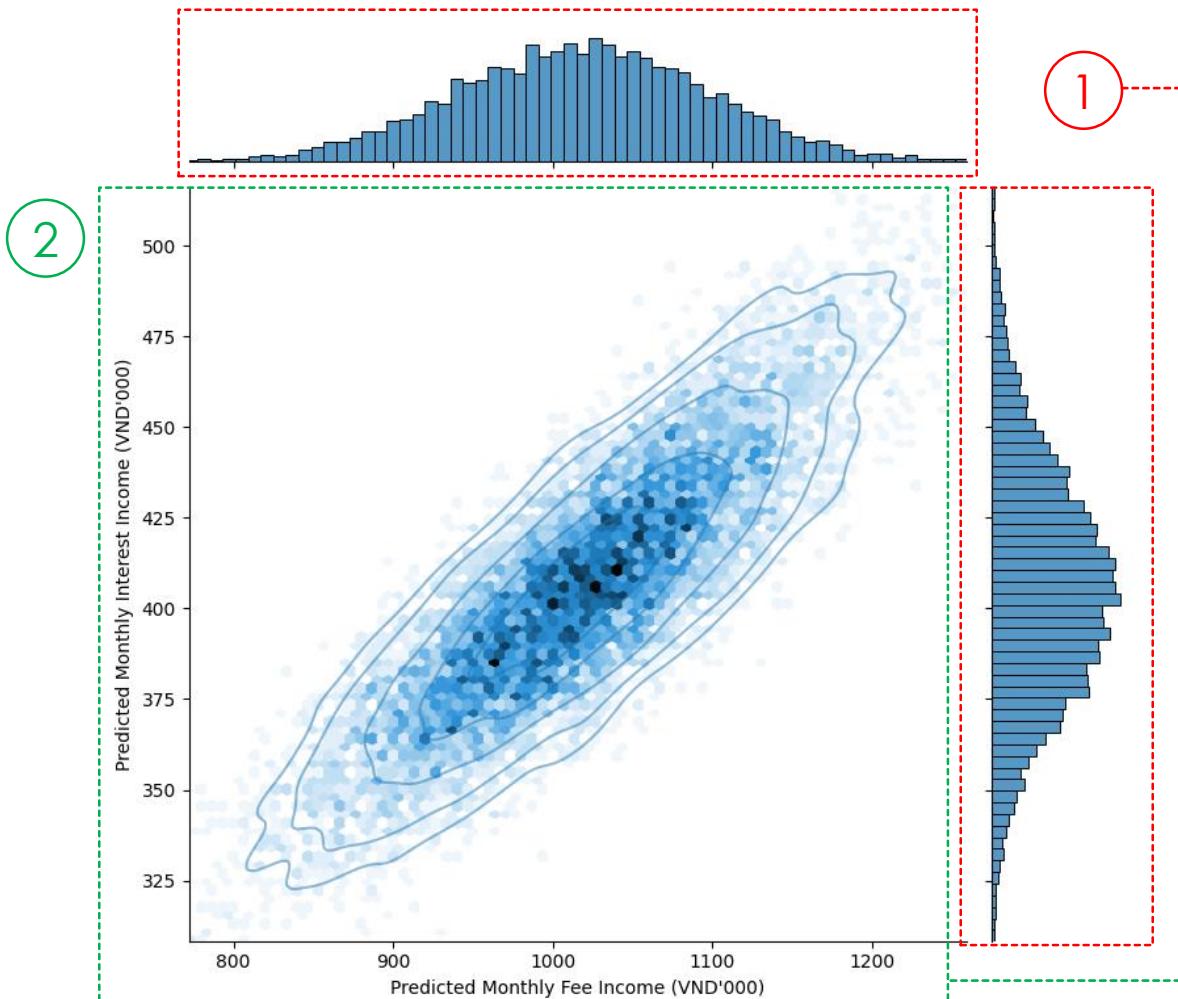
The distribution plot describes how likely one quantity takes on possible values. Here, it's used to show the possible values of true expected monthly income and how probable they are.

Distribution plots with 2 peaks as seen reveals that there is a divergence in the underlying data that could possibly divide the examined customers into 2 smaller groups. But as you might realize later, customers of same location, gender, and age are usually well described by a single model

# HOW TO READ THE RESULT:

## JOINT DISTRIBUTION PLOT ON PREDICTED FEE INCOME & MARGIN INCOME

Monthly Income Prediction  
Location: Ho Chi Minh City, Age: 50, Gender: Male, Account: Margin



1 → The two marginal distribution plots describe how likely two quantities take on two sets of possible values.

Technically speaking, it measures two probabilities:

$P[E(I) = a]$ ; **and**  $P[E(F) = b]$  where  $E(I)$  is expected interest income,  $E(F)$  is expected monthly fee income.  $(a,b)$  is any pair of values

2 → The joint distribution plot illustrates how likely both quantities take on a pair of values.

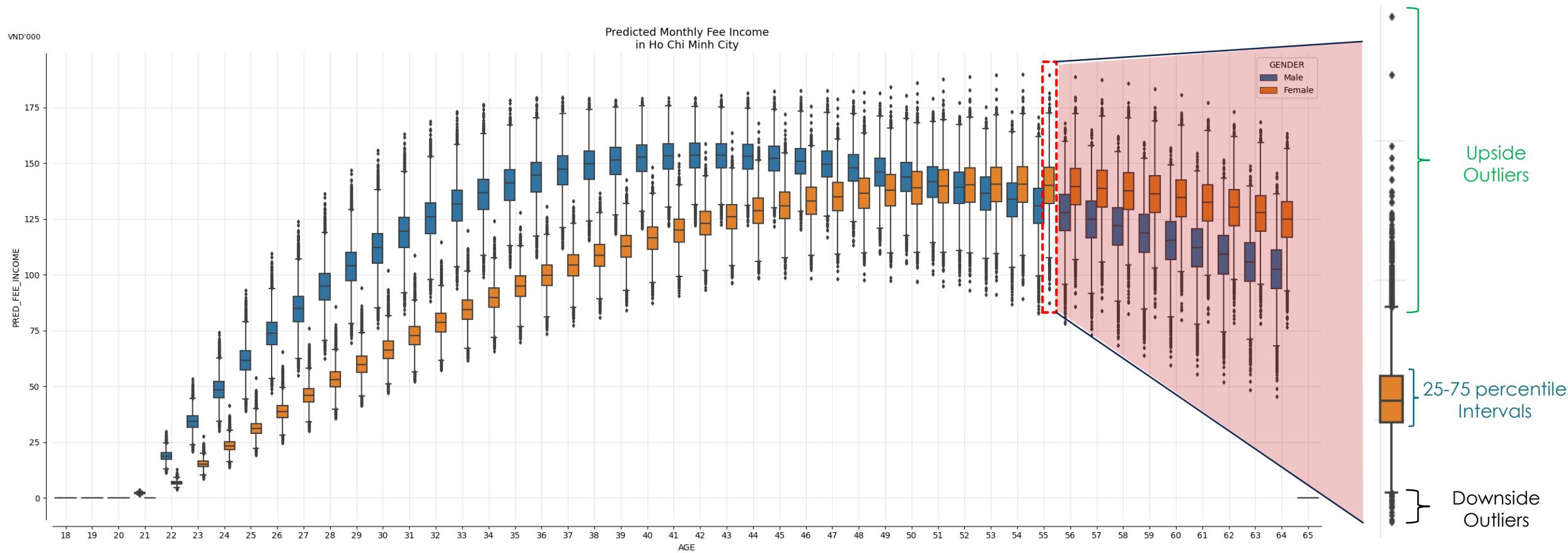
Technically speaking, it measures the probability:

$P[E(I) = a, E(F) = b]$  where  $E(I)$  is expected monthly interest income,  $E(F)$  is expected fee income.  $(a,b)$  is any pair of values

# HOW TO READ THE RESULT:

## BOX PLOT ON PREDICTED FEE INCOME: SUMMARY RESULT

This box plot summarizes predictive results on Monthly Fee Income in HCMC across genders and ages:



# RESULT OF HO CHI MINH CITY



# NORMAL ACCOUNT



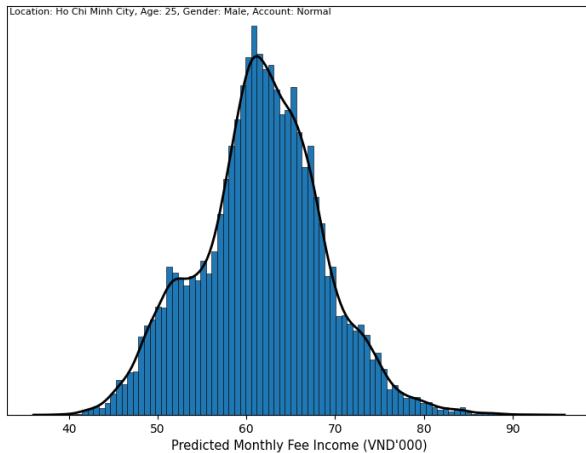
[click to go back to guideline](#)

[click to go back to key findings](#)

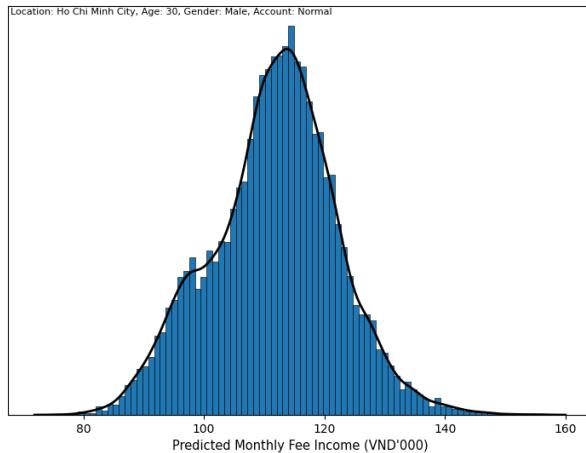
# INCOME PREDICTION

ACCOUNT TYPE: NORMAL , LOCATION: HO CHI MINH CITY, GENDER: MALE

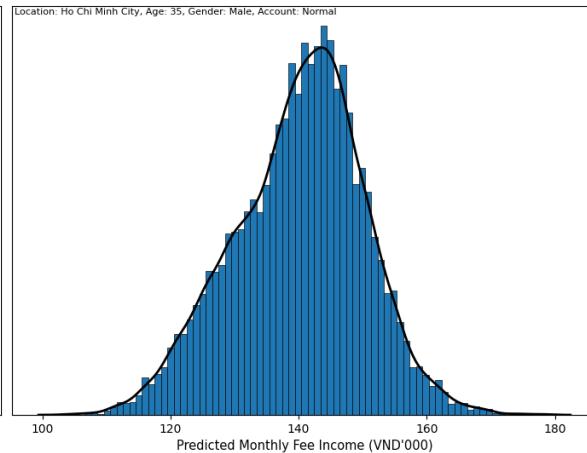
Monthly Income Prediction - Age: 25



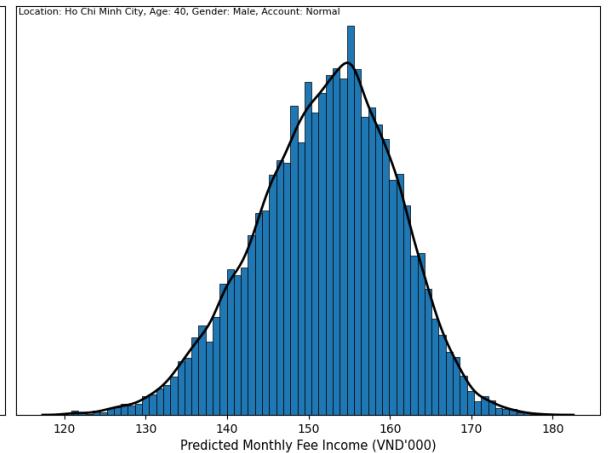
Monthly Income Prediction - Age: 30



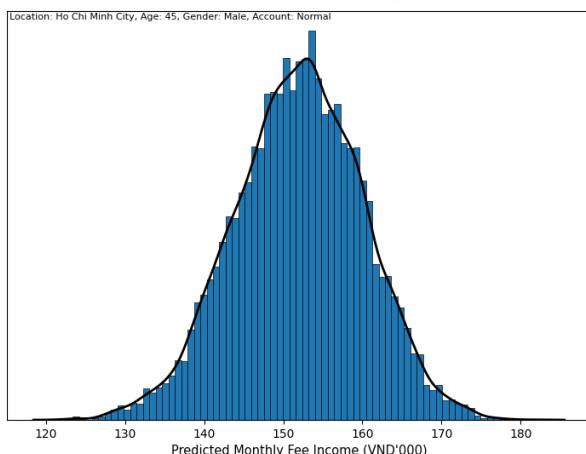
Monthly Income Prediction - Age: 35



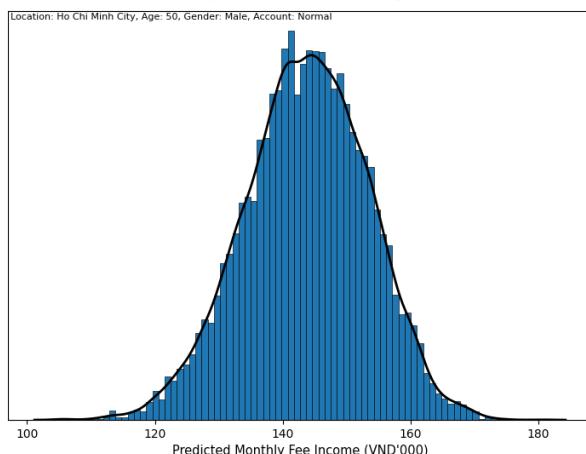
Monthly Income Prediction - Age: 40



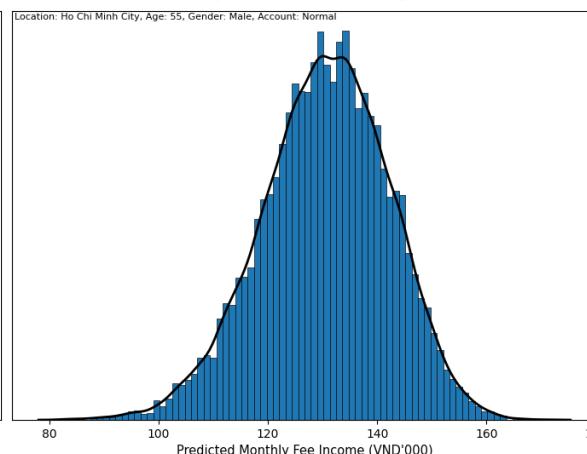
Monthly Income Prediction - Age: 45



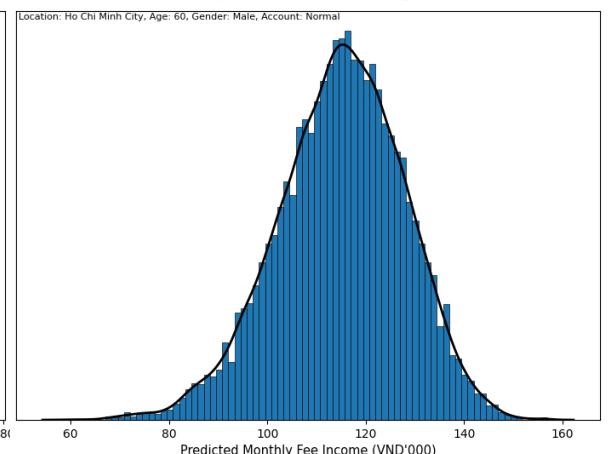
Monthly Income Prediction - Age: 50



Monthly Income Prediction - Age: 55



Monthly Income Prediction - Age: 60



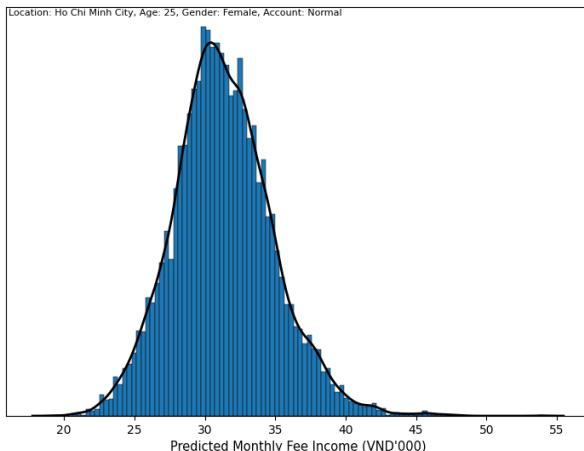
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[click to go back to key findings](#)

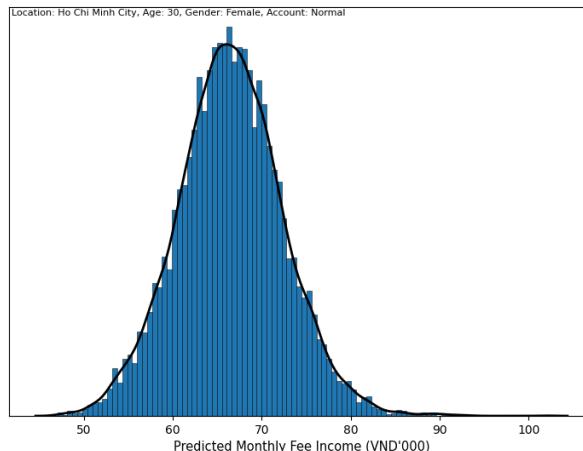
# INCOME PREDICTION

ACCOUNT TYPE: NORMAL , LOCATION: HO CHI MINH CITY, GENDER: FEMALE

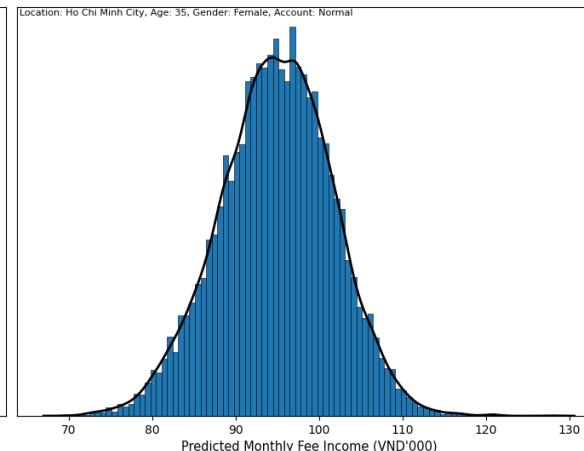
Monthly Income Prediction - Age: 25



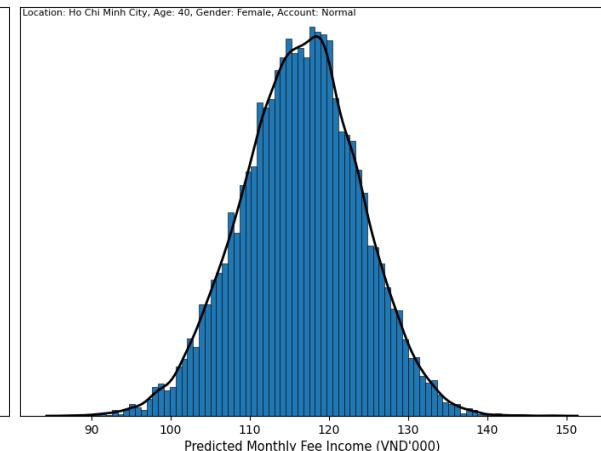
Monthly Income Prediction - Age: 30



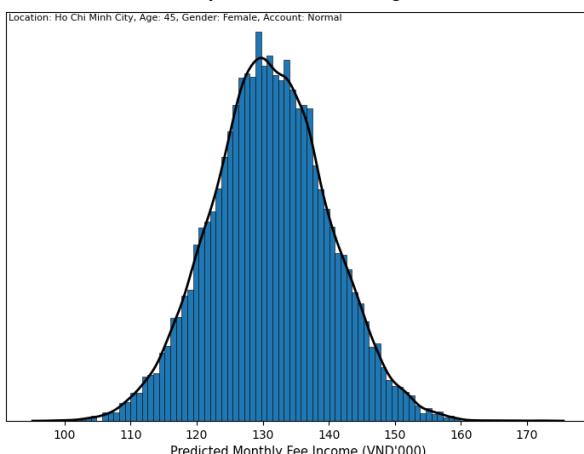
Monthly Income Prediction - Age: 35



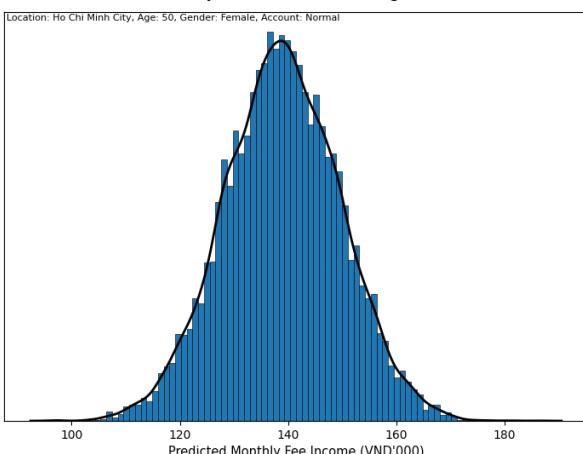
Monthly Income Prediction - Age: 40



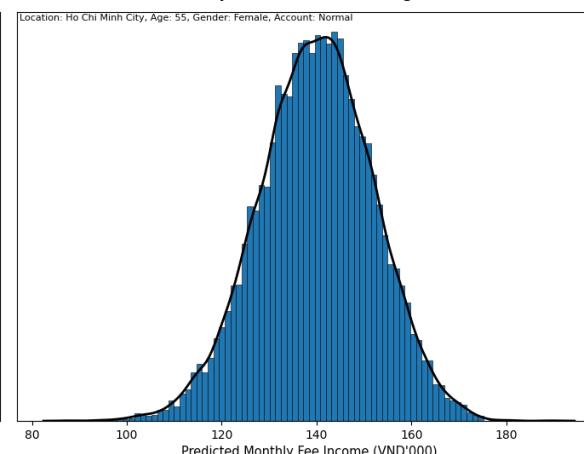
Monthly Income Prediction - Age: 45



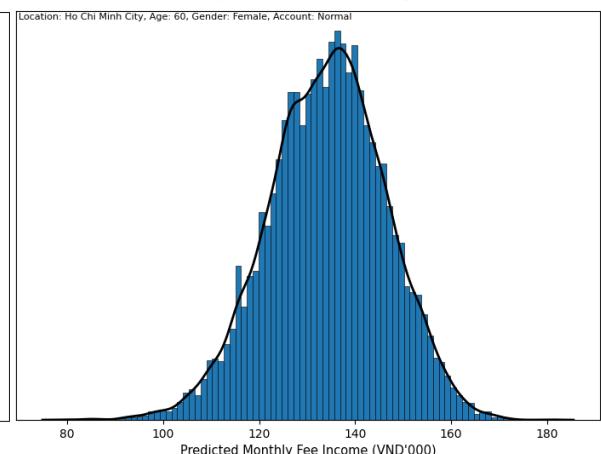
Monthly Income Prediction - Age: 50



Monthly Income Prediction - Age: 55



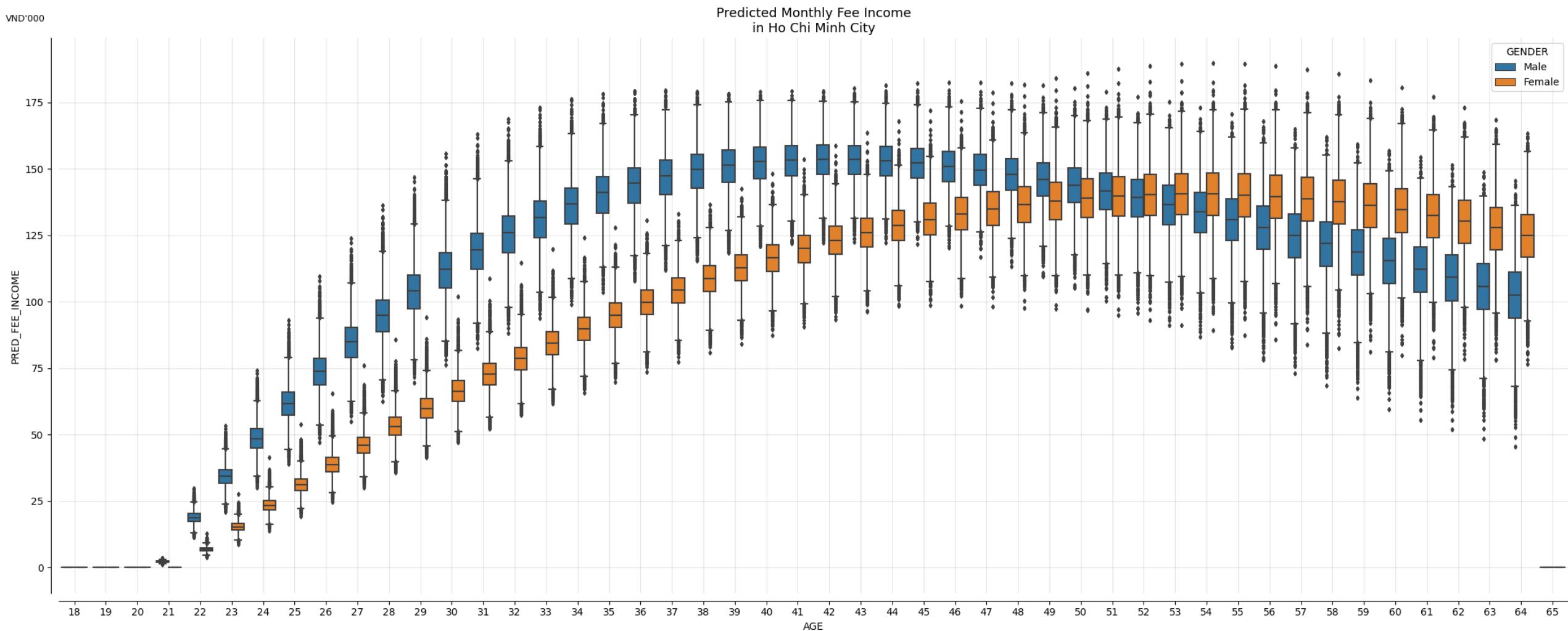
Monthly Income Prediction - Age: 60



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# PREDICTION RESULT SUMMARY: FEE INCOME

LOCATION: HO CHI MINH CITY, ACCOUNT TYPE: NORMAL



# MARGIN ACCOUNT



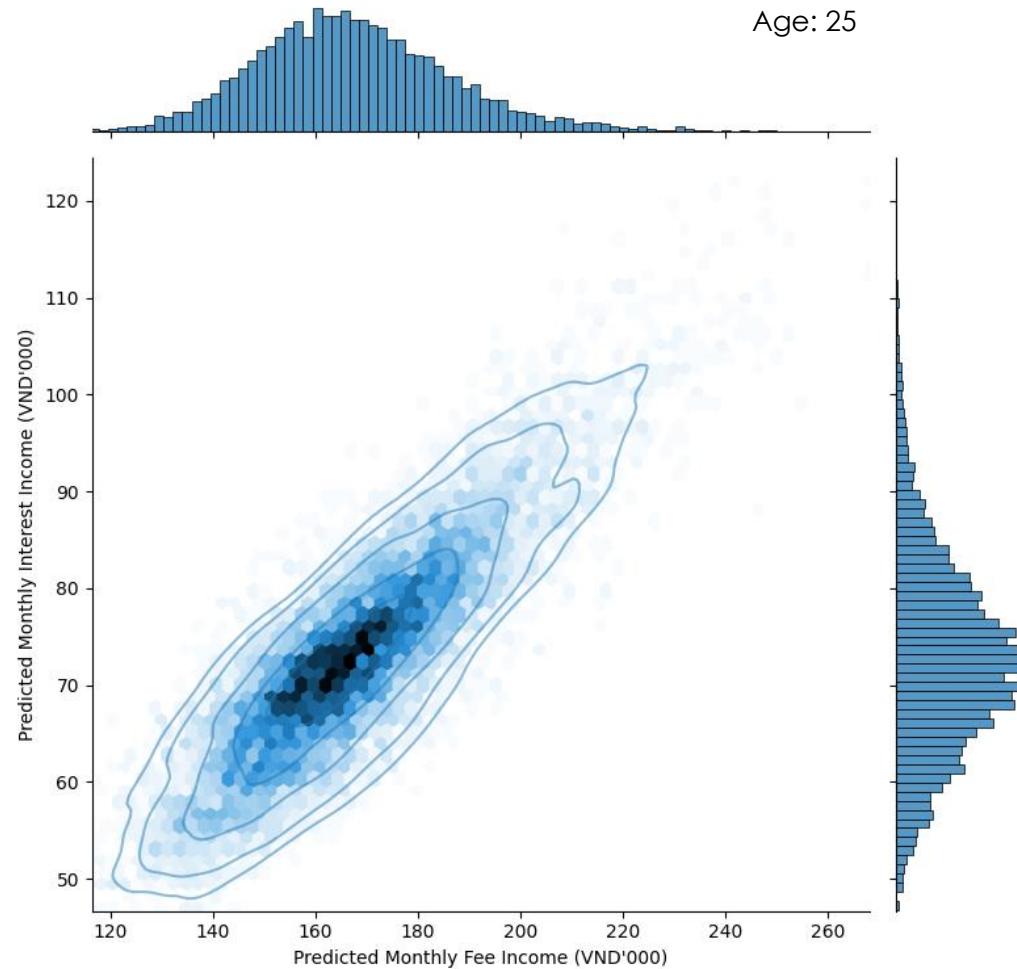
# INCOME PREDICTION

ACCOUNT TYPE: MARGIN, LOCATION: HO CHI MINH CITY, GENDER: MALE

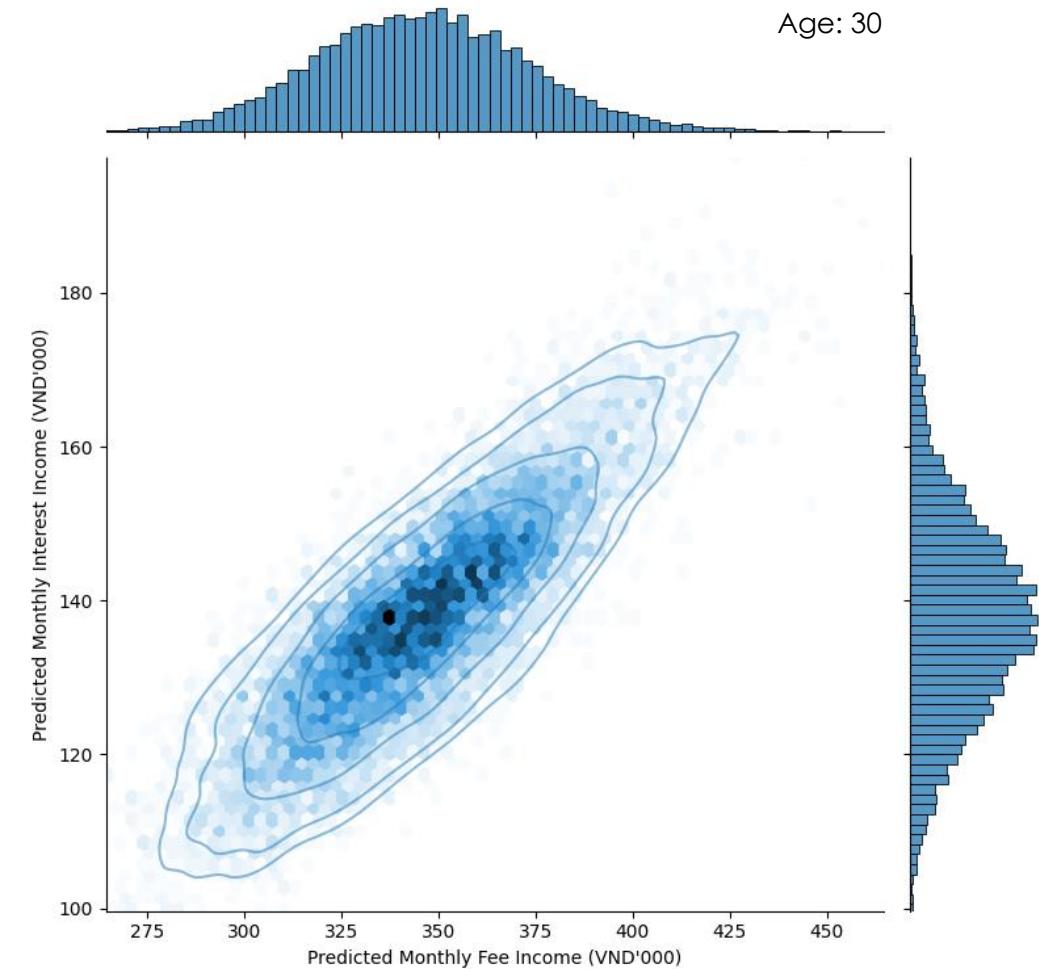
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[click to go back to key findings](#)

Monthly Income Prediction  
Location: Ho Chi Minh City, Age: 25, Gender: Male, Account: Margin



Monthly Income Prediction  
Location: Ho Chi Minh City, Age: 30, Gender: Male, Account: Margin



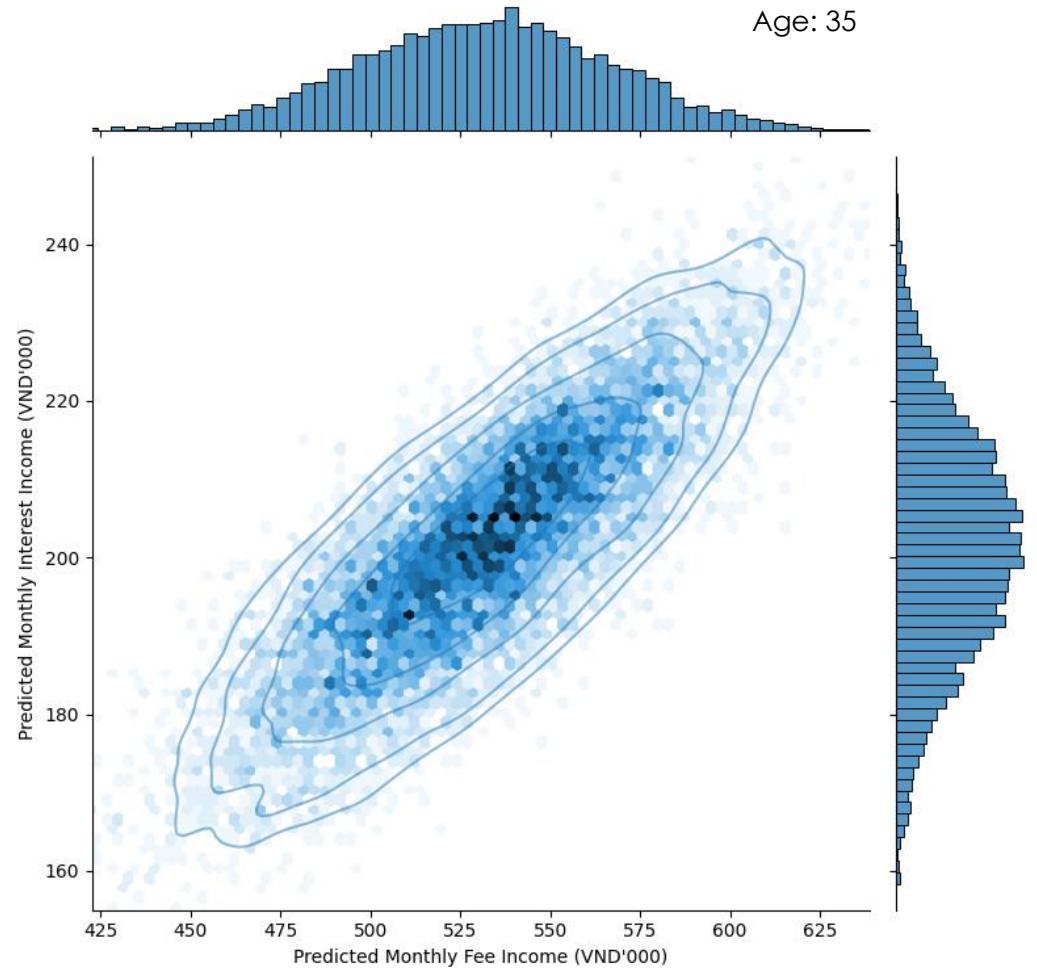
# INCOME PREDICTION

ACCOUNT TYPE: MARGIN, LOCATION: HO CHI MINH CITY, GENDER: MALE

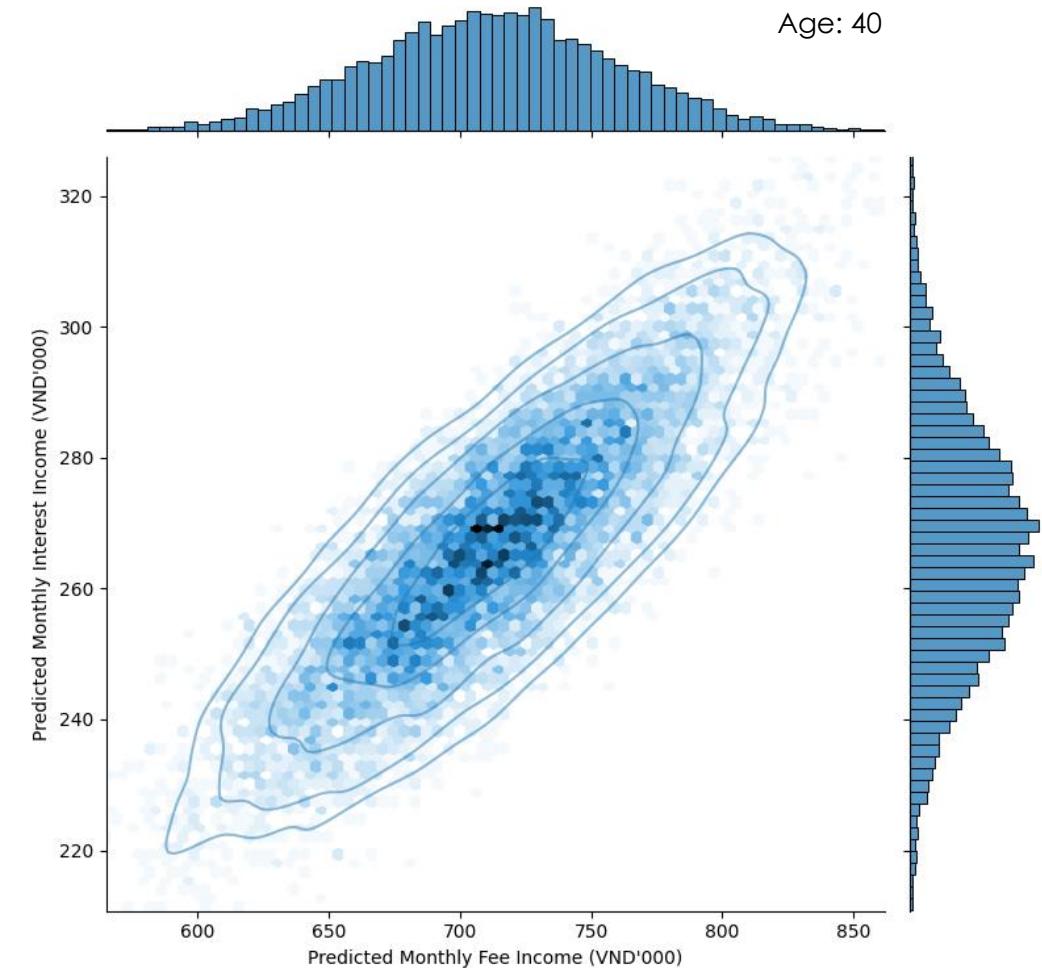
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Monthly Income Prediction  
Location: Ho Chi Minh City, Age: 35, Gender: Male, Account: Margin



Monthly Income Prediction  
Location: Ho Chi Minh City, Age: 40, Gender: Male, Account: Margin



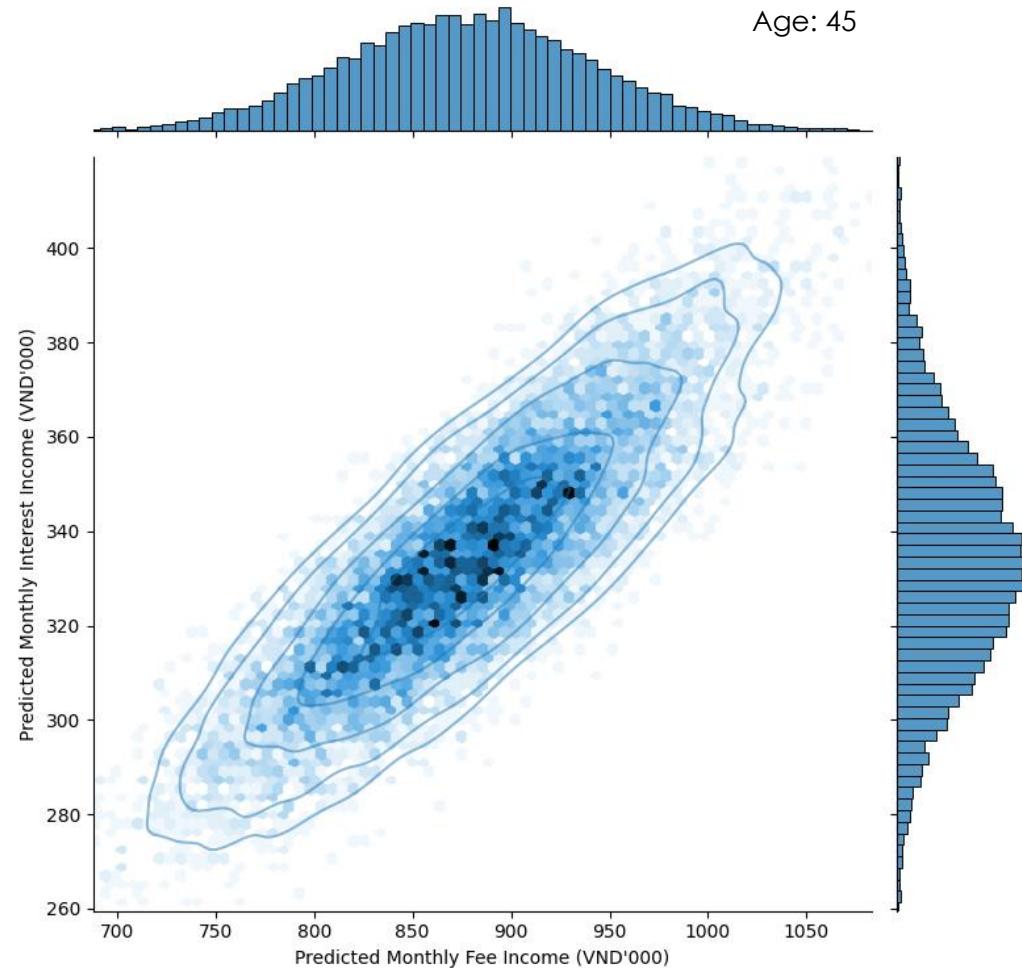
# INCOME PREDICTION

ACCOUNT TYPE: MARGIN, LOCATION: HO CHI MINH CITY, GENDER: MALE

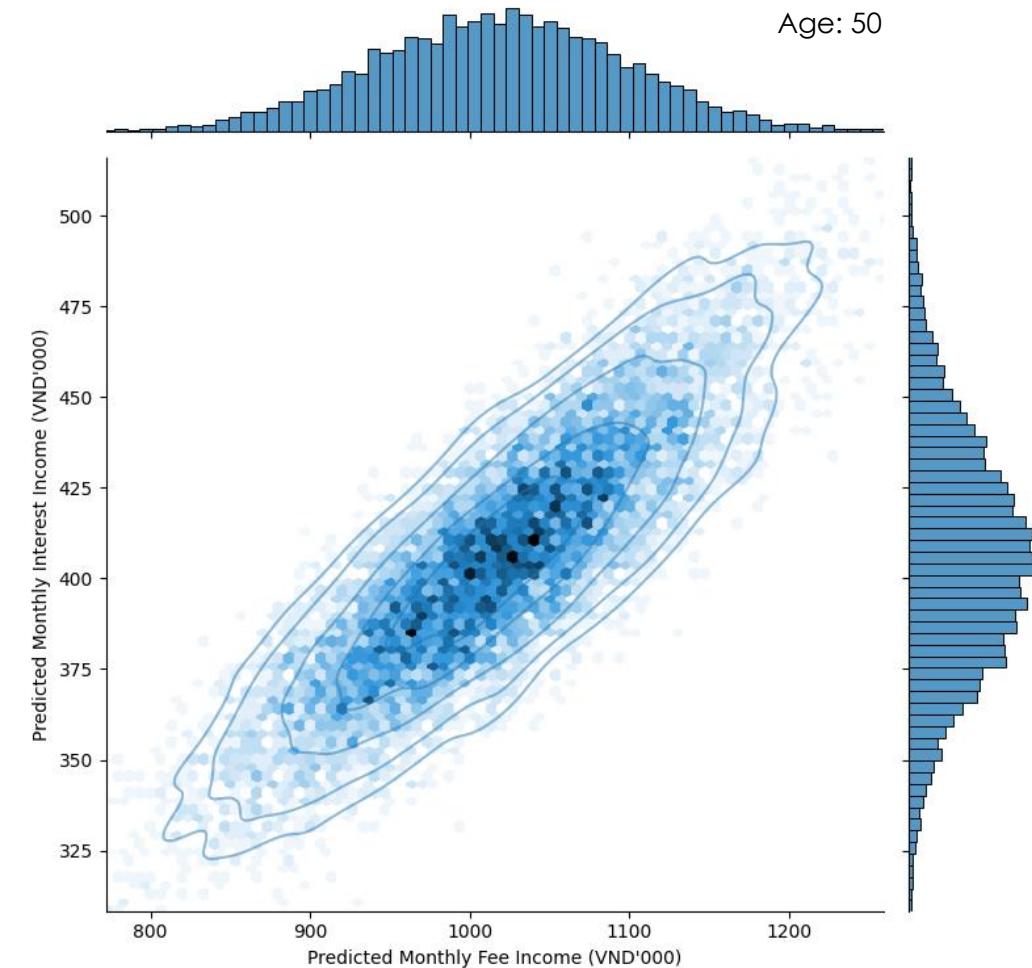
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Monthly Income Prediction  
Location: Ho Chi Minh City, Age: 45, Gender: Male, Account: Margin



Monthly Income Prediction  
Location: Ho Chi Minh City, Age: 50, Gender: Male, Account: Margin



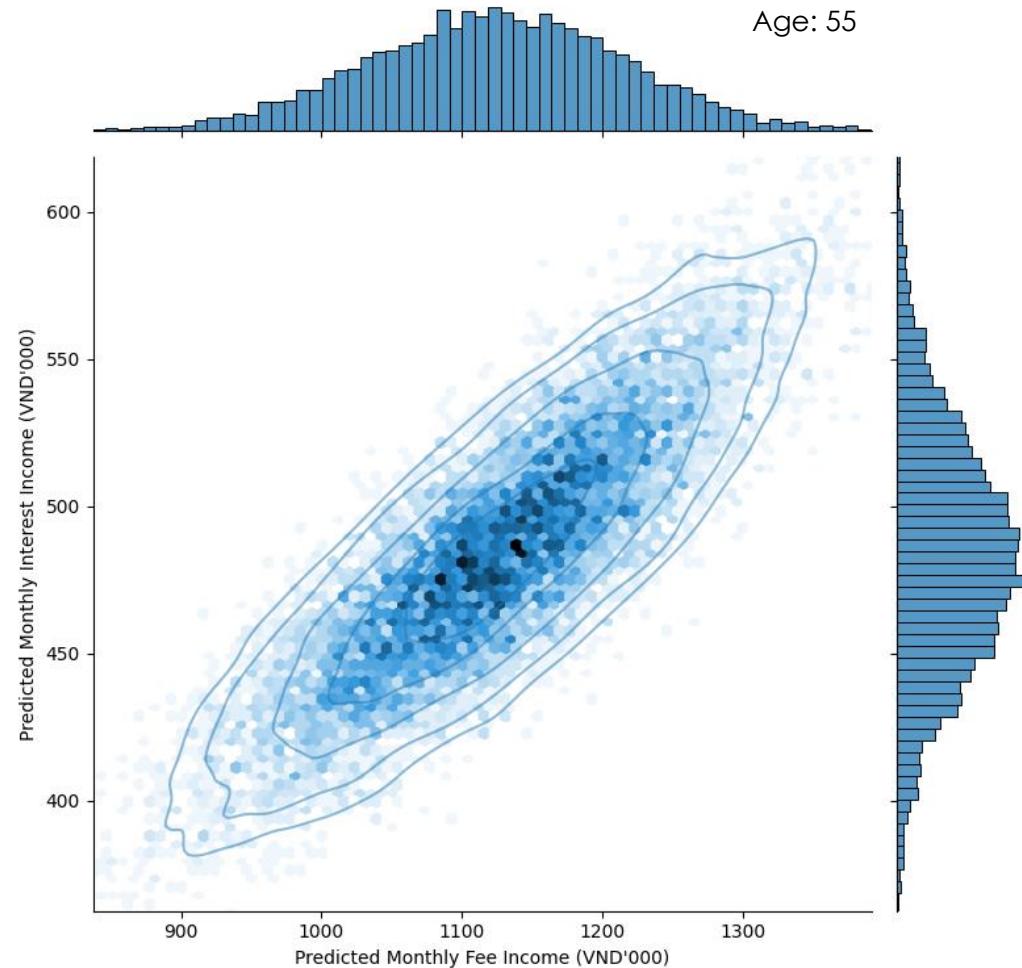
# INCOME PREDICTION

ACCOUNT TYPE: MARGIN, LOCATION: HO CHI MINH CITY, GENDER: MALE

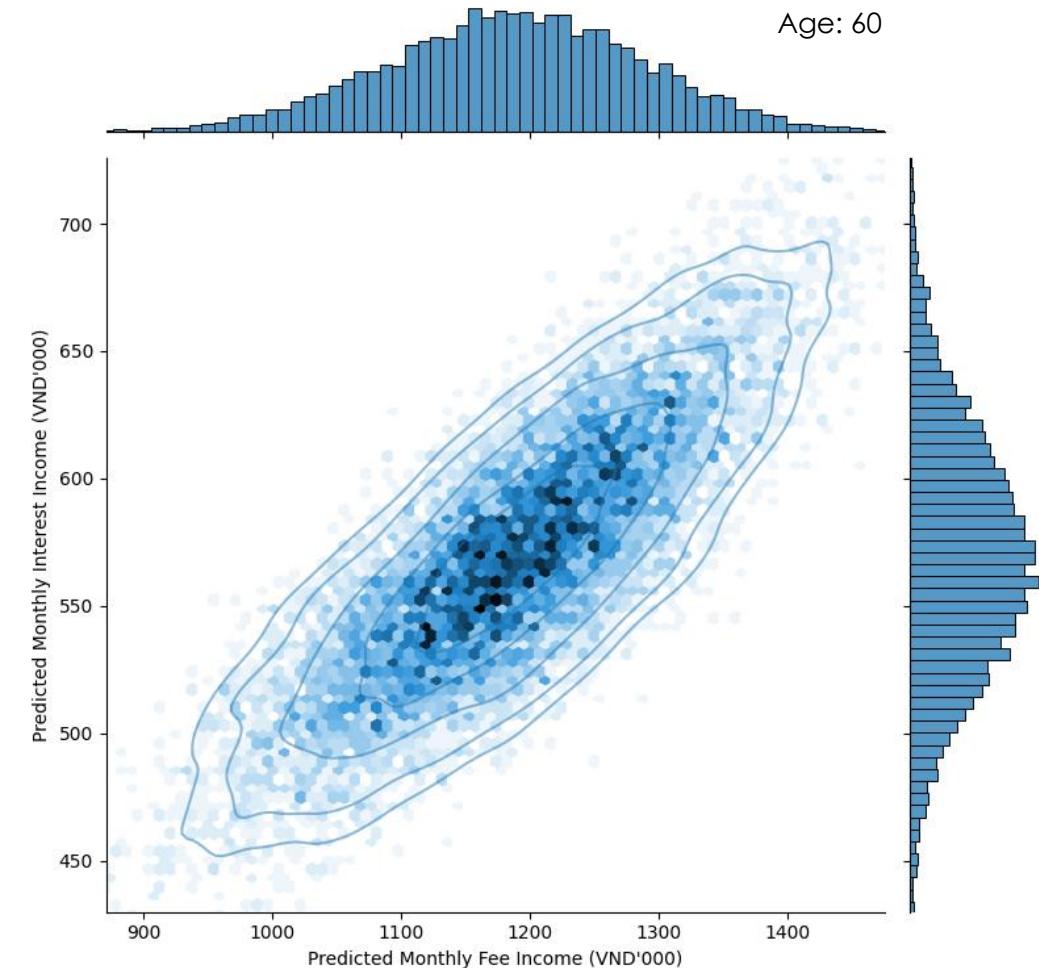
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Monthly Income Prediction  
Location: Ho Chi Minh City, Age: 55, Gender: Male, Account: Margin



Monthly Income Prediction  
Location: Ho Chi Minh City, Age: 60, Gender: Male, Account: Margin



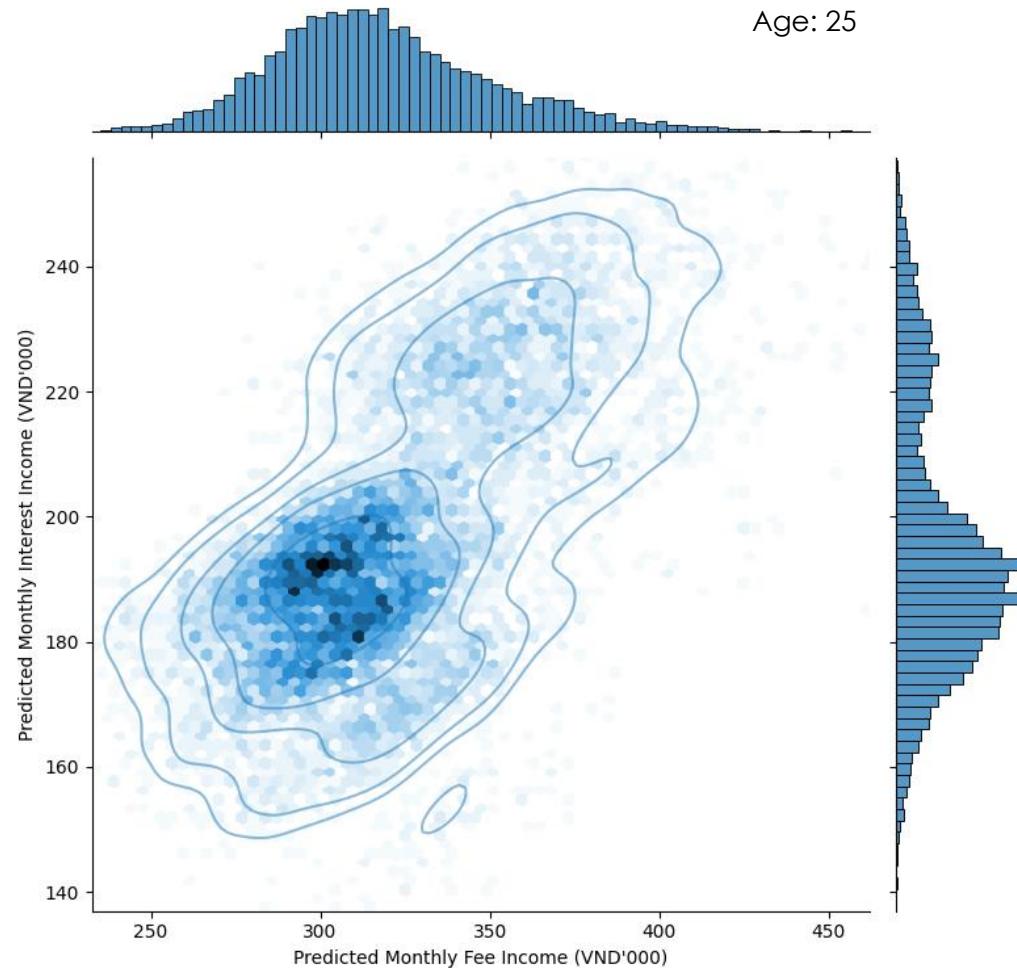
# INCOME PREDICTION

ACCOUNT TYPE: MARGIN, LOCATION: HO CHI MINH CITY, GENDER: FEMALE

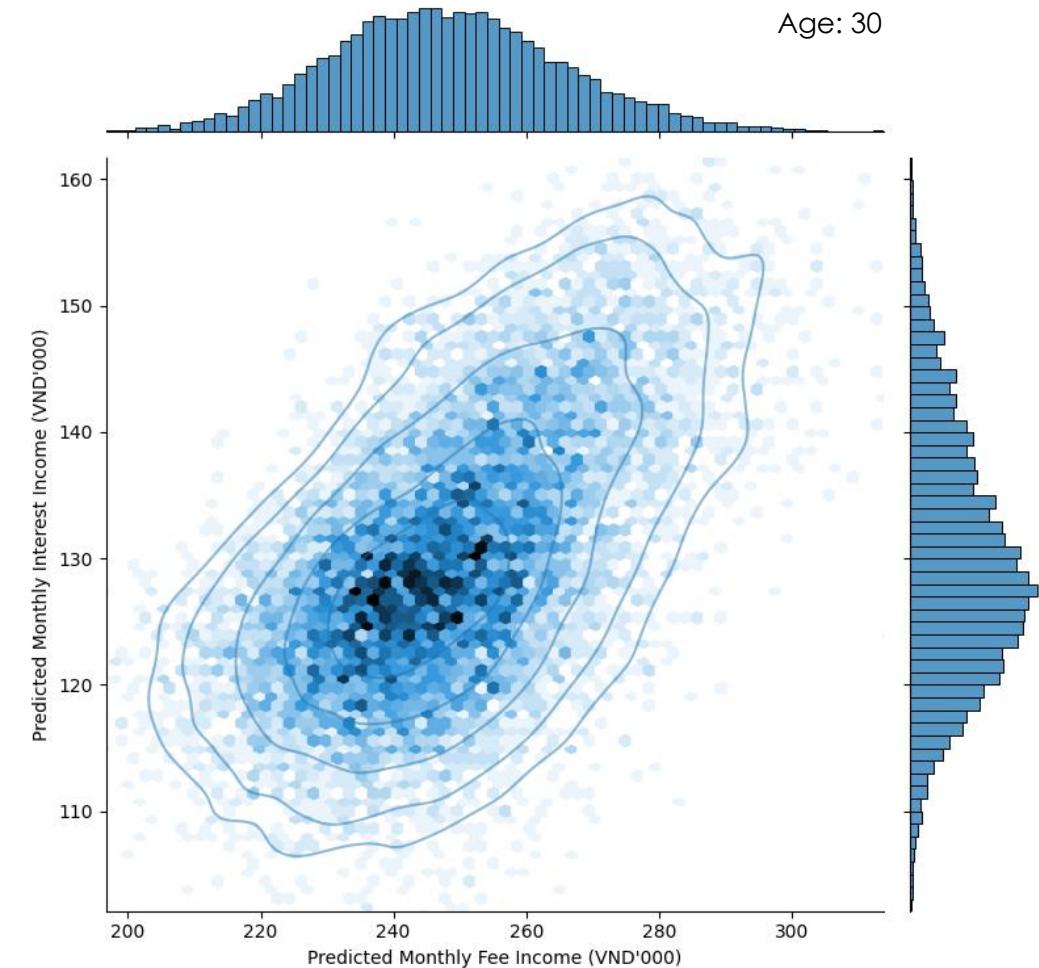
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Monthly Income Prediction  
Location: Ho Chi Minh City, Age: 25, Gender: Female, Account: Margin



Monthly Income Prediction  
Location: Ho Chi Minh City, Age: 30, Gender: Female, Account: Margin



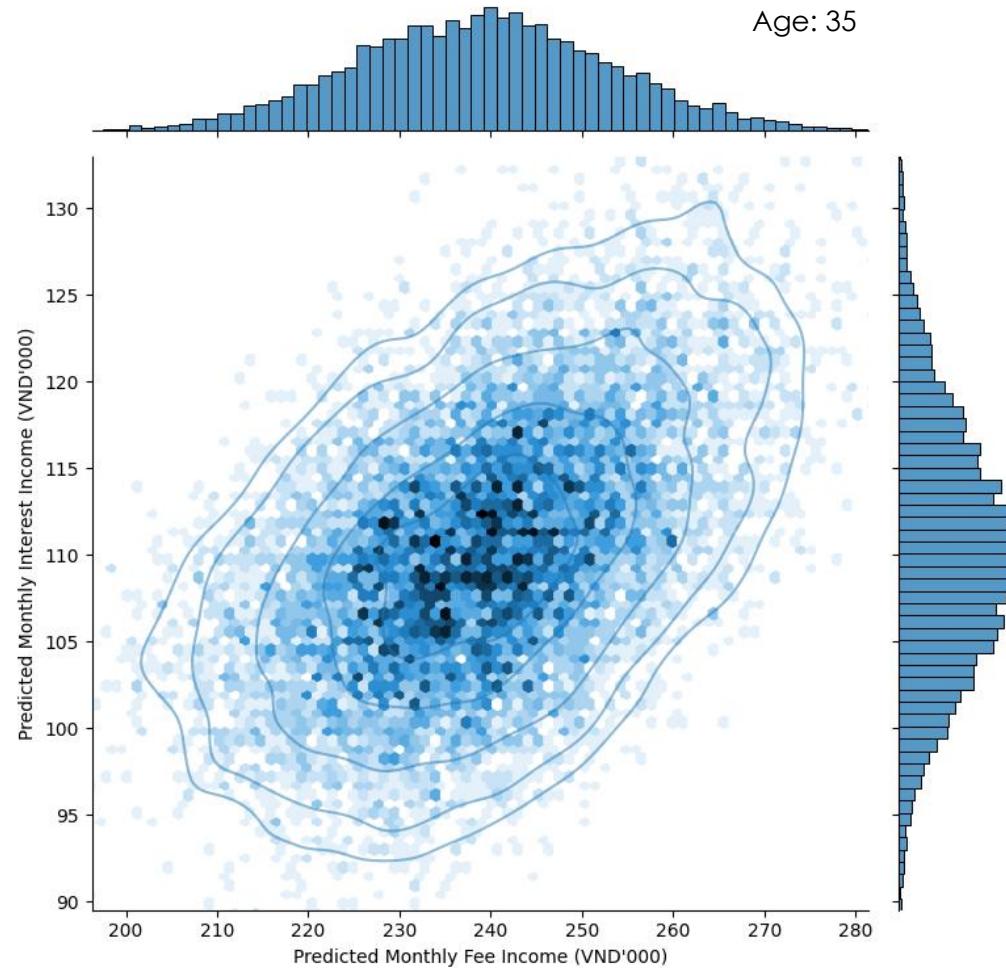
# INCOME PREDICTION

ACCOUNT TYPE: MARGIN, LOCATION: HO CHI MINH CITY, GENDER: FEMALE

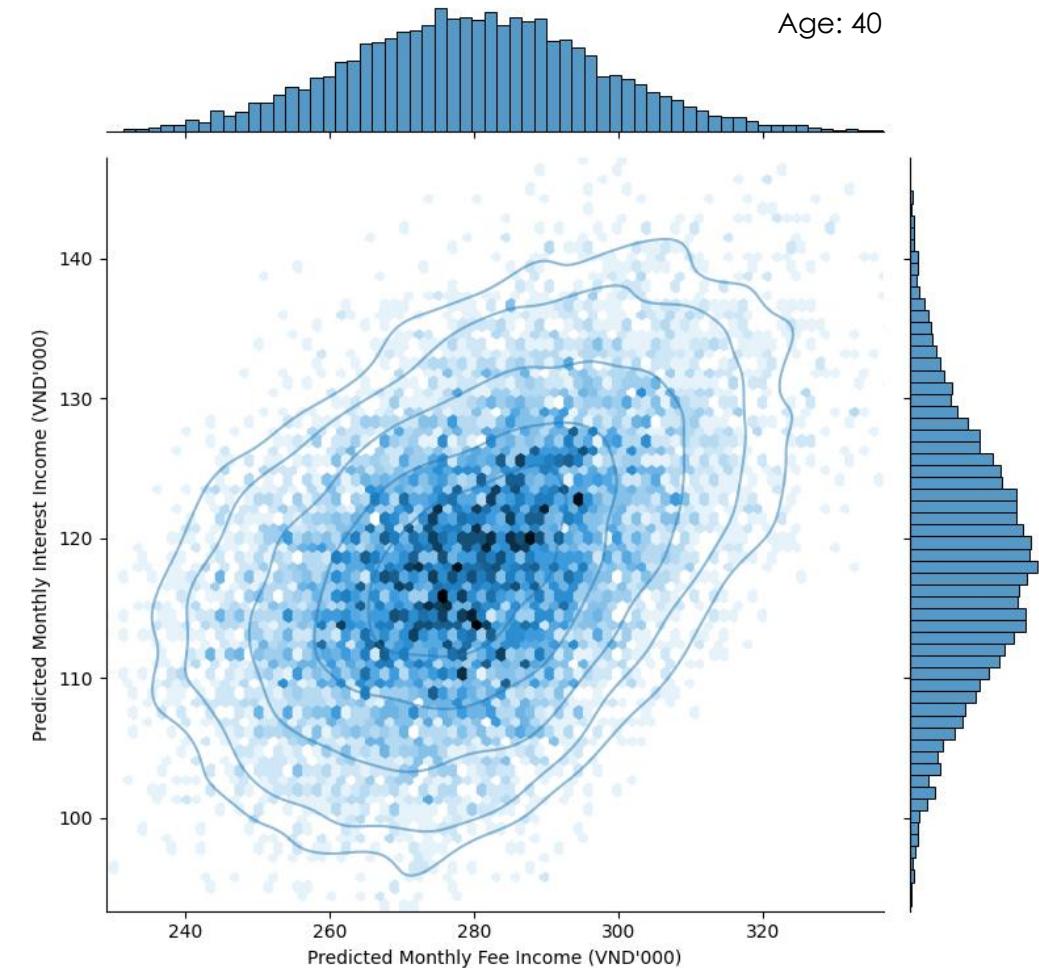
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Monthly Income Prediction  
Location: Ho Chi Minh City, Age: 35, Gender: Female, Account: Margin



Monthly Income Prediction  
Location: Ho Chi Minh City, Age: 40, Gender: Female, Account: Margin



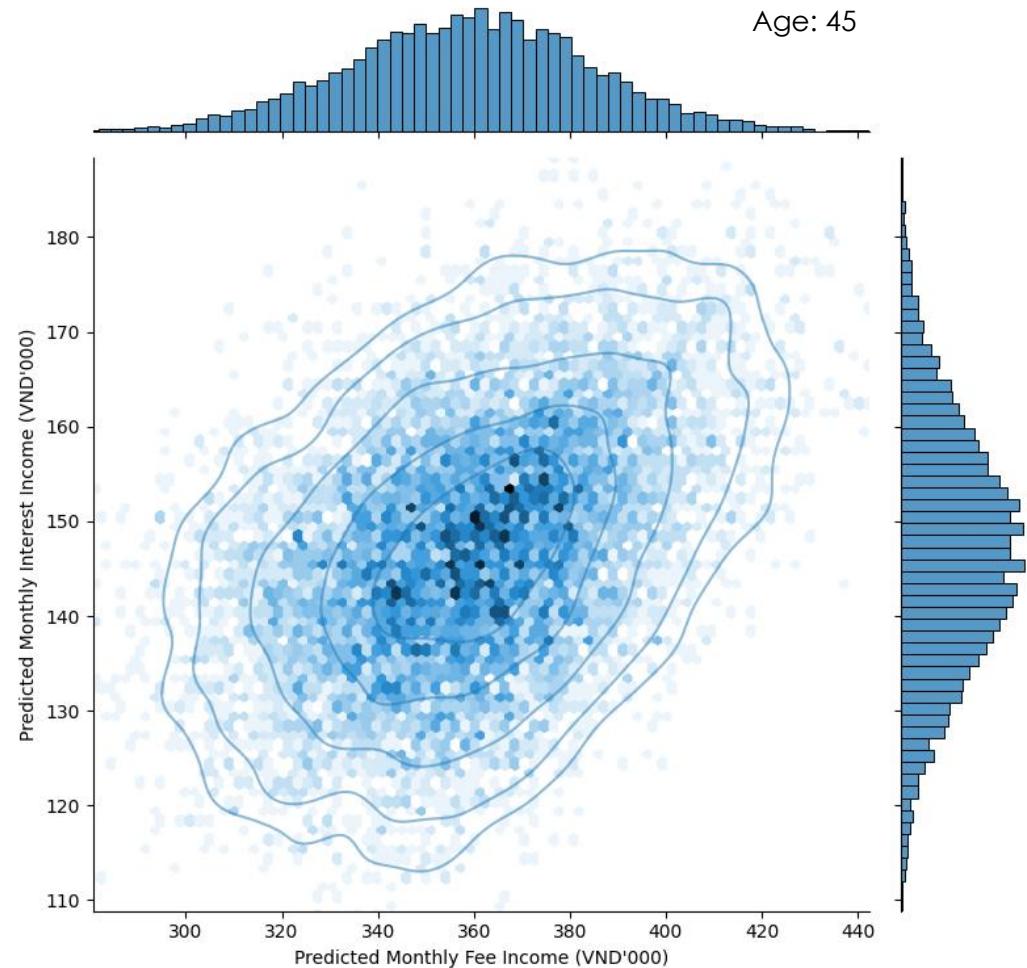
# INCOME PREDICTION

ACCOUNT TYPE: MARGIN, LOCATION: HO CHI MINH CITY, GENDER: FEMALE

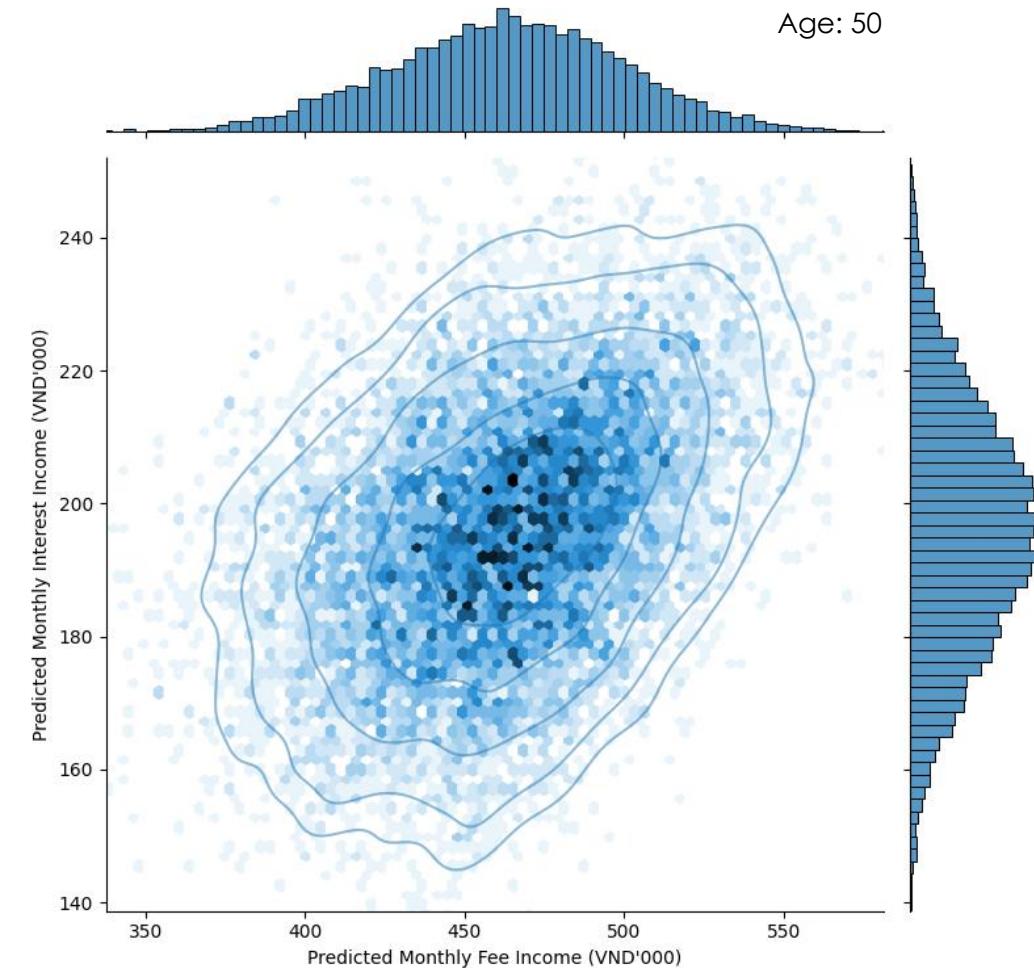
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Monthly Income Prediction  
Location: Ho Chi Minh City, Age: 45, Gender: Female, Account: Margin



Monthly Income Prediction  
Location: Ho Chi Minh City, Age: 50, Gender: Female, Account: Margin



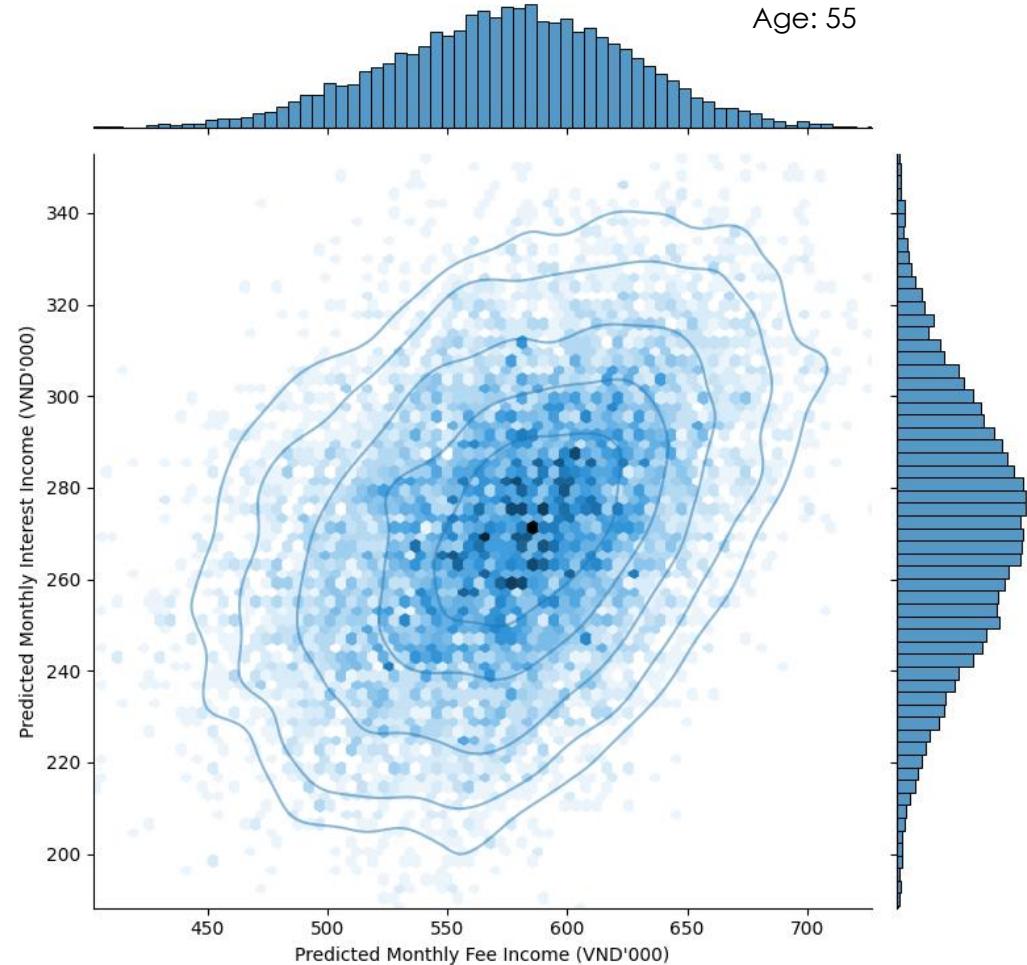
# INCOME PREDICTION

ACCOUNT TYPE: MARGIN, LOCATION: HO CHI MINH CITY, GENDER: FEMALE

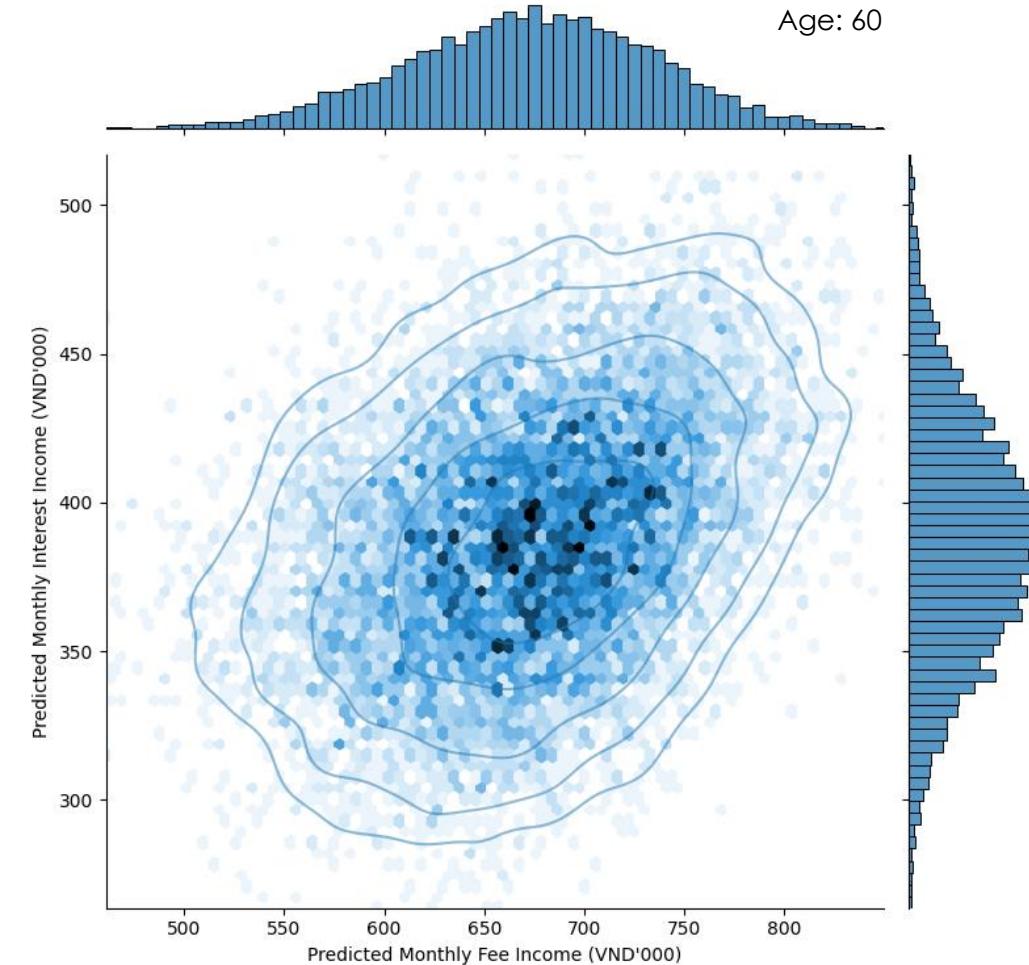
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Monthly Income Prediction  
Location: Ho Chi Minh City, Age: 55, Gender: Female, Account: Margin



Monthly Income Prediction  
Location: Ho Chi Minh City, Age: 60, Gender: Female, Account: Margin

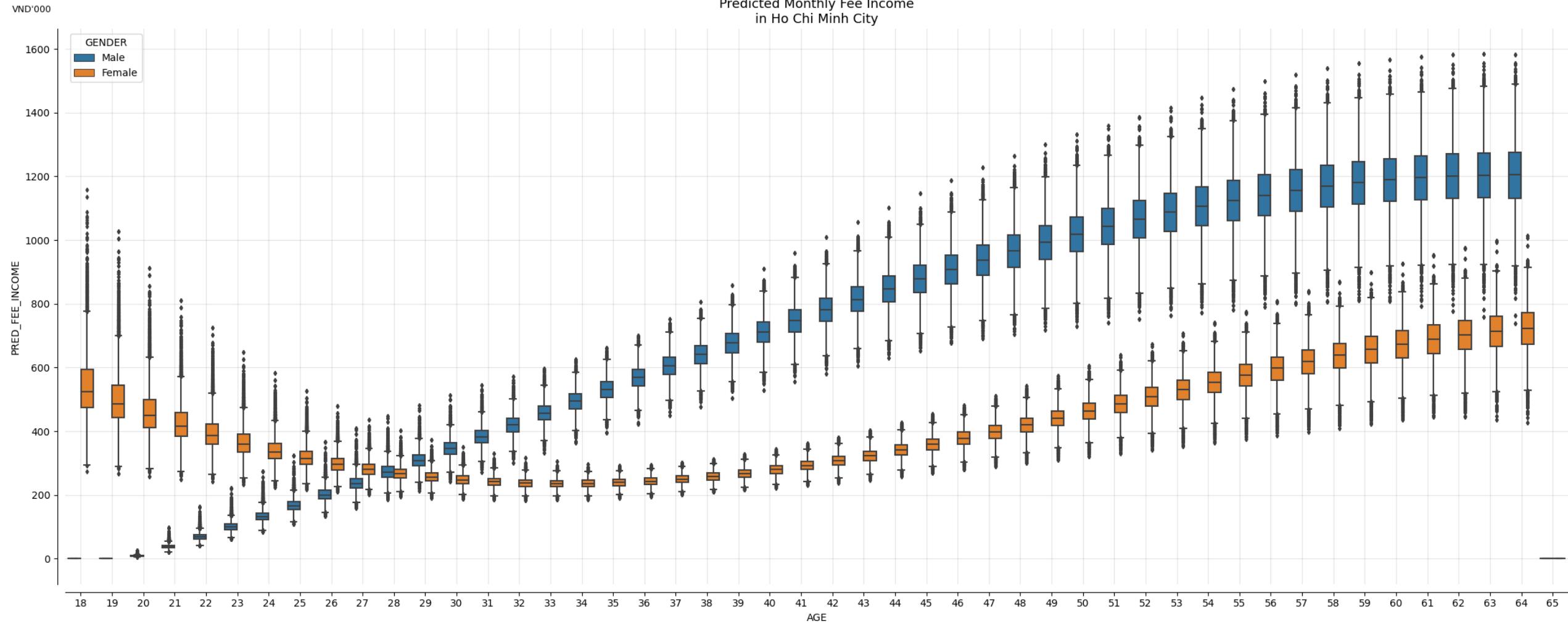


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# PREDICTION RESULT SUMMARY: FEE INCOME

LOCATION: HO CHI MINH CITY, ACCOUNT TYPE: MARGIN

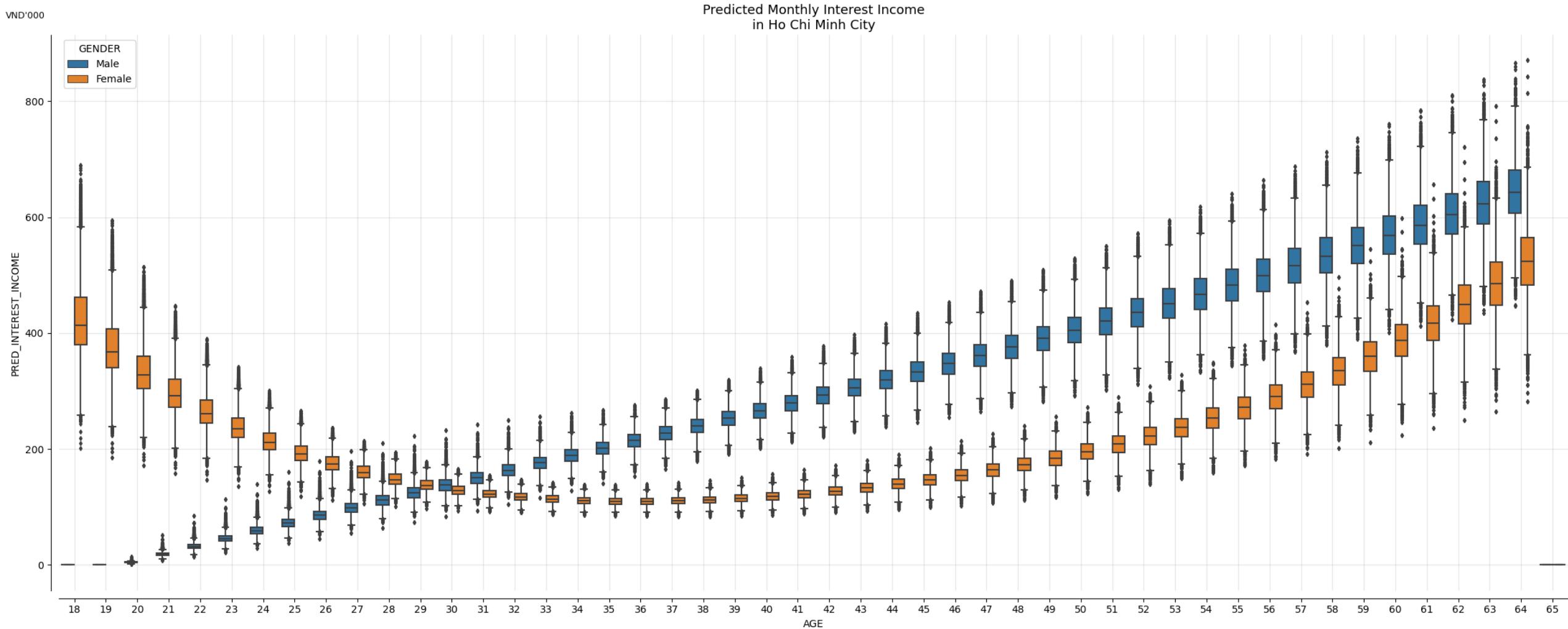
Predicted Monthly Fee Income  
in Ho Chi Minh City



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[click to go back to key findings](#)

# PREDICTION RESULT SUMMARY: INTEREST INCOME

LOCATION: HO CHI MINH CITY, ACCOUNT TYPE: MARGIN



# RESULT OF HA NOI



# NORMAL ACCOUNT



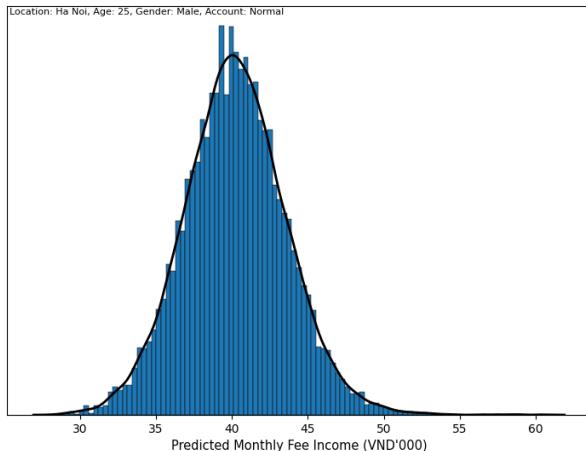
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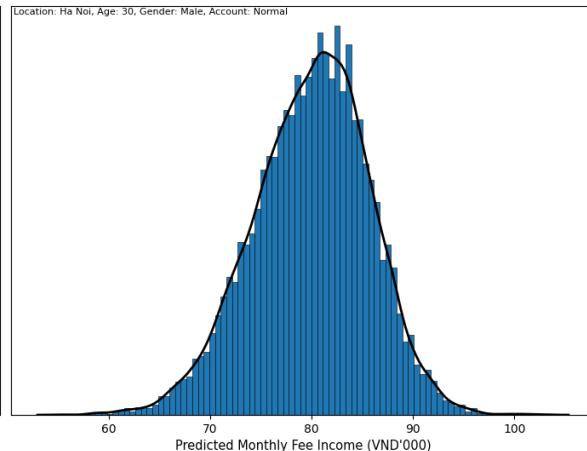
# INCOME PREDICTION

ACCOUNT TYPE: NORMAL , LOCATION: HA NOI, GENDER: MALE

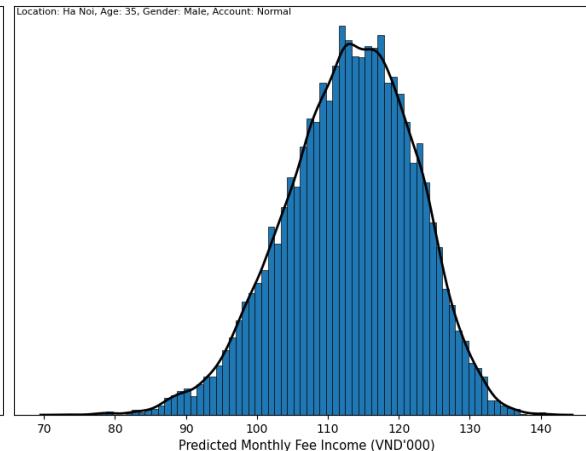
Monthly Income Prediction - Age: 25



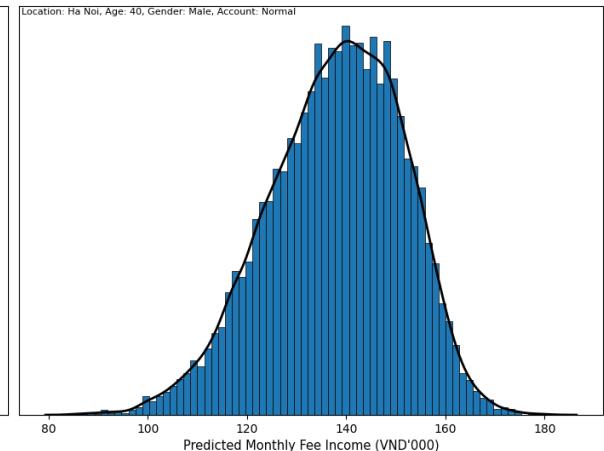
Monthly Income Prediction - Age: 30



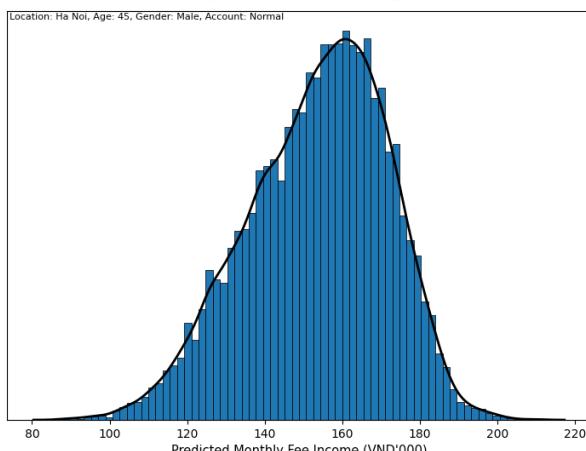
Monthly Income Prediction - Age: 35



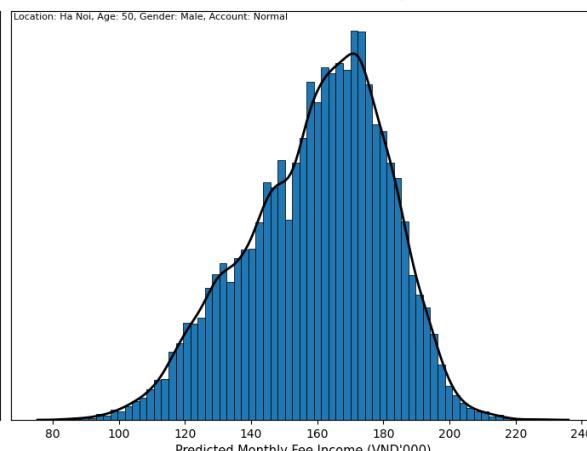
Monthly Income Prediction - Age: 40



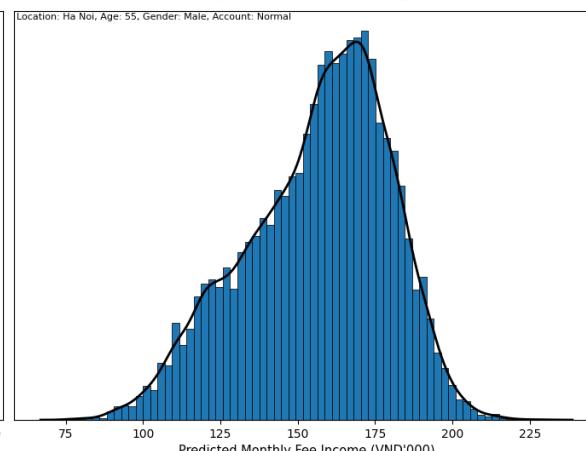
Monthly Income Prediction - Age: 45



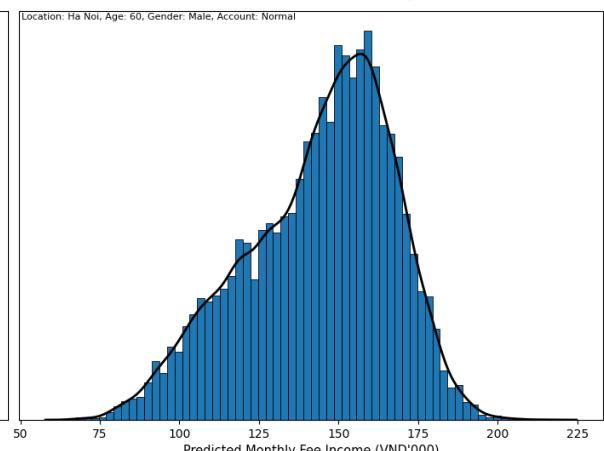
Monthly Income Prediction - Age: 50



Monthly Income Prediction - Age: 55



Monthly Income Prediction - Age: 60



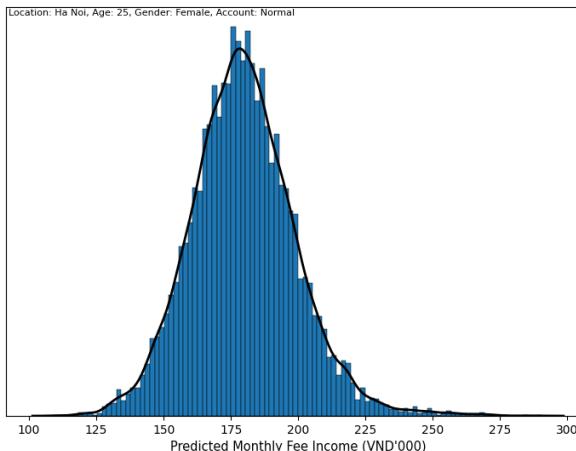
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[click to go back to key findings](#)

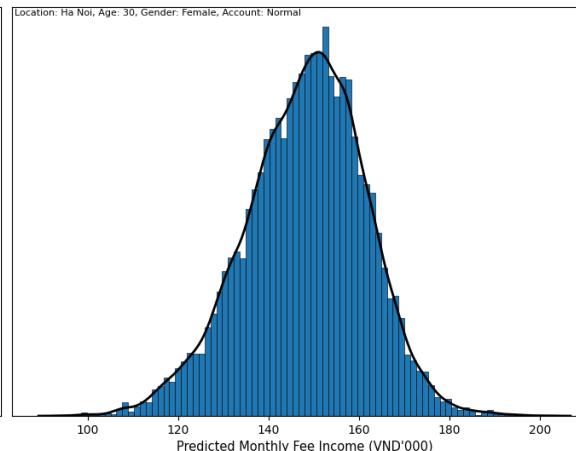
# INCOME PREDICTION

ACCOUNT TYPE: NORMAL , LOCATION: HA NOI, GENDER: FEMALE

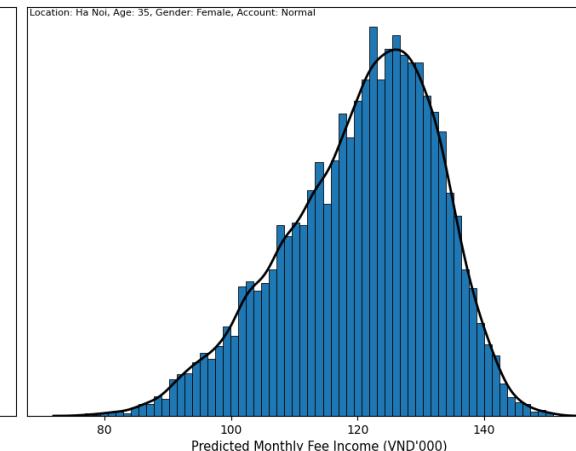
Monthly Income Prediction - Age: 25



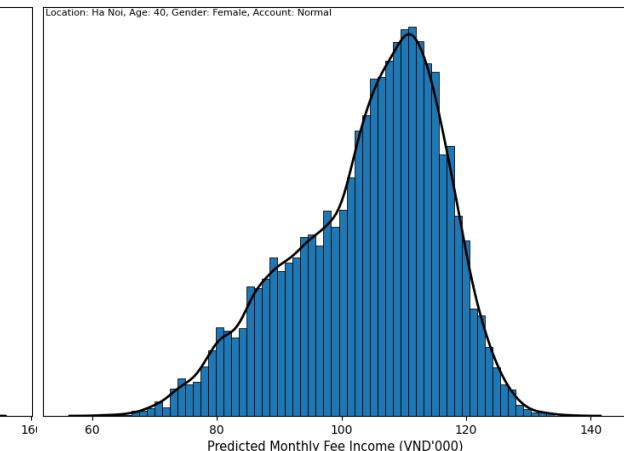
Monthly Income Prediction - Age: 30



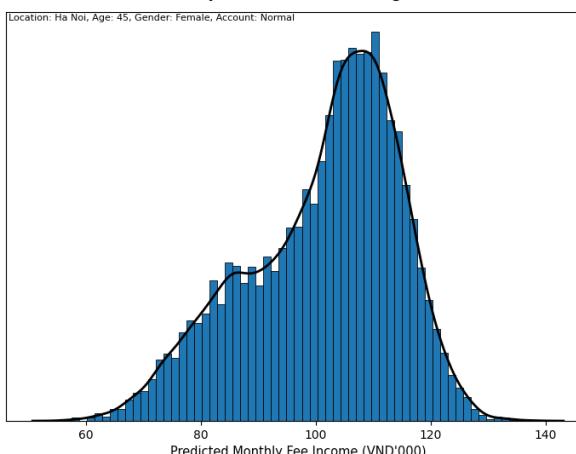
Monthly Income Prediction - Age: 35



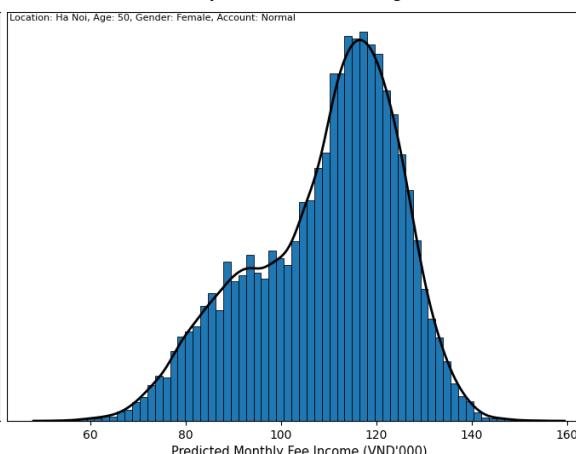
Monthly Income Prediction - Age: 40



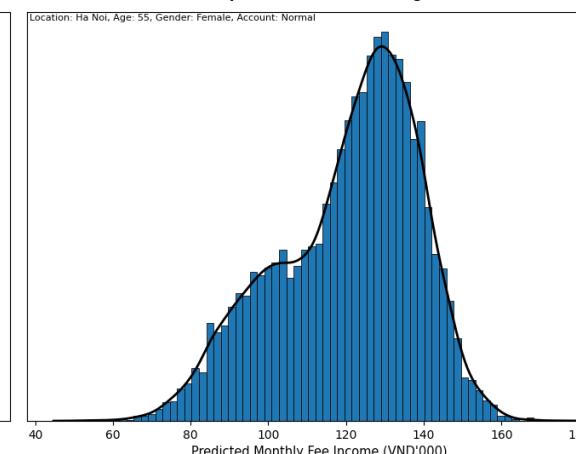
Monthly Income Prediction - Age: 45



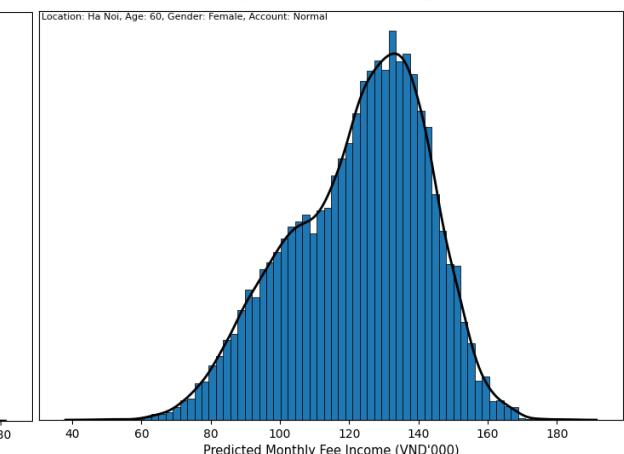
Monthly Income Prediction - Age: 50



Monthly Income Prediction - Age: 55



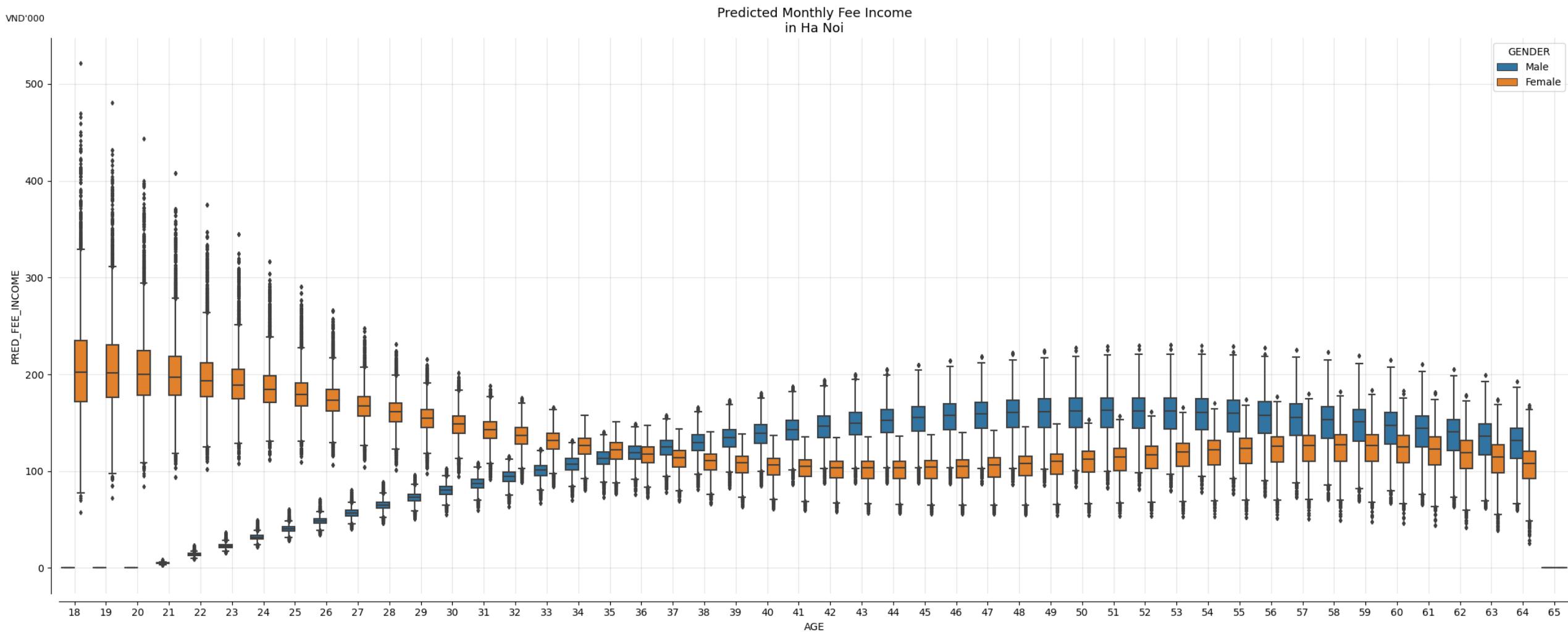
Monthly Income Prediction - Age: 60



# PREDICTION RESULT SUMMARY: FEE INCOME

LOCATION: HA NOI, ACCOUNT TYPE: NORMAL

[click to go back to key findings](#)



# MARGIN ACCOUNT



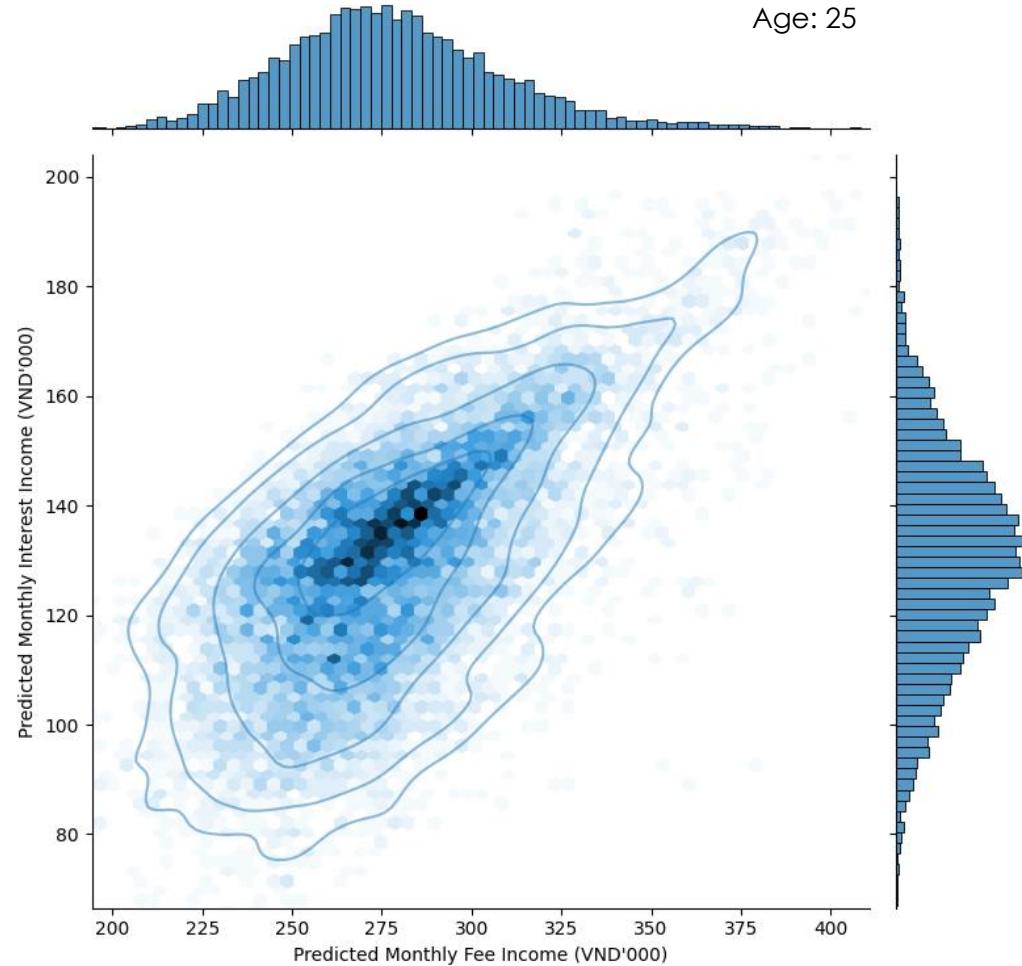
# INCOME PREDICTION

ACCOUNT TYPE: MARGIN, LOCATION: HA NOI, GENDER: MALE

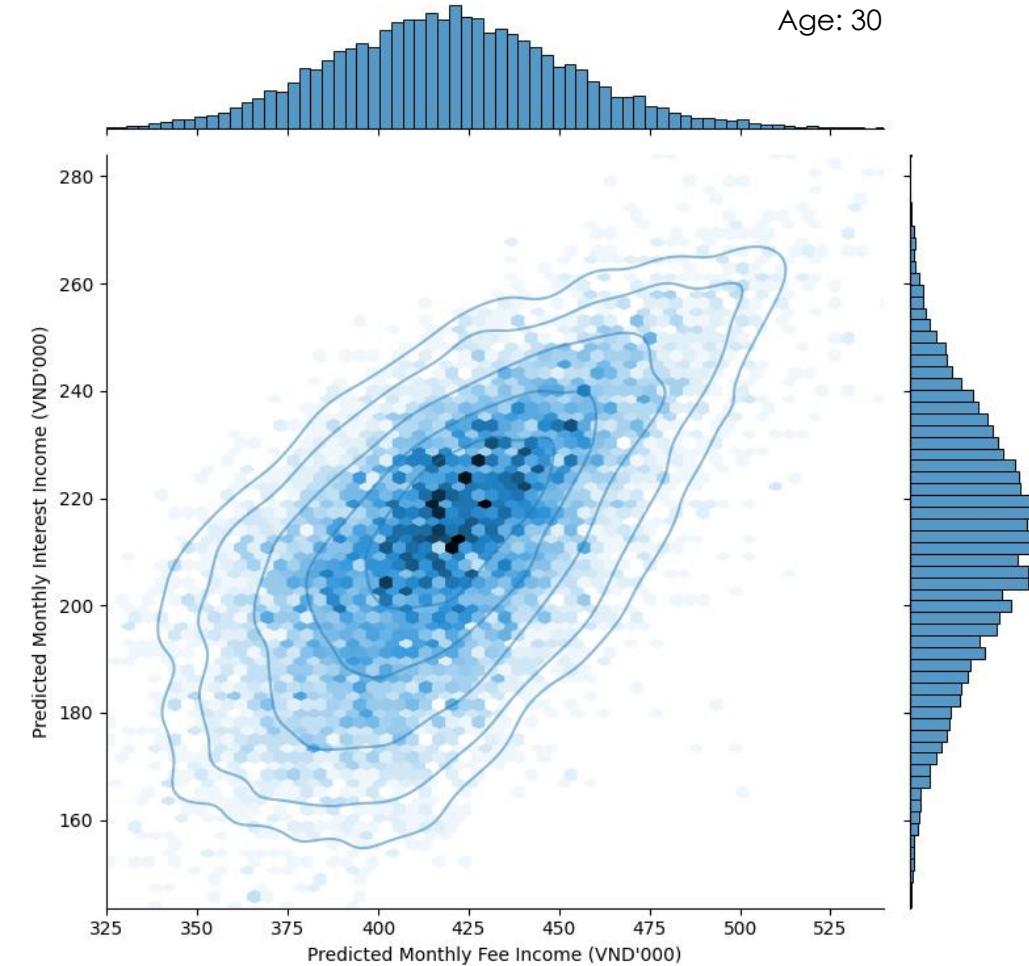
[click to go back to guideline](#)

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Monthly Income Prediction  
Location: Ha Noi, Age: 25, Gender: Male, Account: Margin



Monthly Income Prediction  
Location: Ha Noi, Age: 30, Gender: Male, Account: Margin



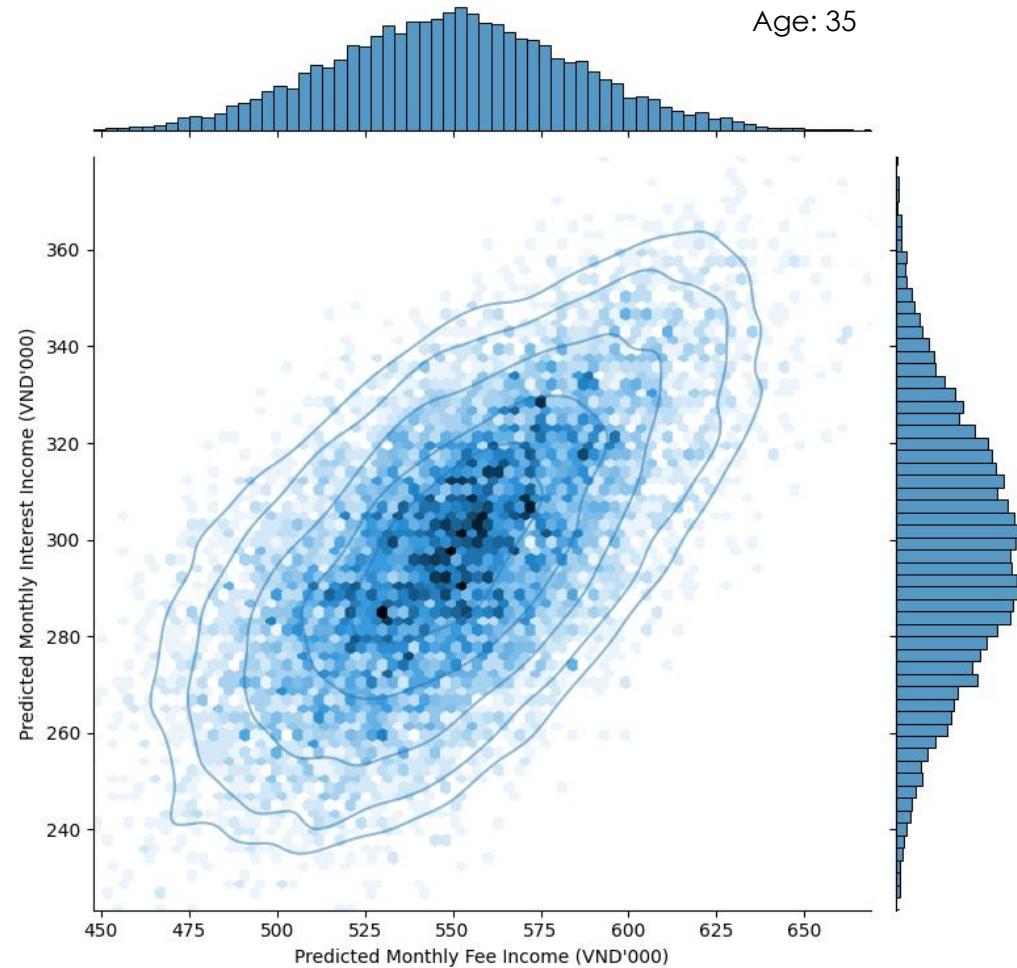
# INCOME PREDICTION

ACCOUNT TYPE: MARGIN, LOCATION: HA NOI, GENDER: MALE

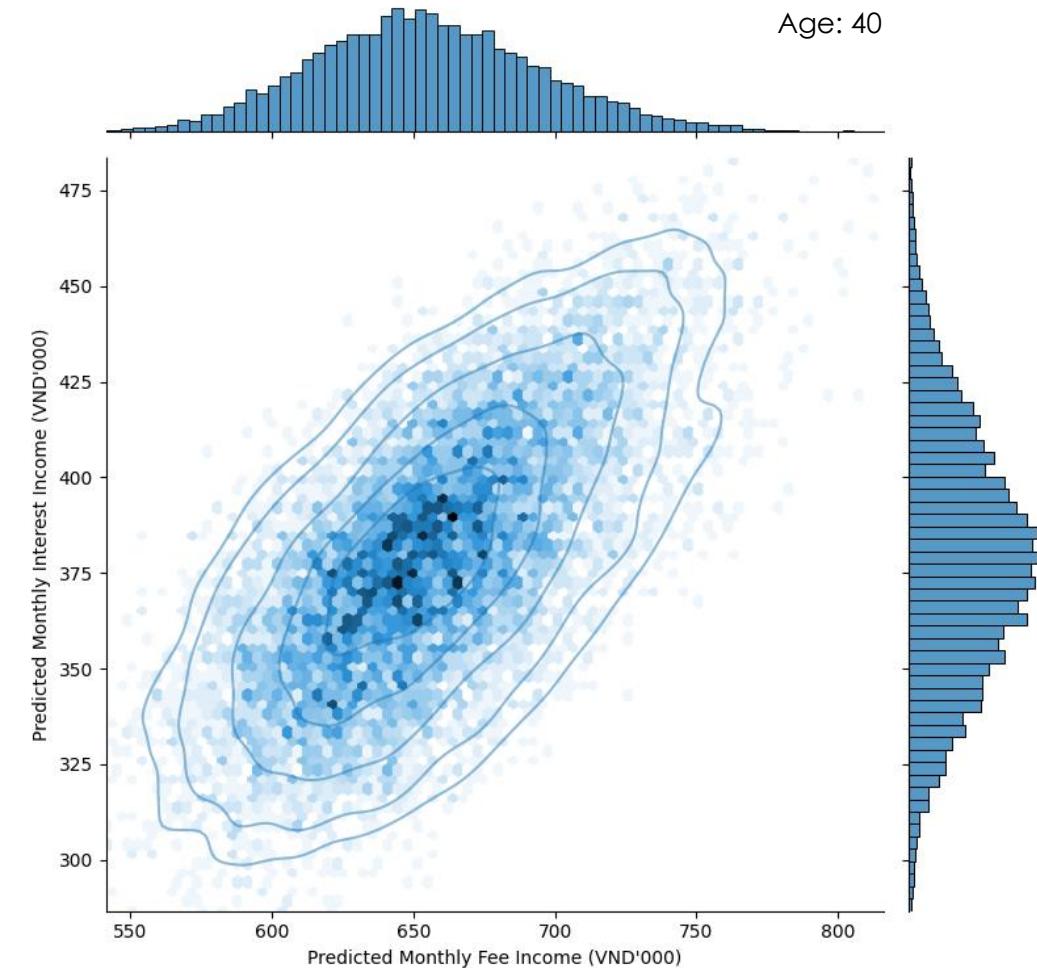
[click to go back to guideline](#)

[click to go back to key findings](#)

Monthly Income Prediction  
Location: Ha Noi, Age: 35, Gender: Male, Account: Margin



Monthly Income Prediction  
Location: Ha Noi, Age: 40, Gender: Male, Account: Margin



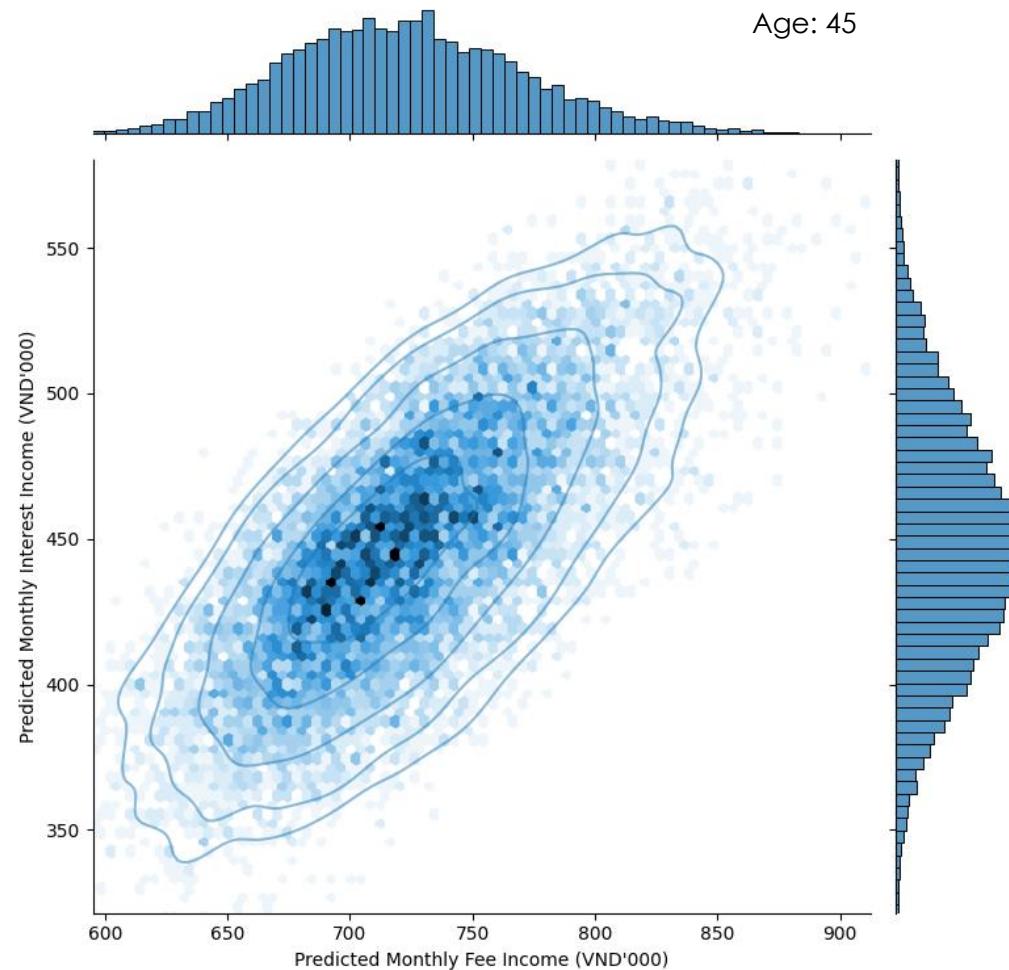
# INCOME PREDICTION

ACCOUNT TYPE: MARGIN, LOCATION: HA NOI, GENDER: MALE

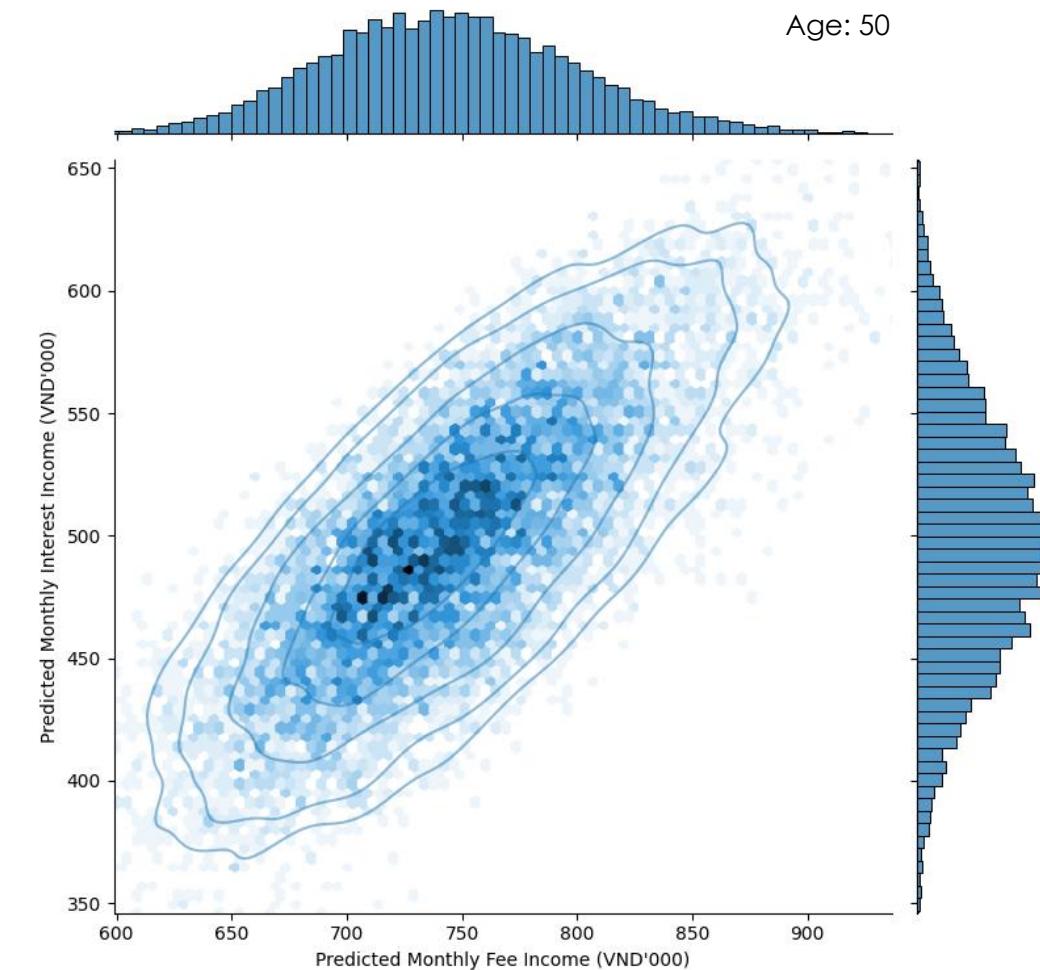
[click to go back to guideline](#)

[click to go back to key findings](#)

Monthly Income Prediction  
Location: Ha Noi, Age: 45, Gender: Male, Account: Margin



Monthly Income Prediction  
Location: Ha Noi, Age: 50, Gender: Male, Account: Margin



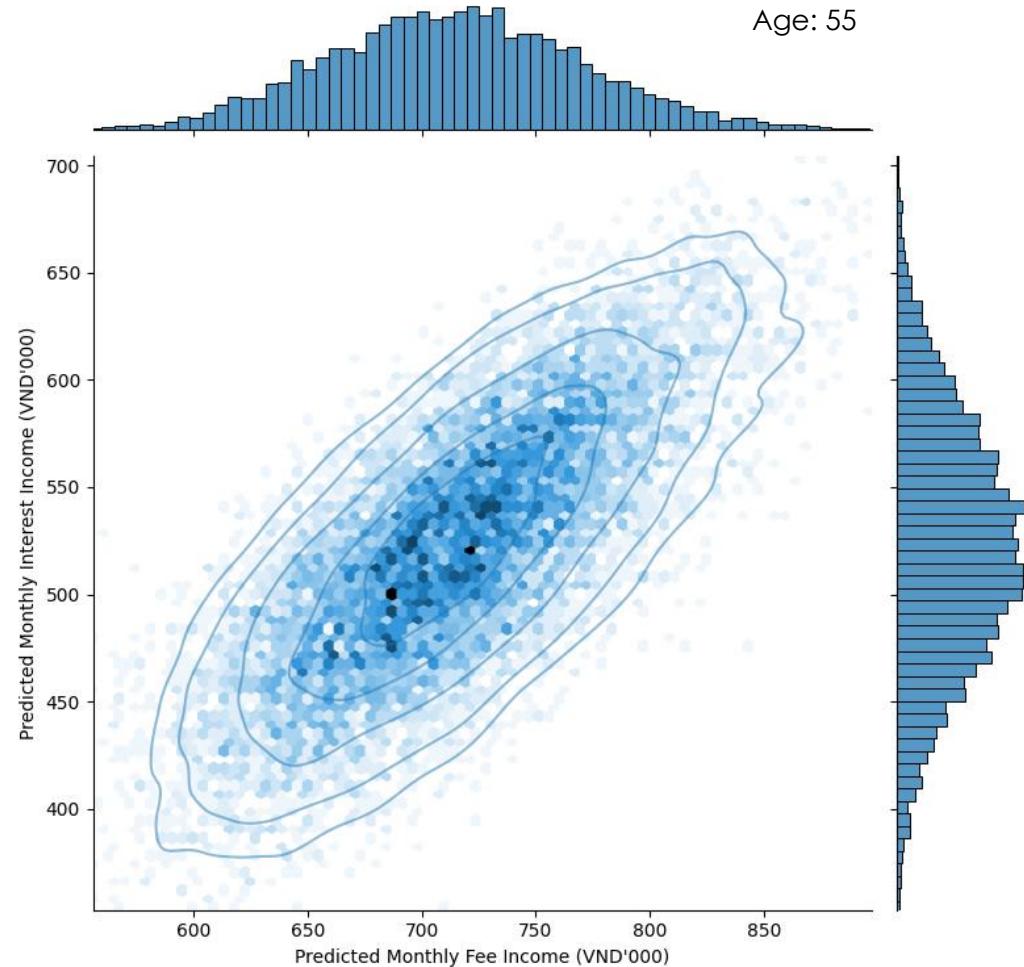
# INCOME PREDICTION

ACCOUNT TYPE: MARGIN, LOCATION: HA NOI, GENDER: MALE

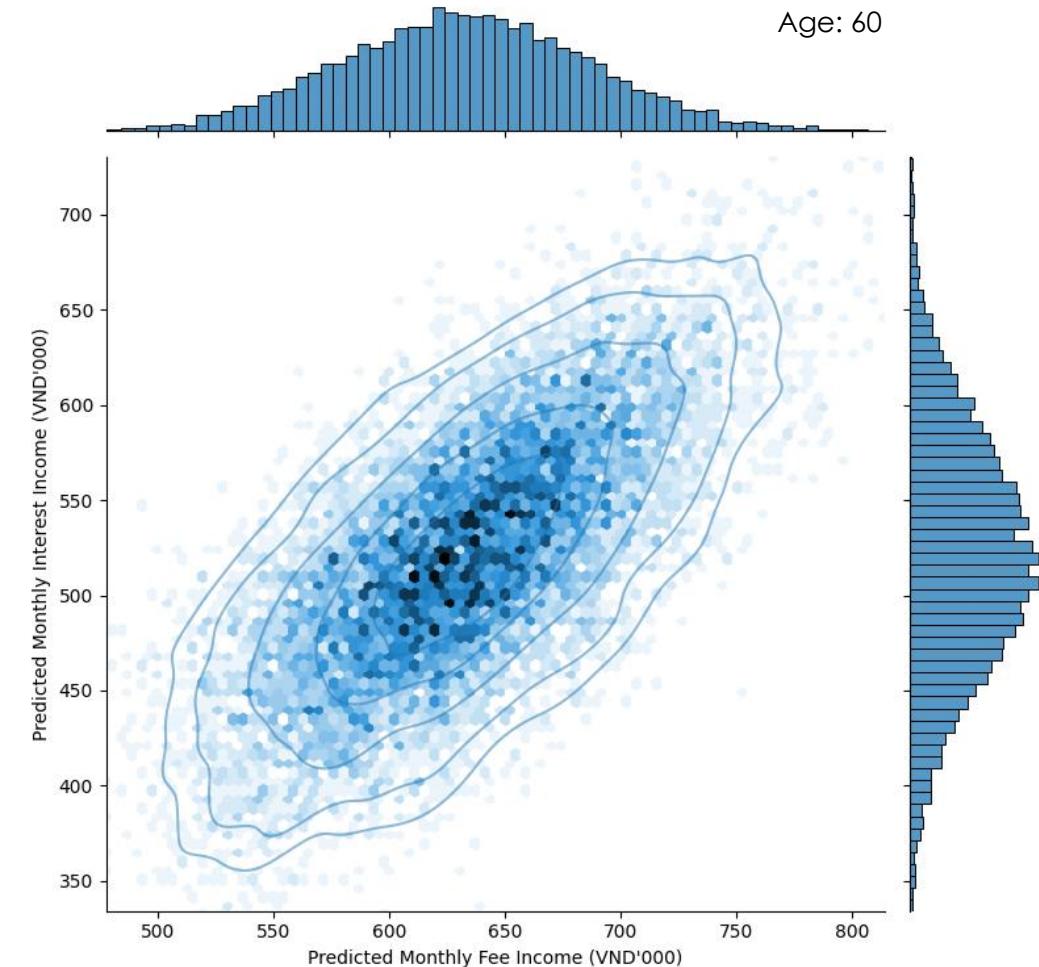
[click to go back to guideline](#)

[click to go back to key findings](#)

Monthly Income Prediction  
Location: Ha Noi, Age: 55, Gender: Male, Account: Margin



Monthly Income Prediction  
Location: Ha Noi, Age: 60, Gender: Male, Account: Margin



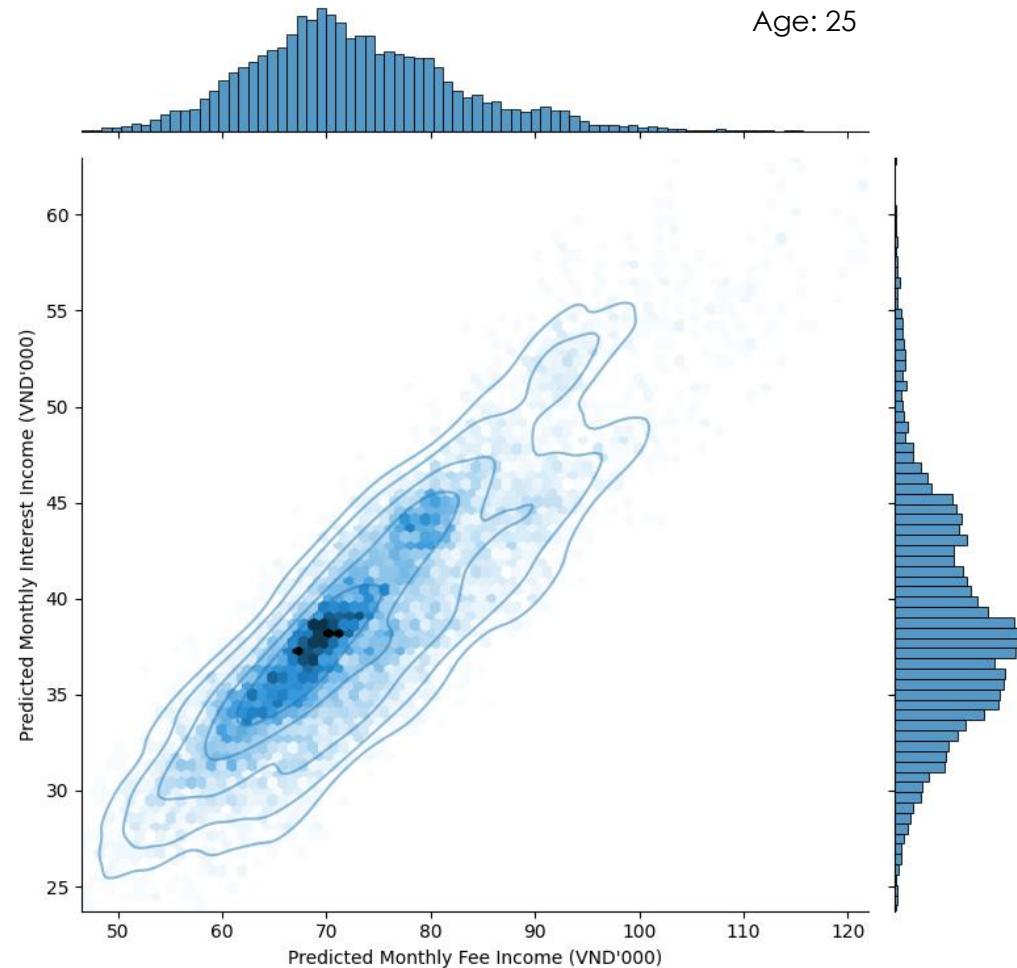
# INCOME PREDICTION

ACCOUNT TYPE: MARGIN, LOCATION: HA NOI, GENDER: FEMALE

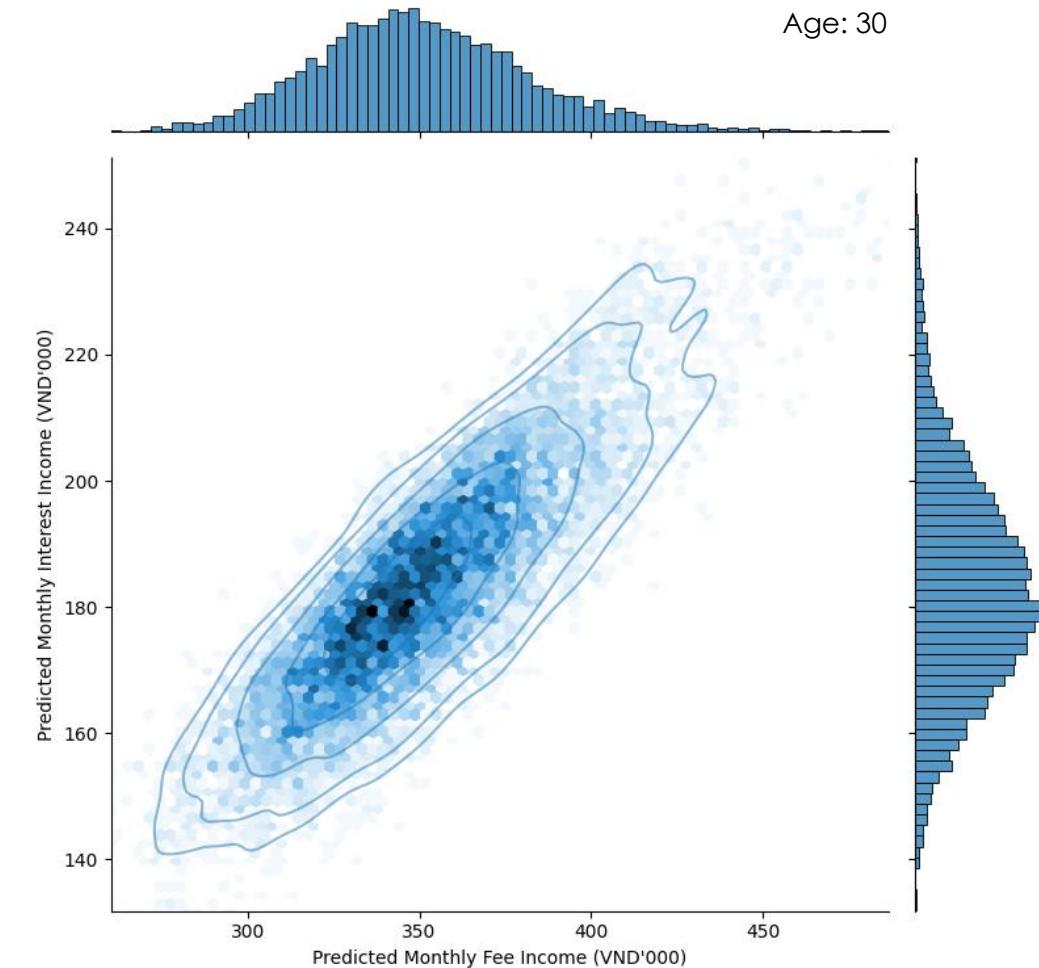
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Monthly Income Prediction  
Location: Ha Noi, Age: 25, Gender: Female, Account: Margin



Monthly Income Prediction  
Location: Ha Noi, Age: 30, Gender: Female, Account: Margin



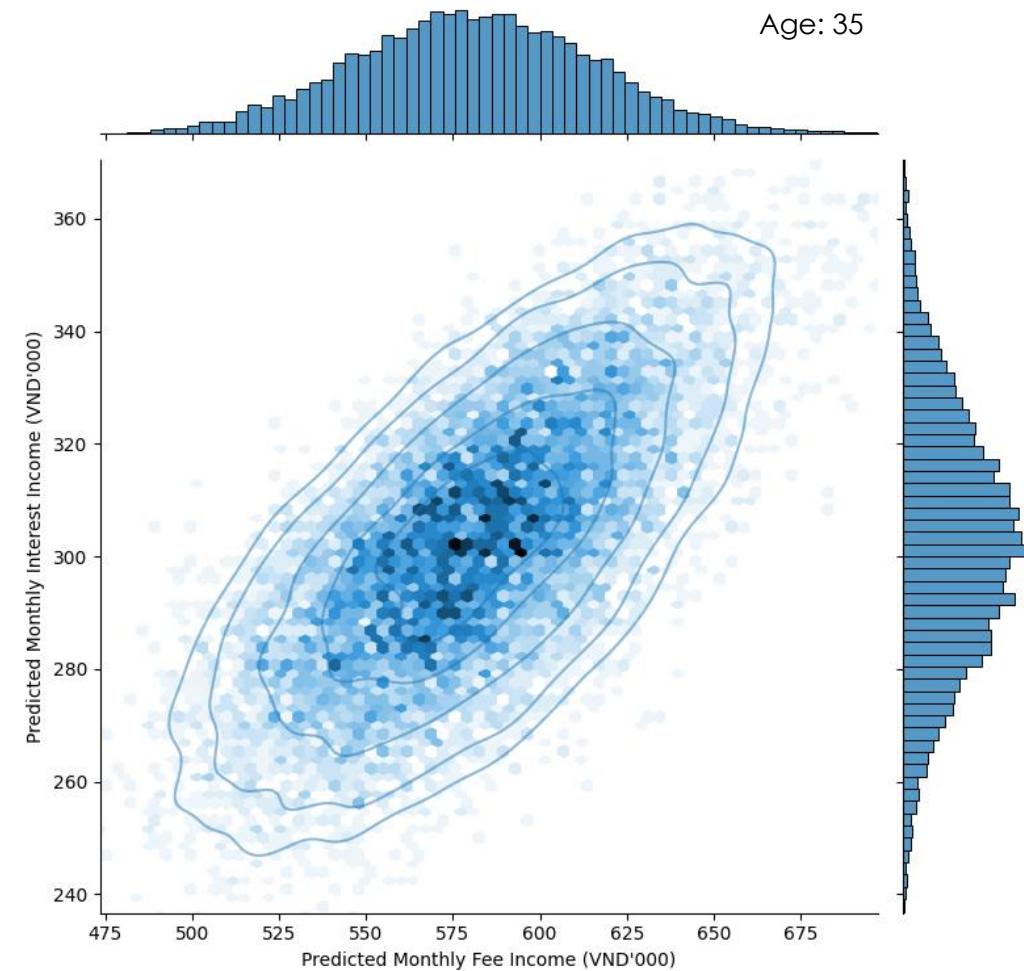
# INCOME PREDICTION

ACCOUNT TYPE: MARGIN, LOCATION: HA NOI, GENDER: FEMALE

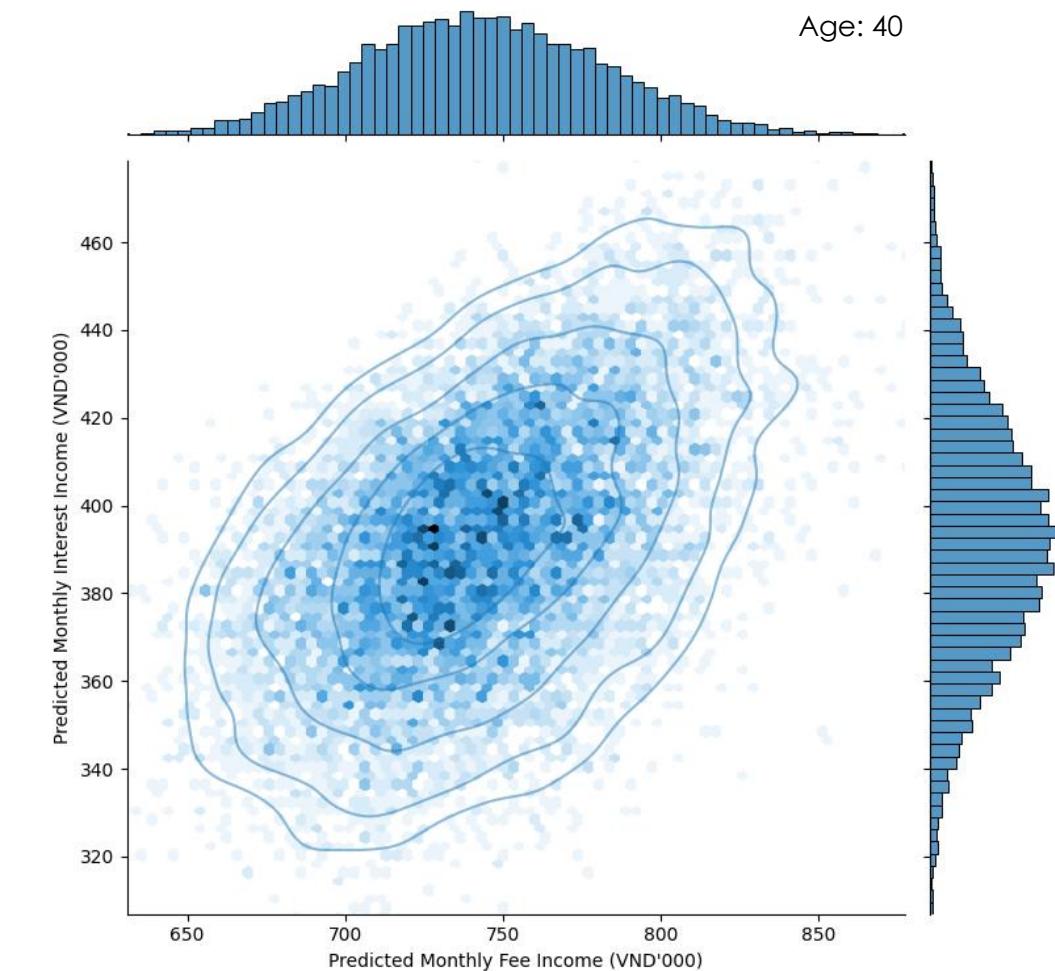
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Monthly Income Prediction  
Location: Ha Noi, Age: 35, Gender: Female, Account: Margin



Monthly Income Prediction  
Location: Ha Noi, Age: 40, Gender: Female, Account: Margin



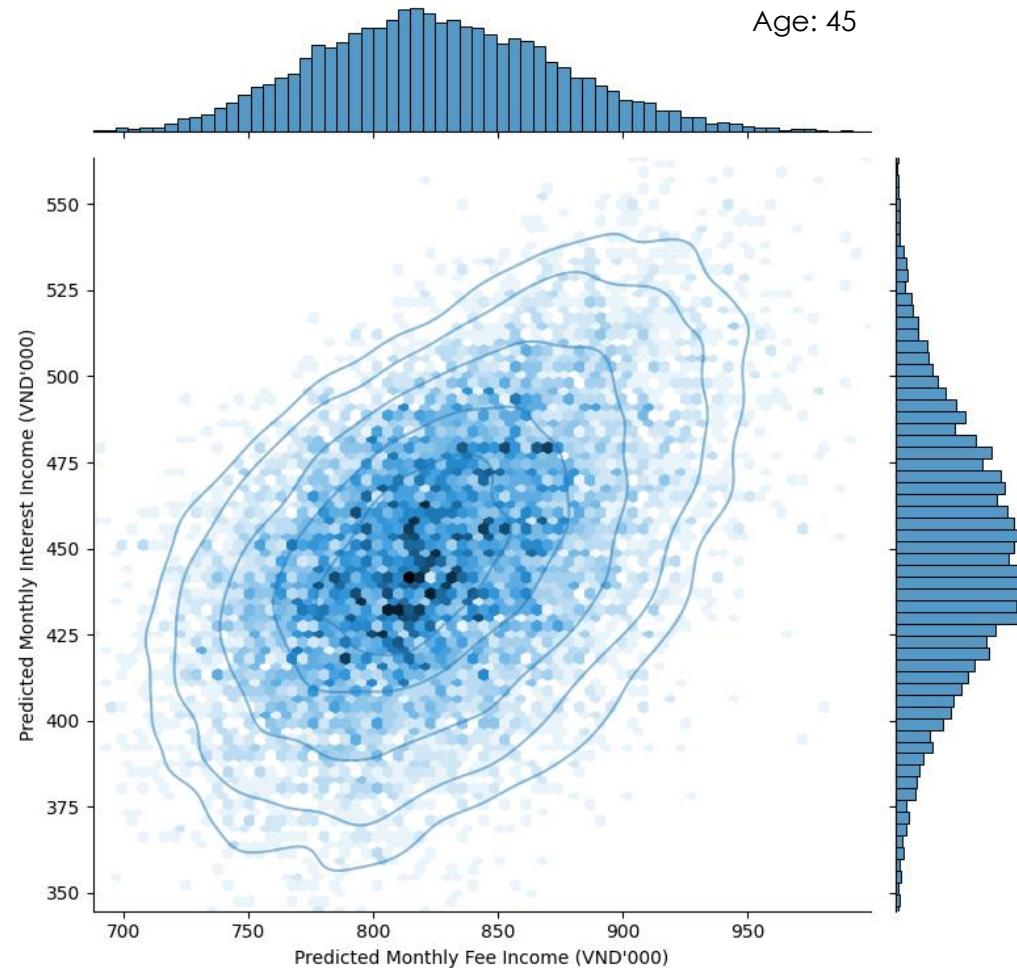
# INCOME PREDICTION

ACCOUNT TYPE: MARGIN, LOCATION: HA NOI, GENDER: FEMALE

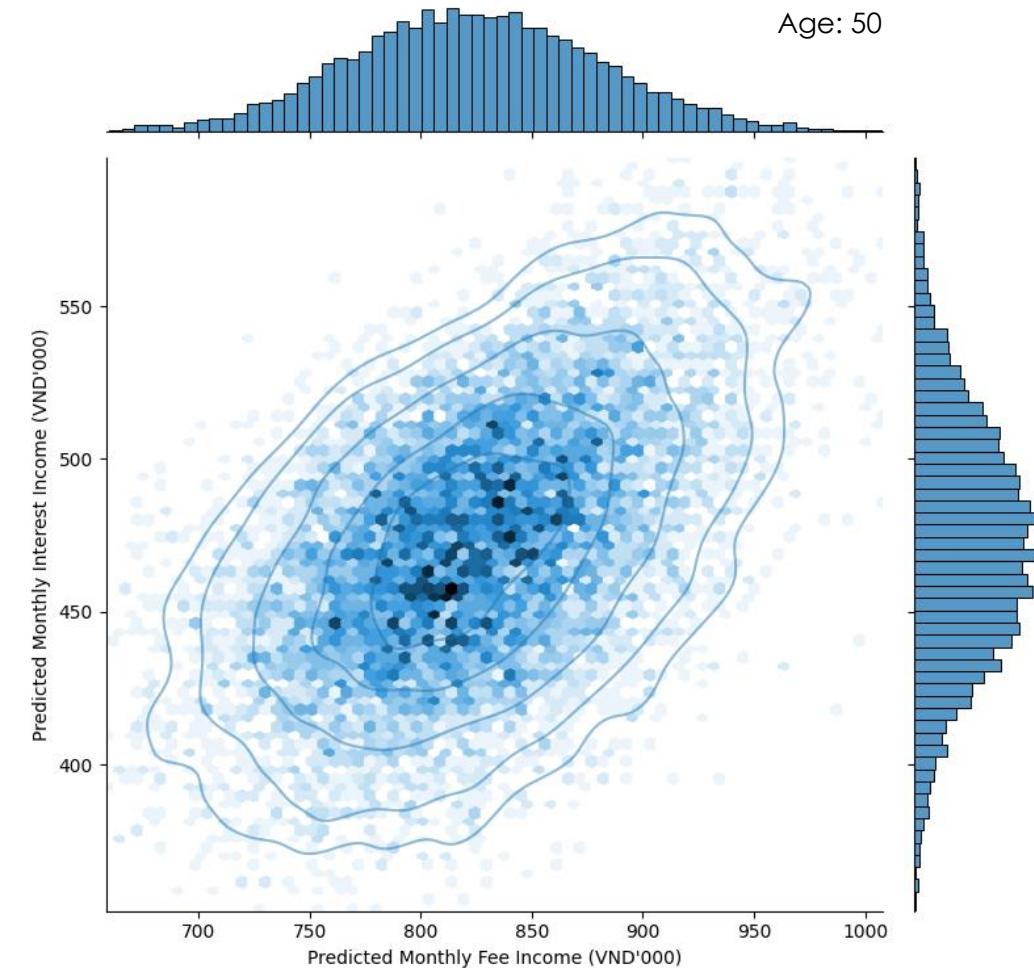
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Monthly Income Prediction  
Location: Ha Noi, Age: 45, Gender: Female, Account: Margin



Monthly Income Prediction  
Location: Ha Noi, Age: 50, Gender: Female, Account: Margin



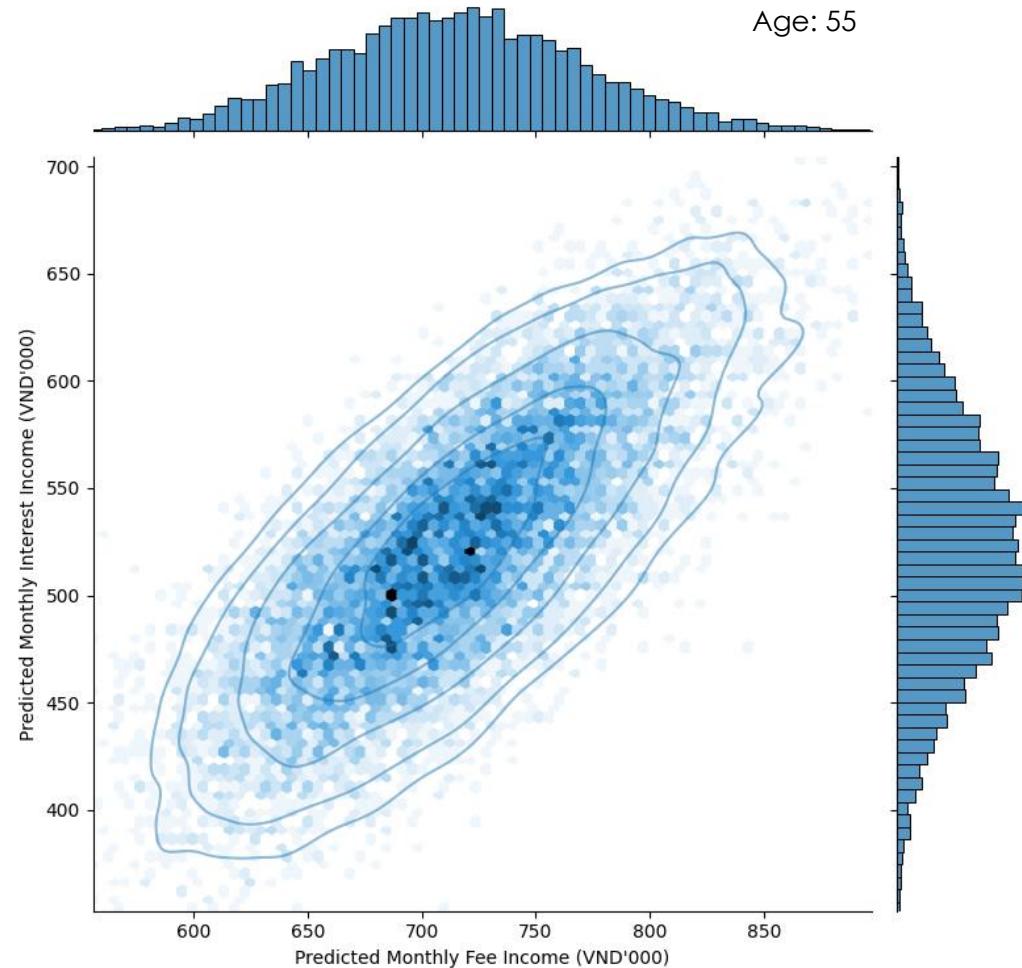
# INCOME PREDICTION

ACCOUNT TYPE: MARGIN, LOCATION: HA NOI, GENDER: FEMALE

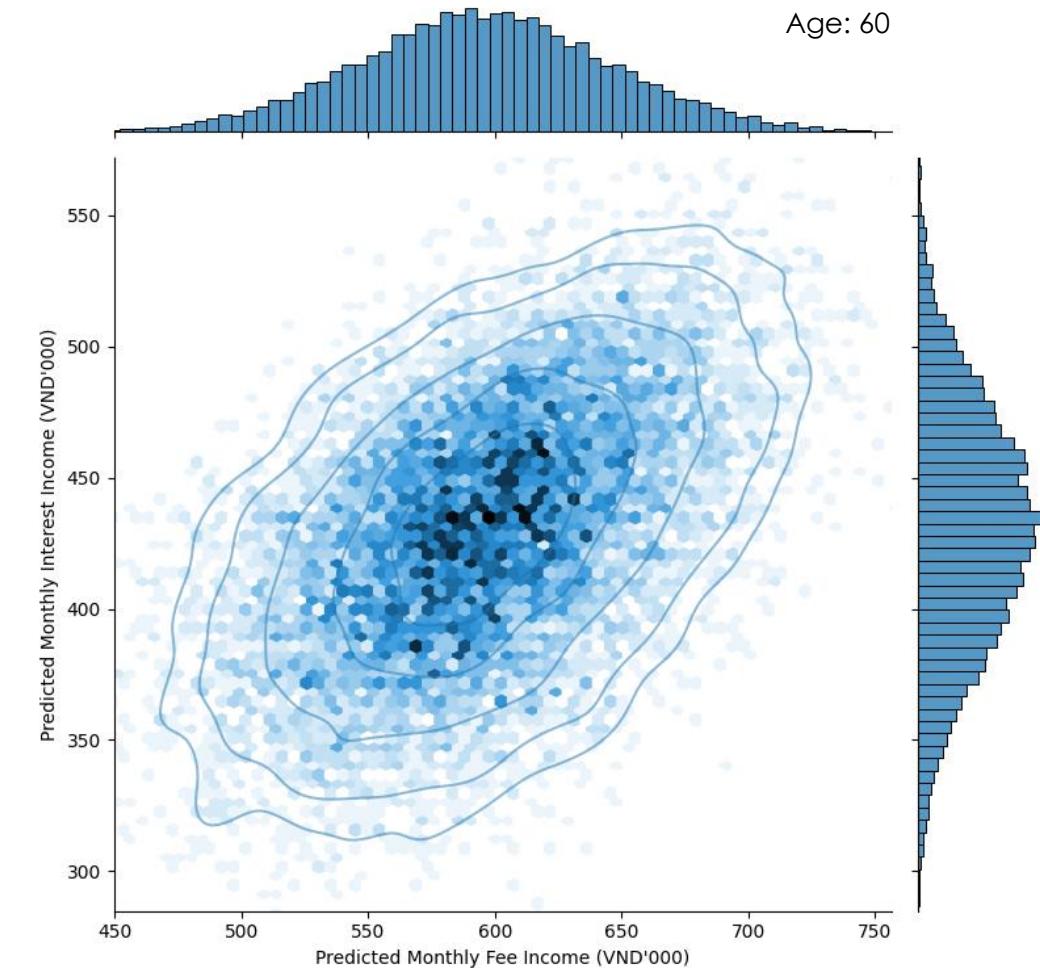
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[click to go back to key findings](#)

Monthly Income Prediction  
Location: Ha Noi, Age: 55, Gender: Male, Account: Margin



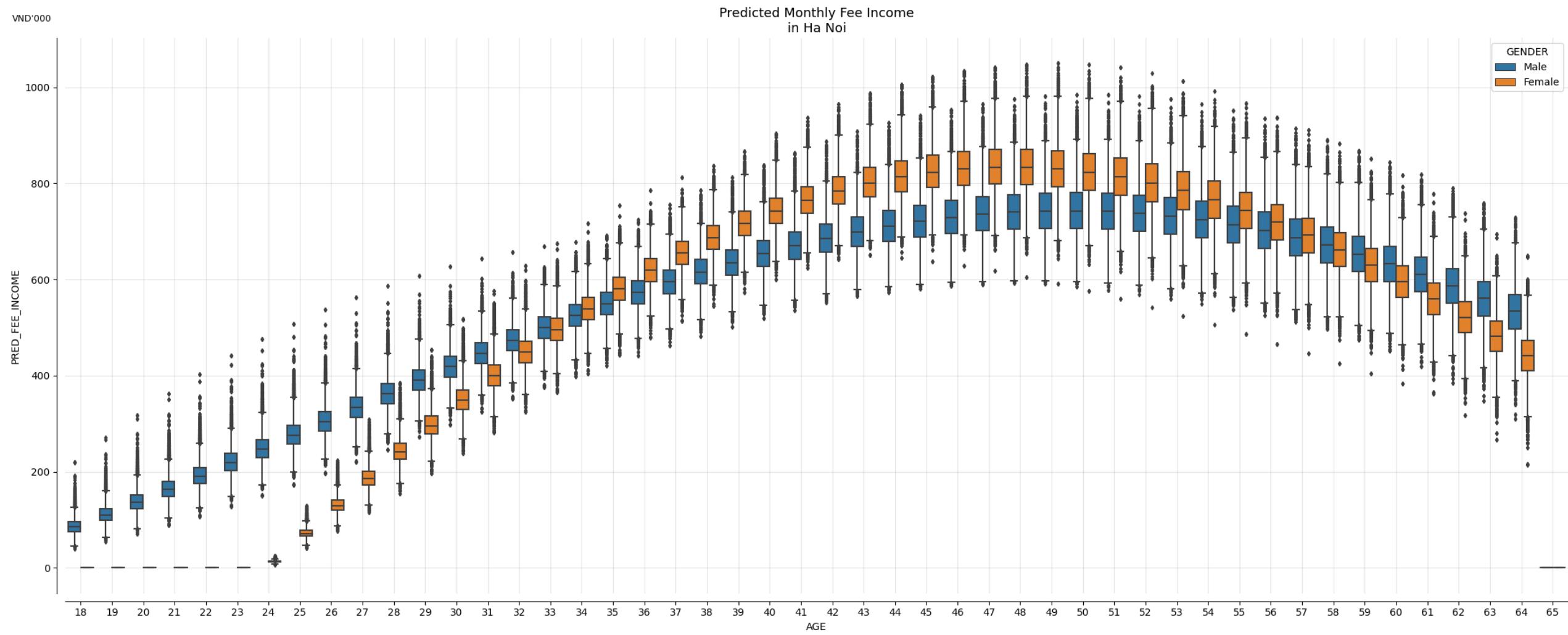
Monthly Income Prediction  
Location: Ha Noi, Age: 60, Gender: Female, Account: Margin



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# PREDICTION RESULT SUMMARY: FEE INCOME

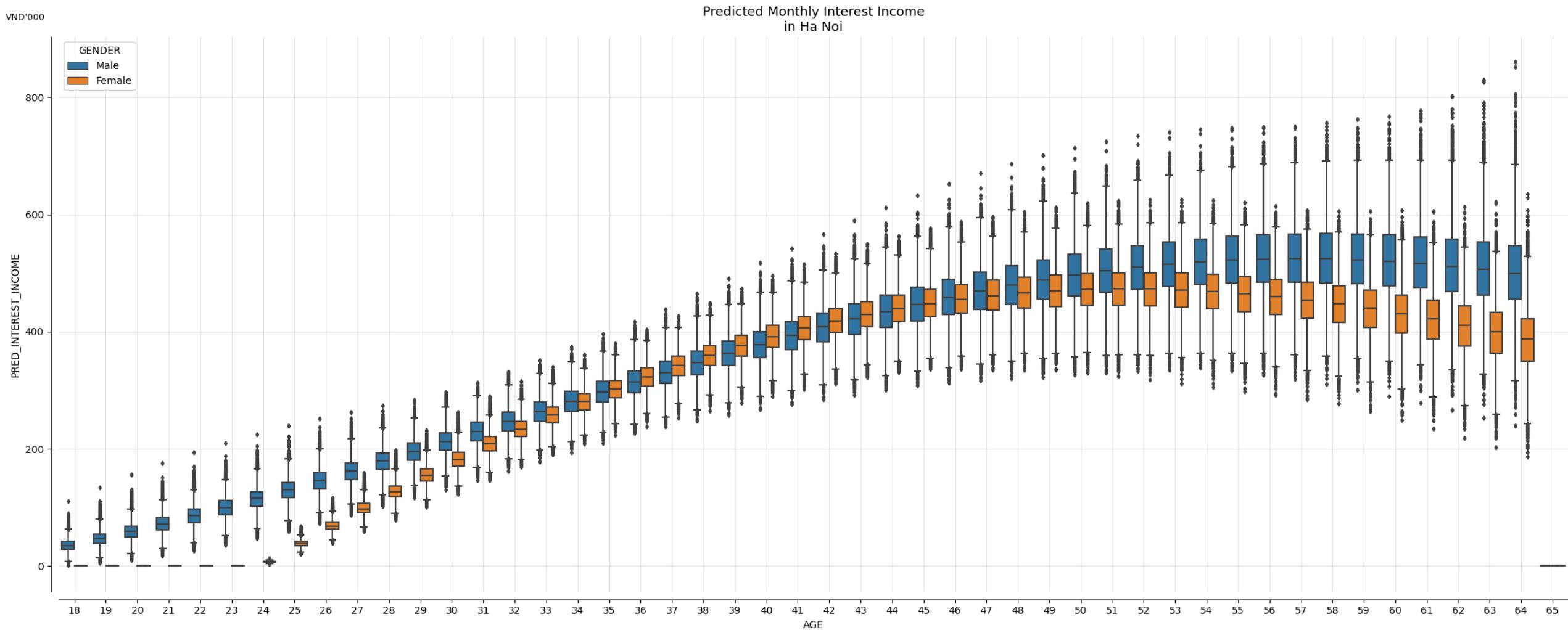
LOCATION: HA NOI, ACCOUNT TYPE: MARGIN



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# PREDICTION RESULT SUMMARY: INTEREST INCOME

LOCATION: HA NOI, ACCOUNT TYPE: MARGIN





HAI PHONG



# NORMAL ACCOUNT



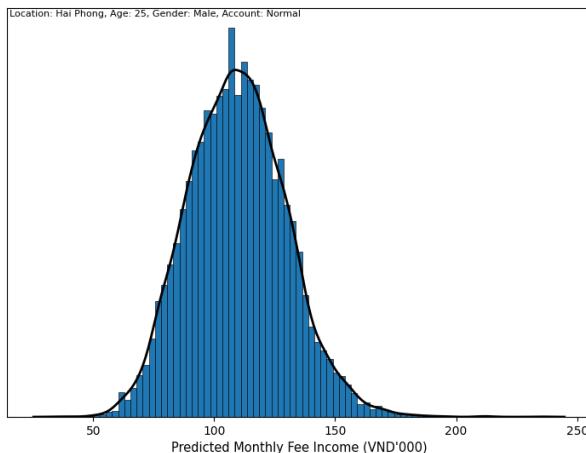
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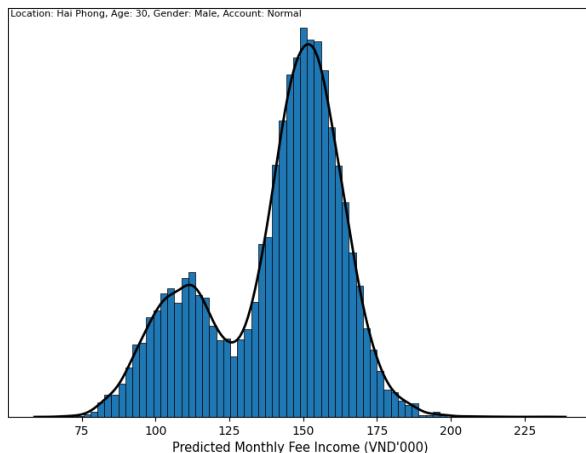
# INCOME PREDICTION

ACCOUNT TYPE: NORMAL , LOCATION: HAI PHONG, GENDER: MALE

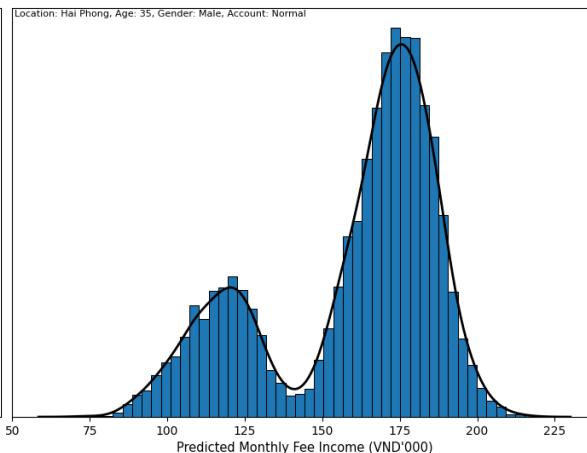
Monthly Income Prediction - Age: 25



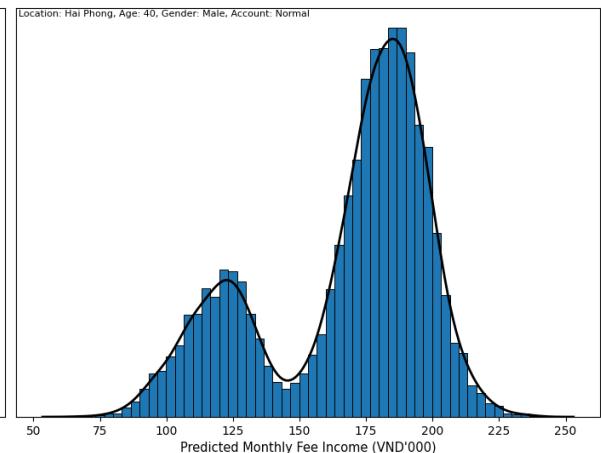
Monthly Income Prediction - Age: 30



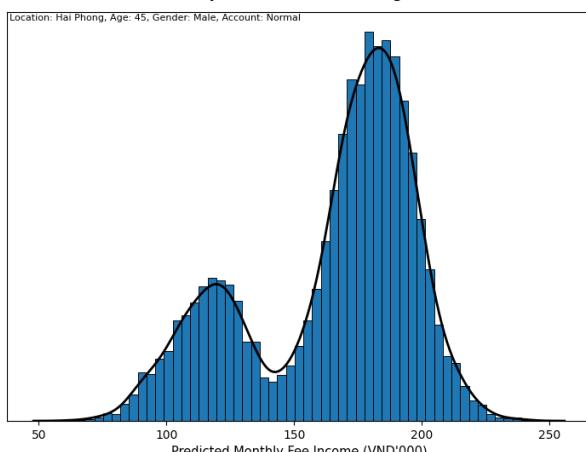
Monthly Income Prediction - Age: 35



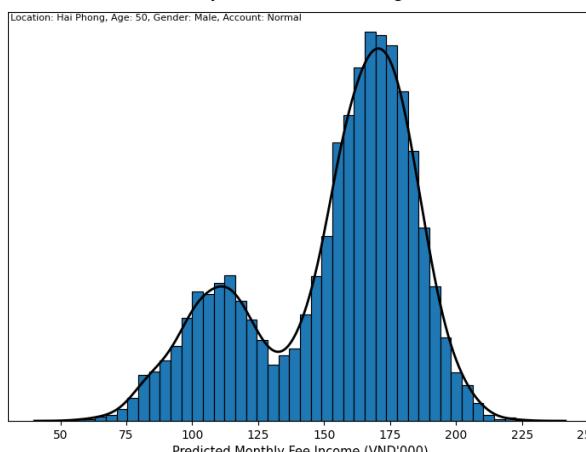
Monthly Income Prediction - Age: 40



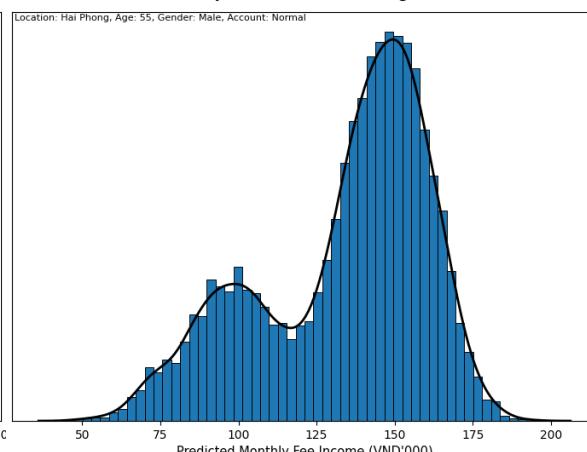
Monthly Income Prediction - Age: 45



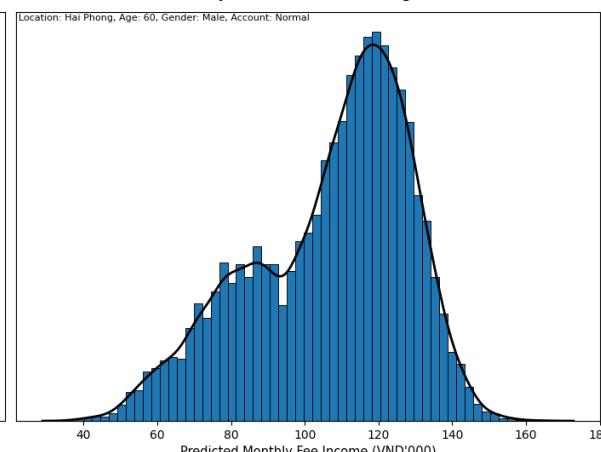
Monthly Income Prediction - Age: 50



Monthly Income Prediction - Age: 55



Monthly Income Prediction - Age: 60



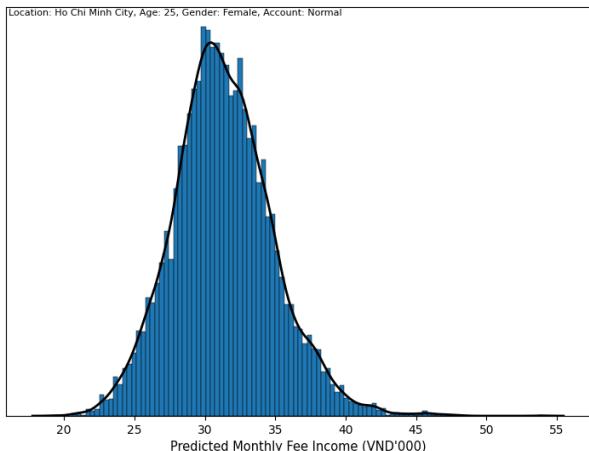
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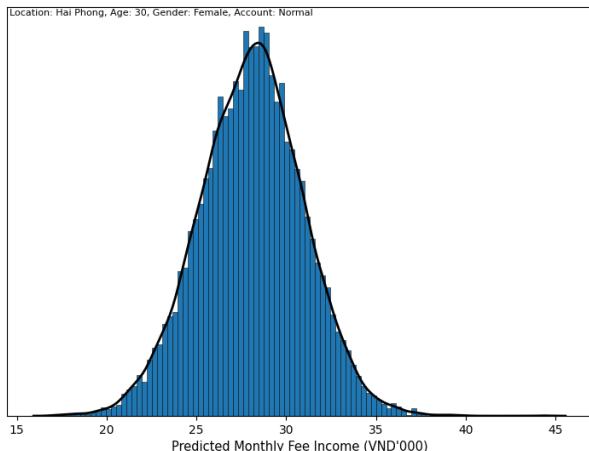
# INCOME PREDICTION

ACCOUNT TYPE: NORMAL , LOCATION: HAI PHONG, GENDER: FEMALE

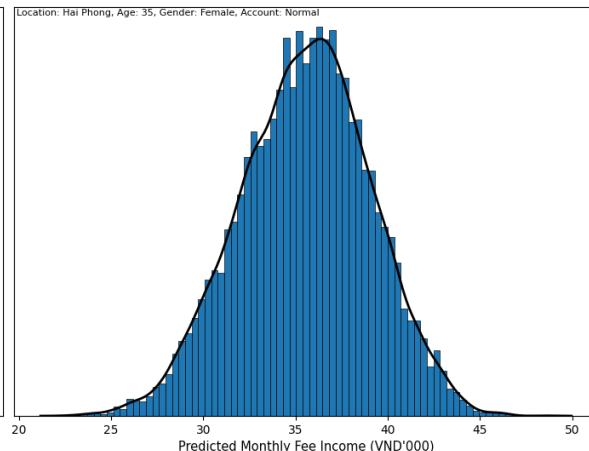
Monthly Income Prediction - Age: 25



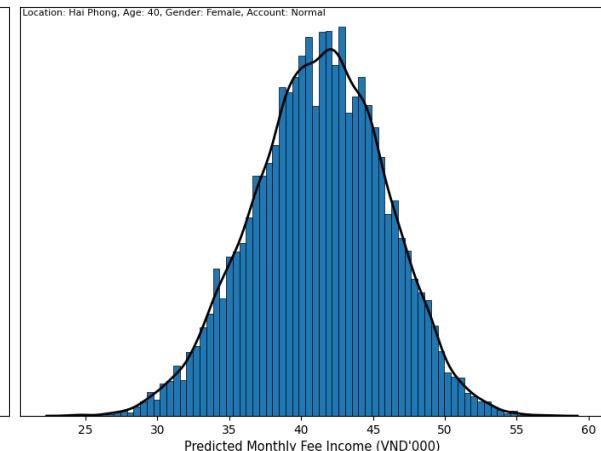
Monthly Income Prediction - Age: 30



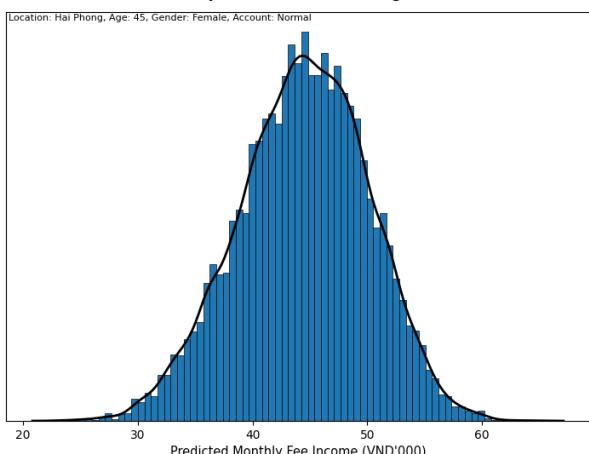
Monthly Income Prediction - Age: 35



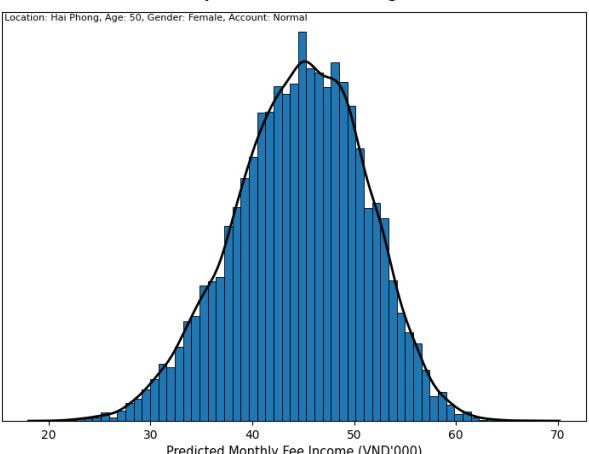
Monthly Income Prediction - Age: 40



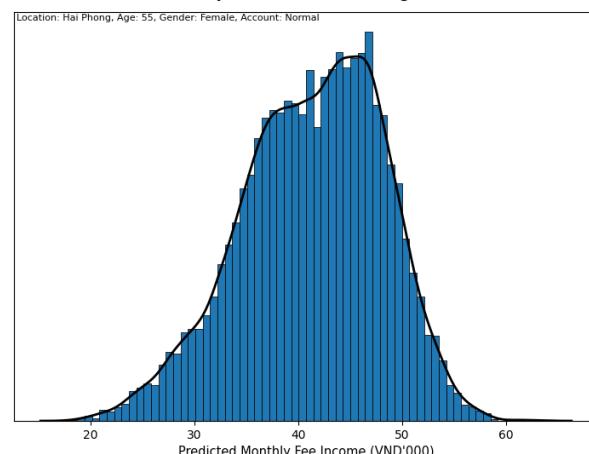
Monthly Income Prediction - Age: 45



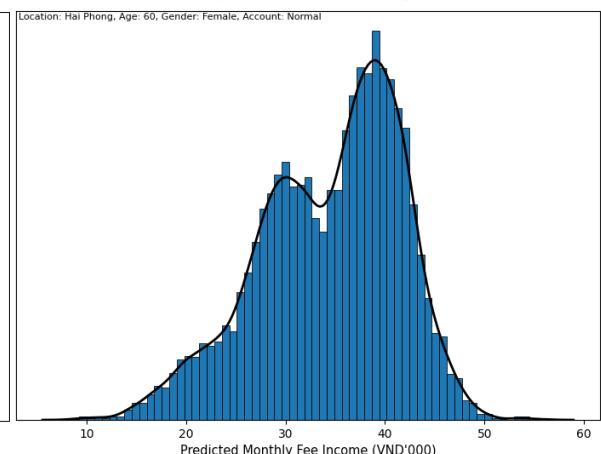
Monthly Income Prediction - Age: 50



Monthly Income Prediction - Age: 55



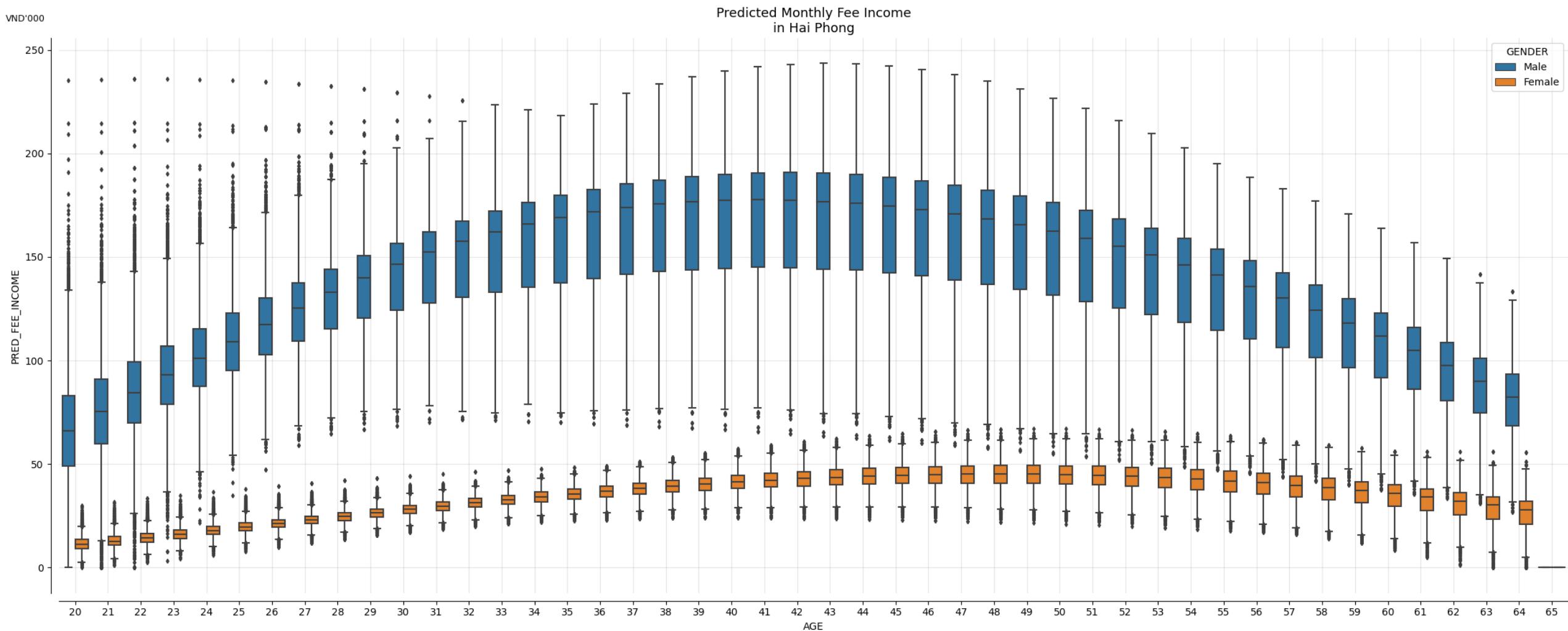
Monthly Income Prediction - Age: 60



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# PREDICTION RESULT SUMMARY: FEE INCOME

LOCATION: HAI PHONG, ACCOUNT TYPE: NORMAL



# MARGIN ACCOUNT



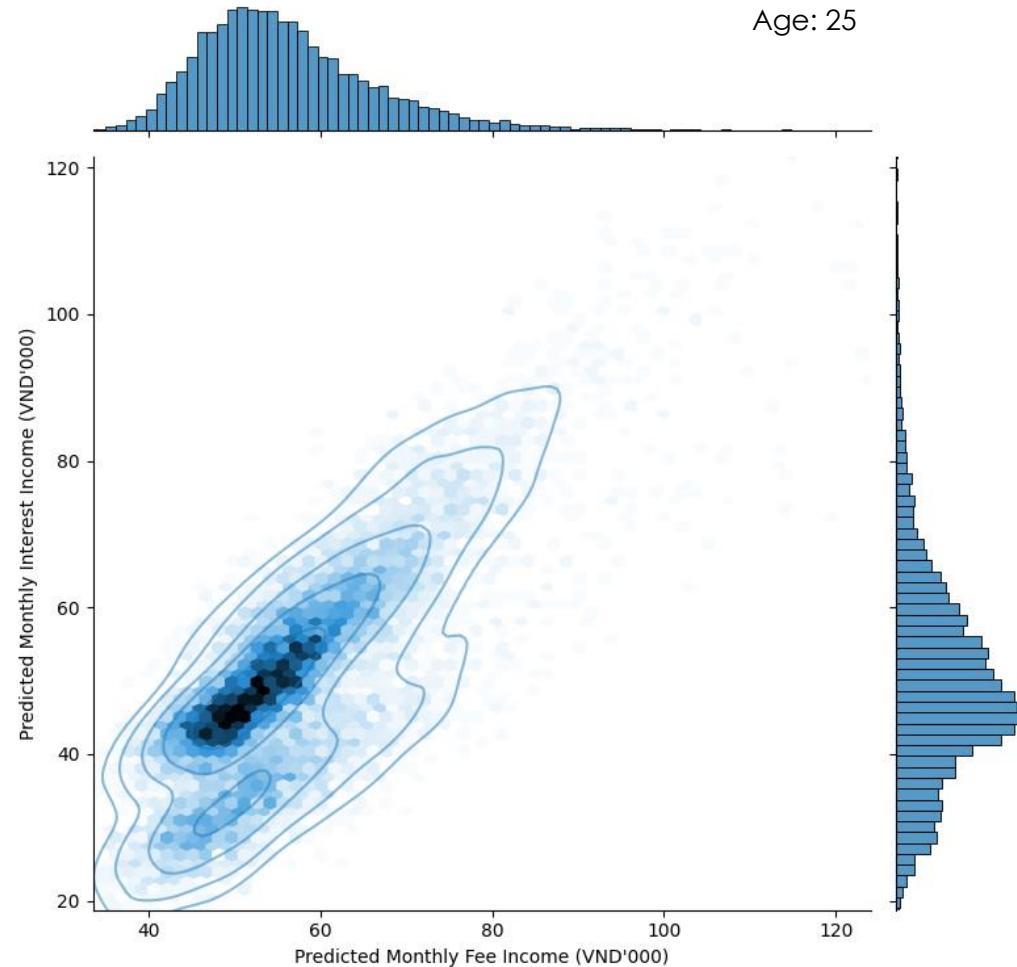
# INCOME PREDICTION

ACCOUNT TYPE: MARGIN, LOCATION: HAI PHONG, GENDER: MALE

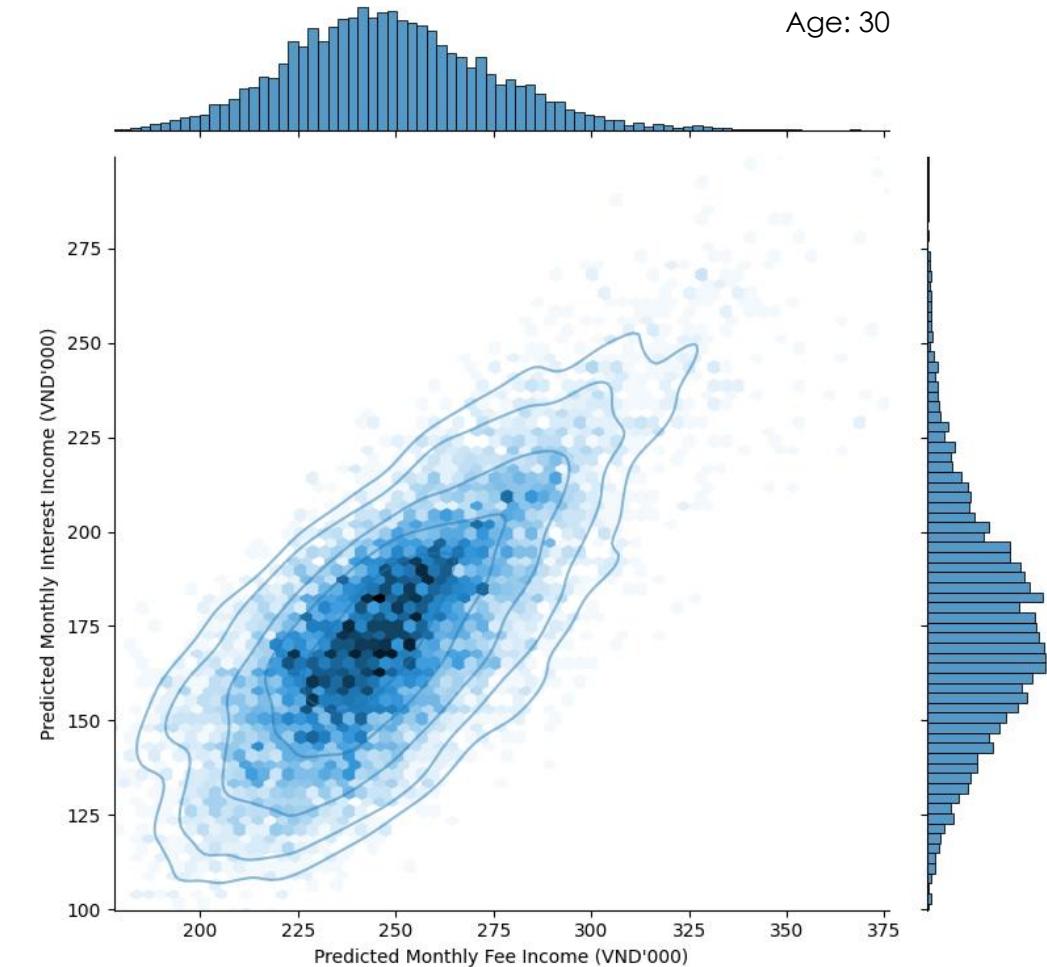
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Monthly Income Prediction  
Location: Hai Phong, Age: 25, Gender: Male, Account: Margin



Monthly Income Prediction  
Location: Hai Phong, Age: 30, Gender: Male, Account: Margin



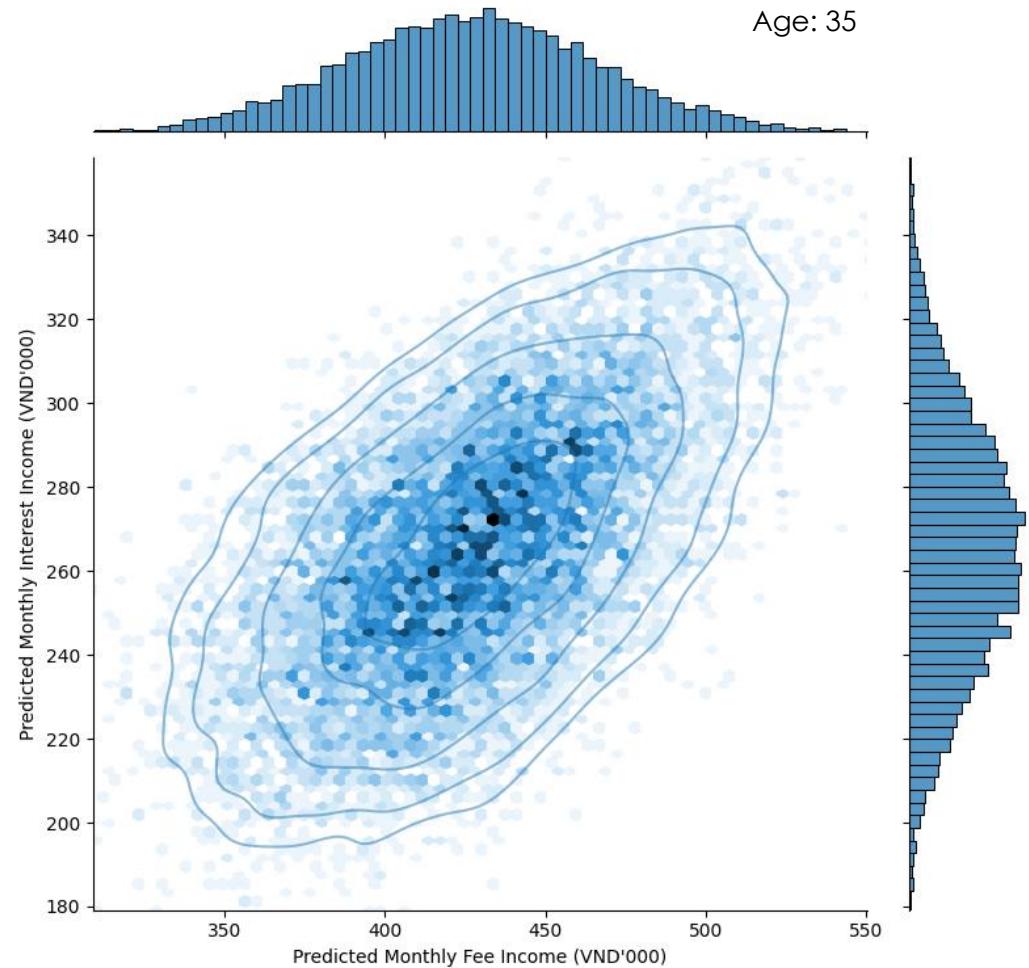
# INCOME PREDICTION

ACCOUNT TYPE: MARGIN, LOCATION: HAI PHONG, GENDER: MALE

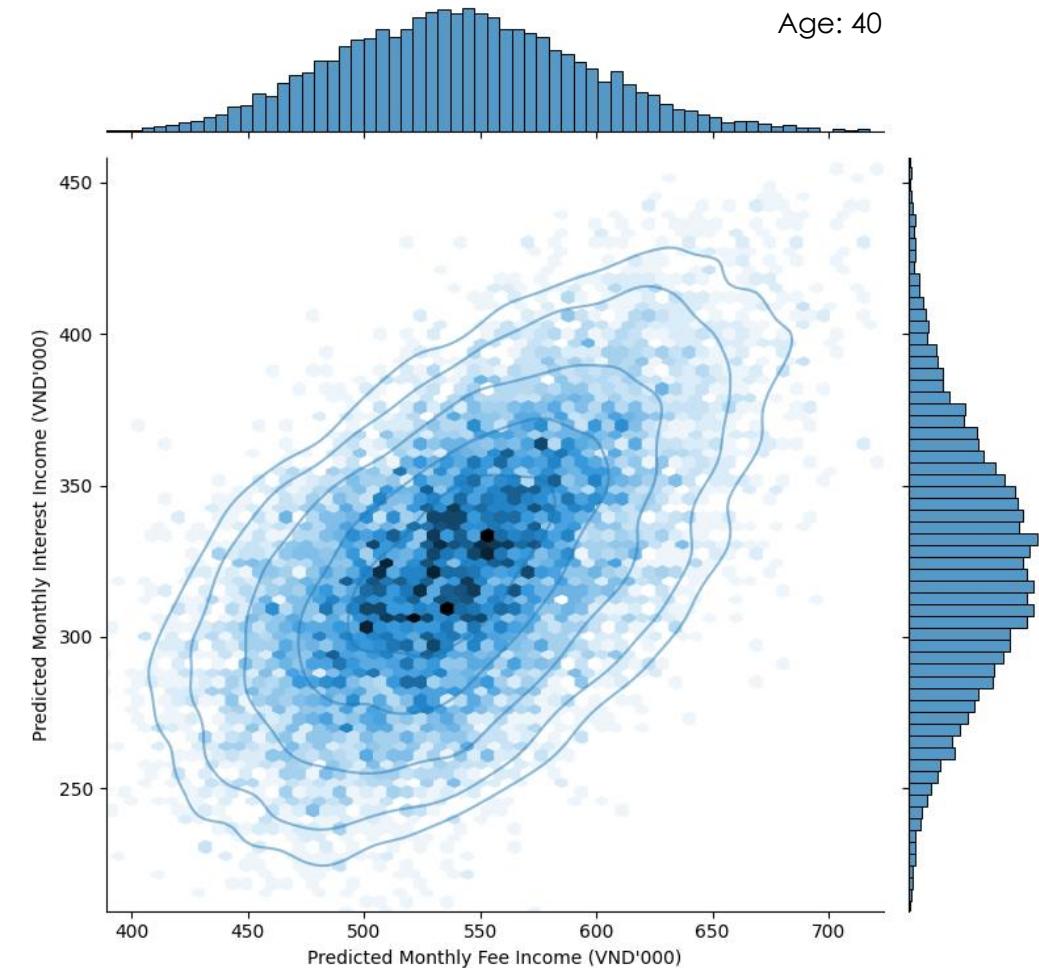
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Monthly Income Prediction  
Location: Hai Phong, Age: 35, Gender: Male, Account: Margin



Monthly Income Prediction  
Location: Hai Phong, Age: 40, Gender: Male, Account: Margin



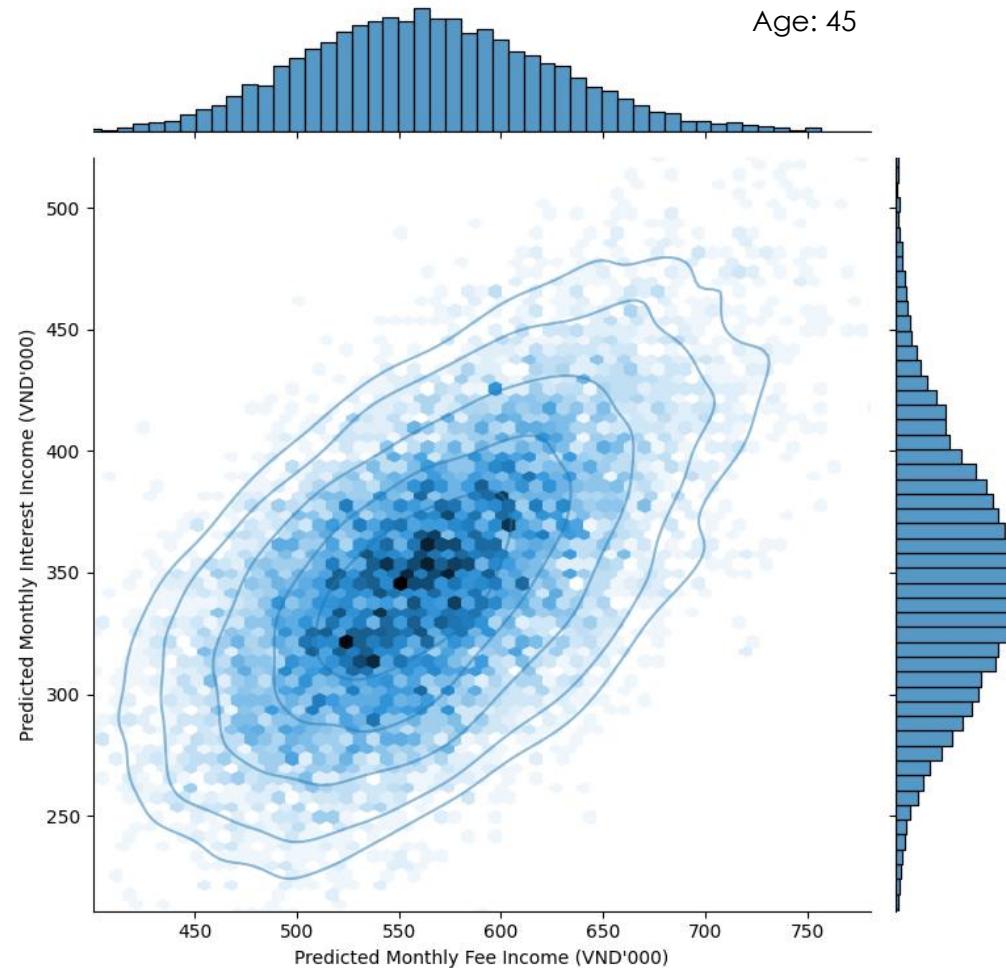
# INCOME PREDICTION

ACCOUNT TYPE: MARGIN, LOCATION: HAI PHONG, GENDER: MALE

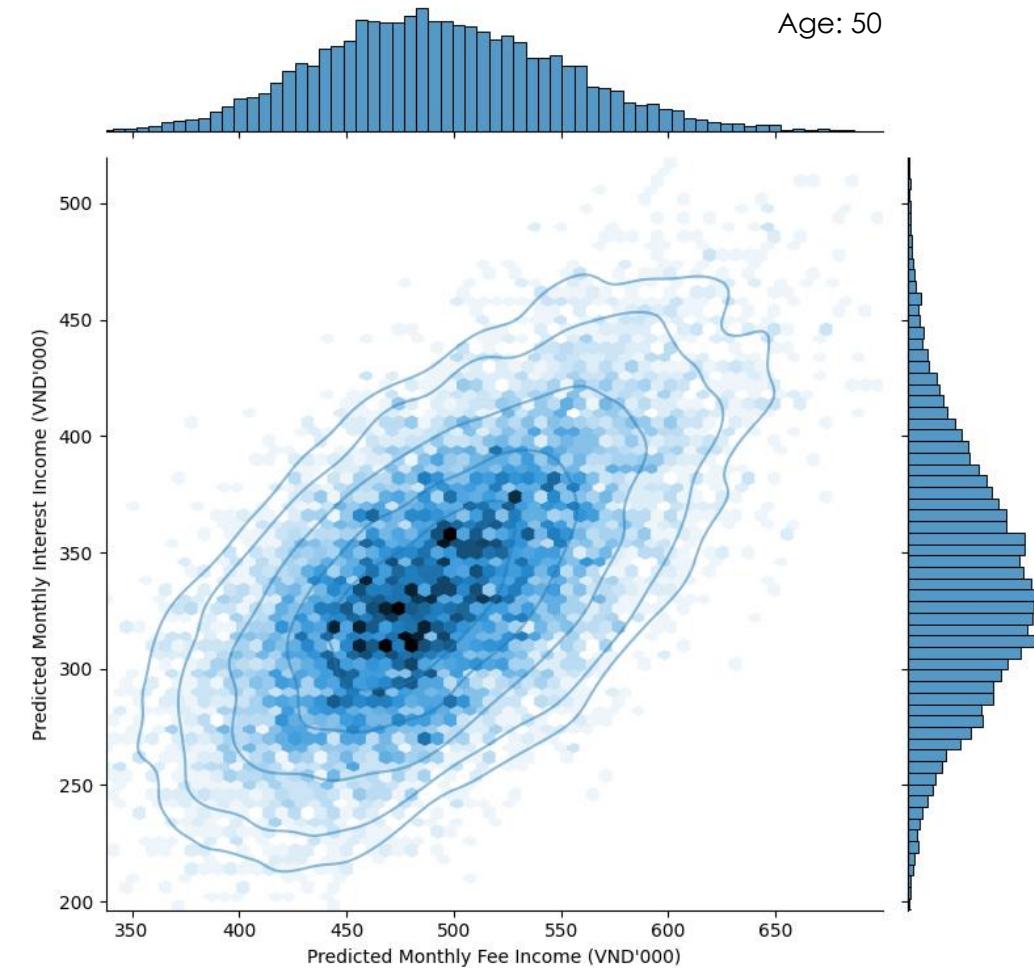
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Monthly Income Prediction  
Location: Hai Phong, Age: 45, Gender: Male, Account: Margin



Monthly Income Prediction  
Location: Hai Phong, Age: 50, Gender: Male, Account: Margin



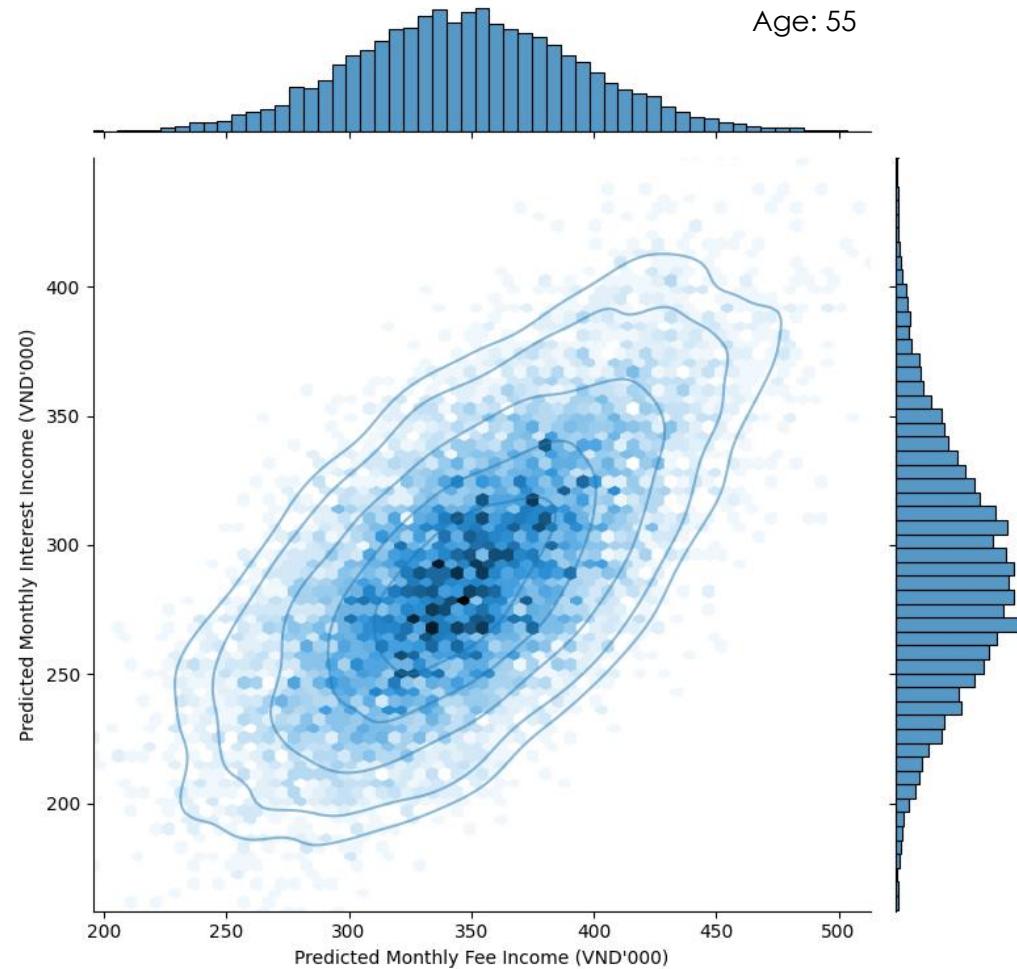
# INCOME PREDICTION

ACCOUNT TYPE: MARGIN, LOCATION: HAI PHONG, GENDER: MALE

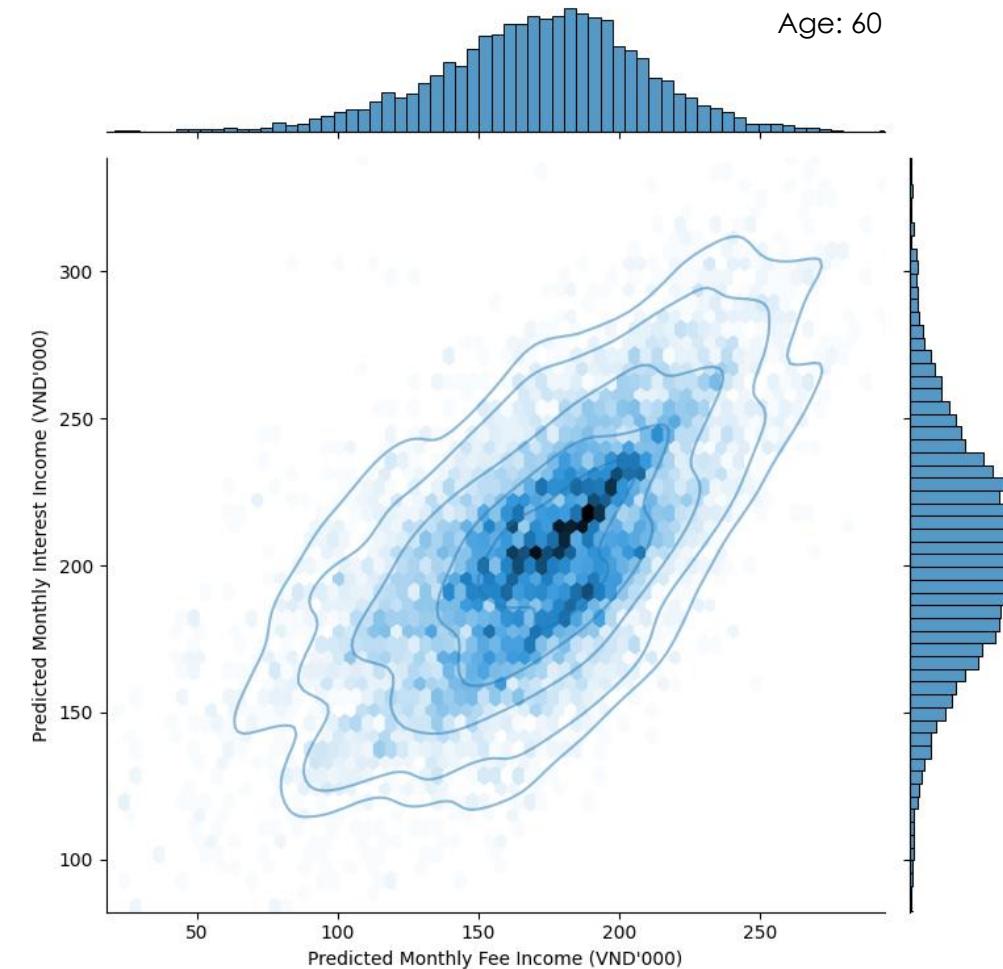
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[click to go back to key findings](#)

Monthly Income Prediction  
Location: Hai Phong, Age: 55, Gender: Male, Account: Margin



Monthly Income Prediction  
Location: Hai Phong, Age: 60, Gender: Male, Account: Margin



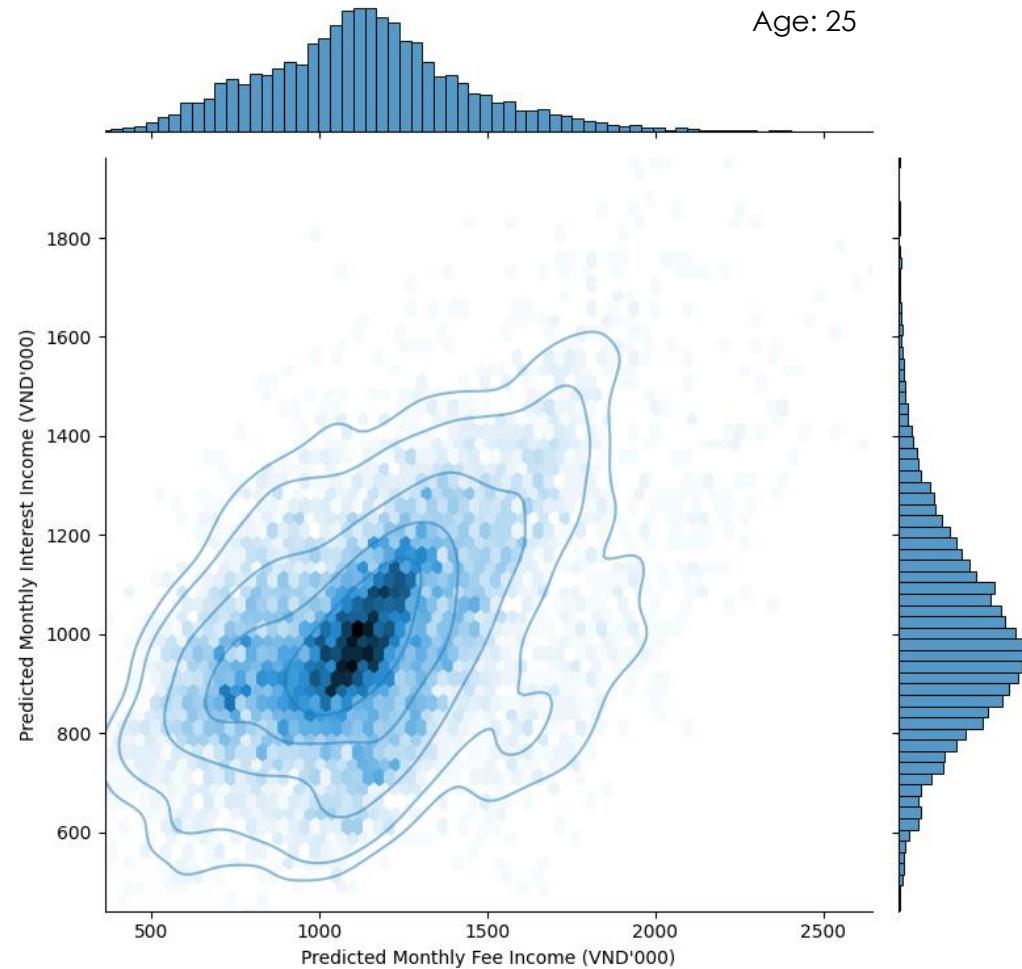
# INCOME PREDICTION

ACCOUNT TYPE: MARGIN, LOCATION: HAI PHONG, GENDER: FEMALE

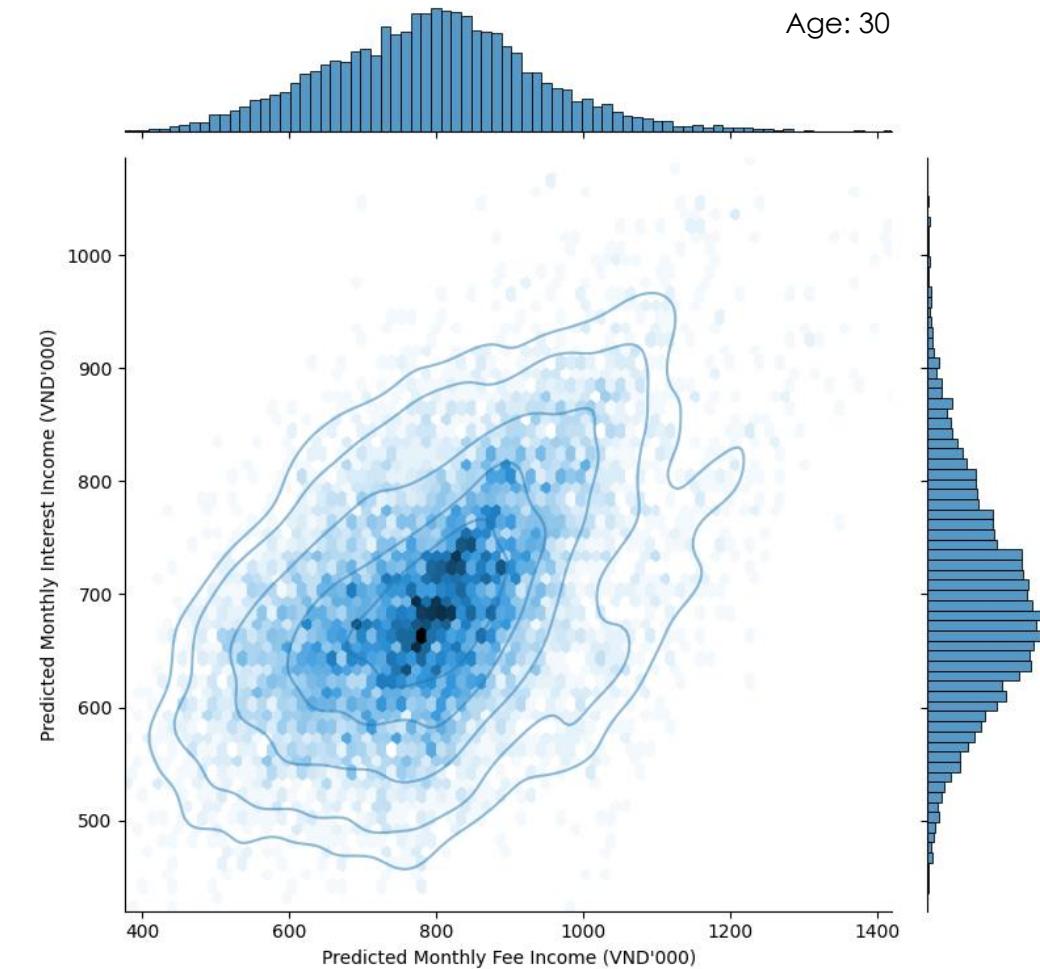
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[click to go back to key findings](#)

Monthly Income Prediction  
Location: Hai Phong, Age: 25, Gender: Female, Account: Margin



Monthly Income Prediction  
Location: Hai Phong, Age: 30, Gender: Female, Account: Margin



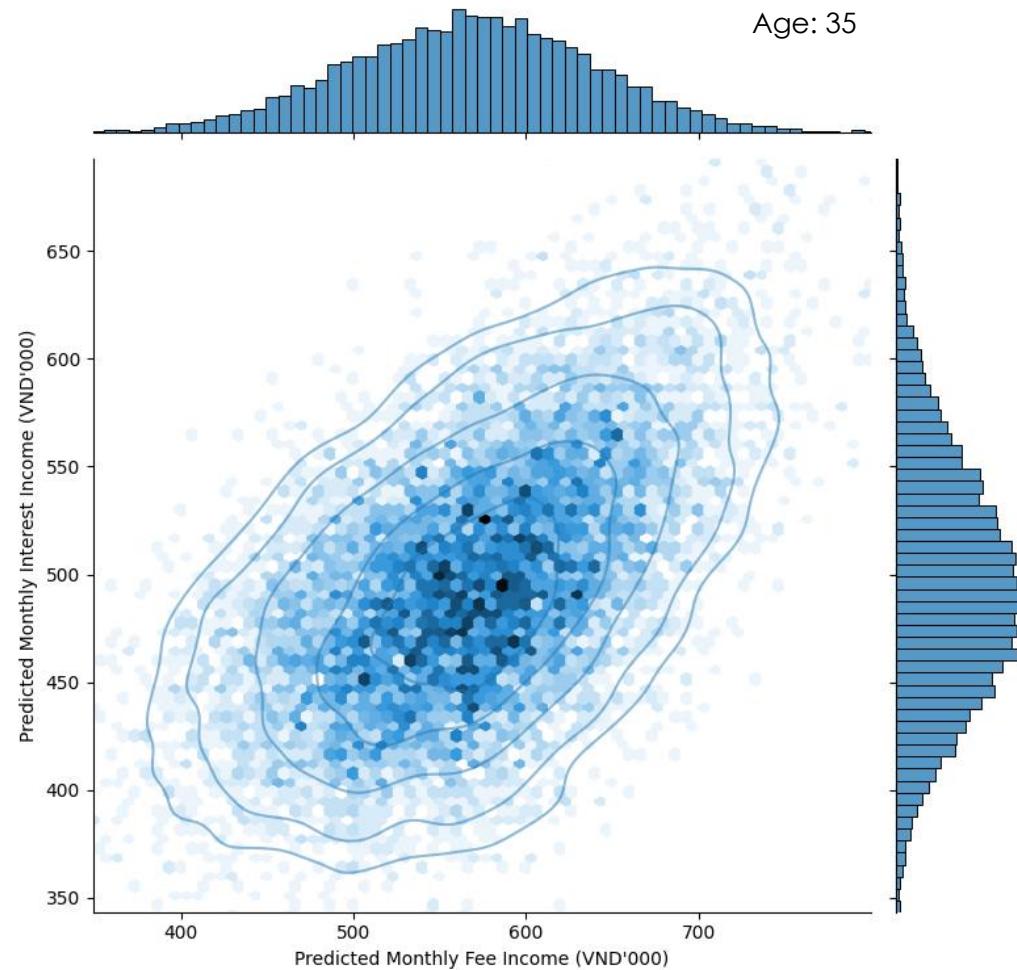
# INCOME PREDICTION

ACCOUNT TYPE: MARGIN, LOCATION: HAI PHONG, GENDER: FEMALE

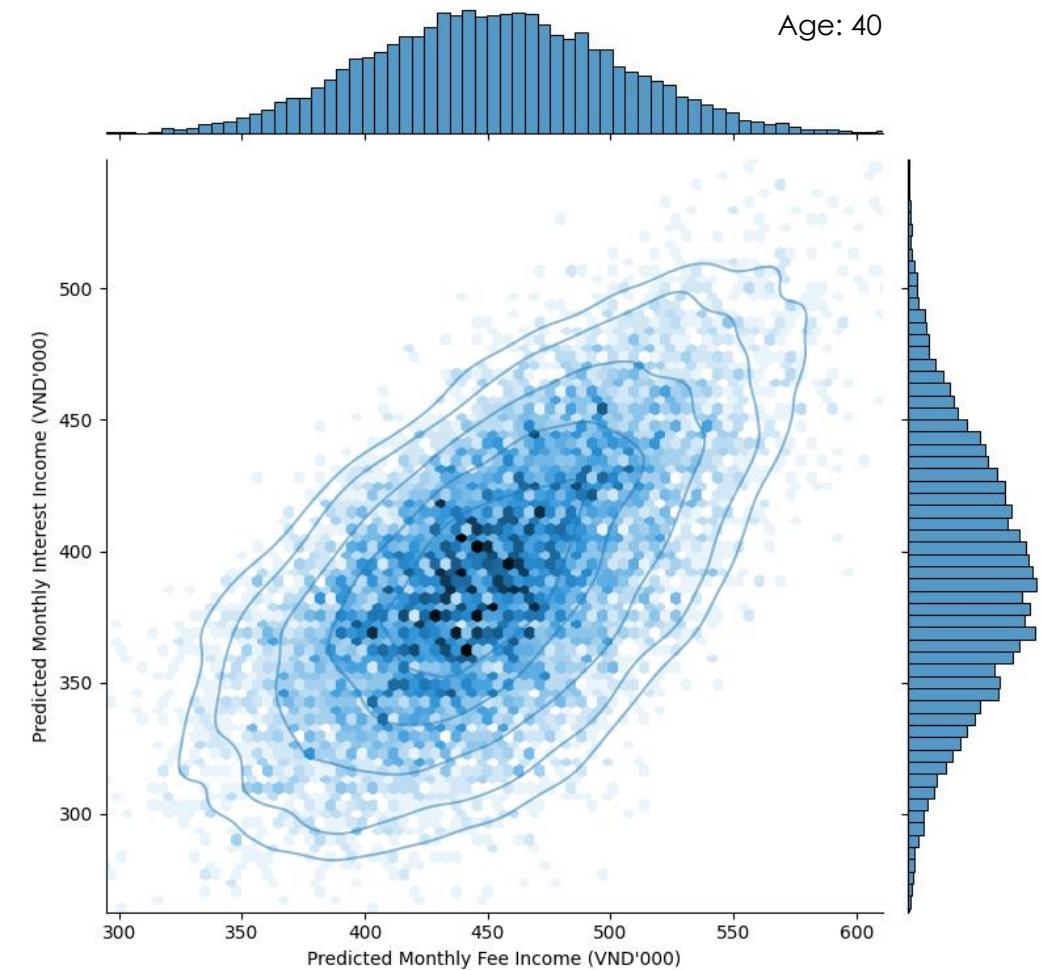
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[click to go back to key findings](#)

Monthly Income Prediction  
Location: Hai Phong, Age: 35, Gender: Female, Account: Margin



Monthly Income Prediction  
Location: Hai Phong, Age: 40, Gender: Female, Account: Margin



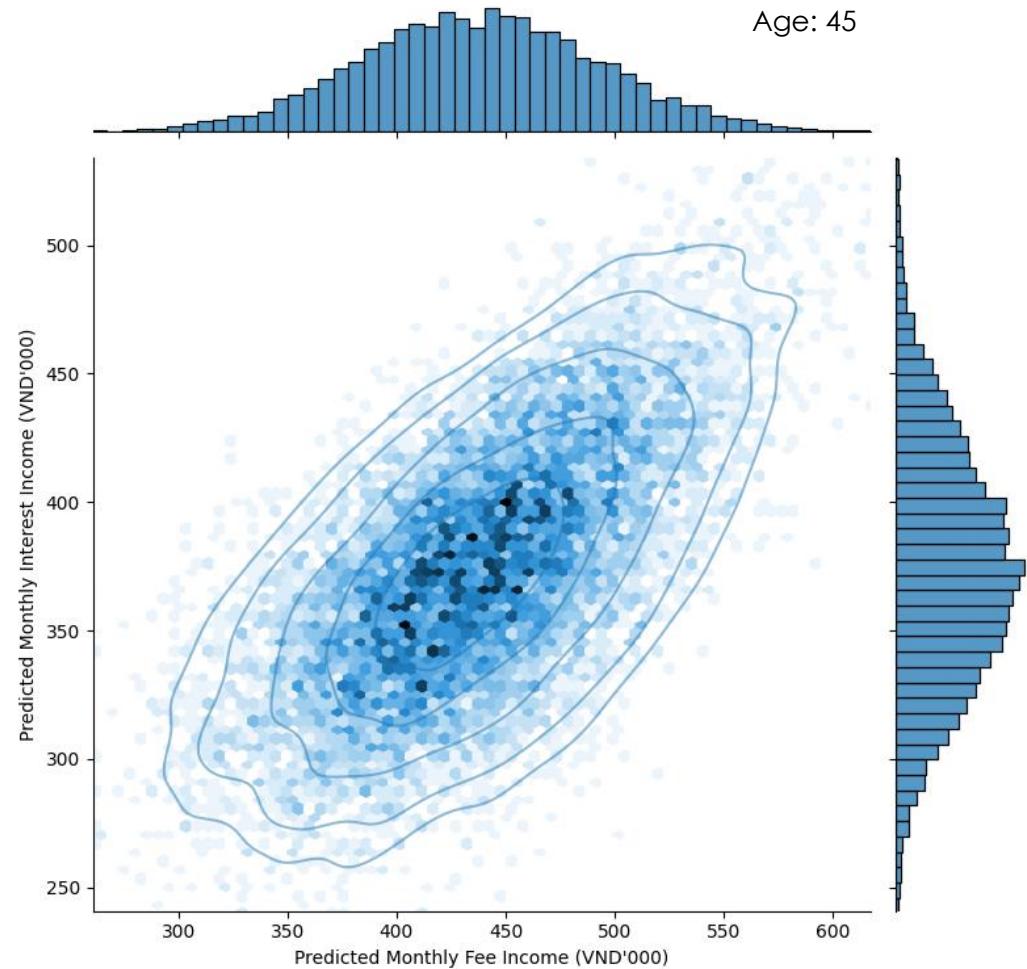
# INCOME PREDICTION

ACCOUNT TYPE: MARGIN, LOCATION: HAI PHONG, GENDER: FEMALE

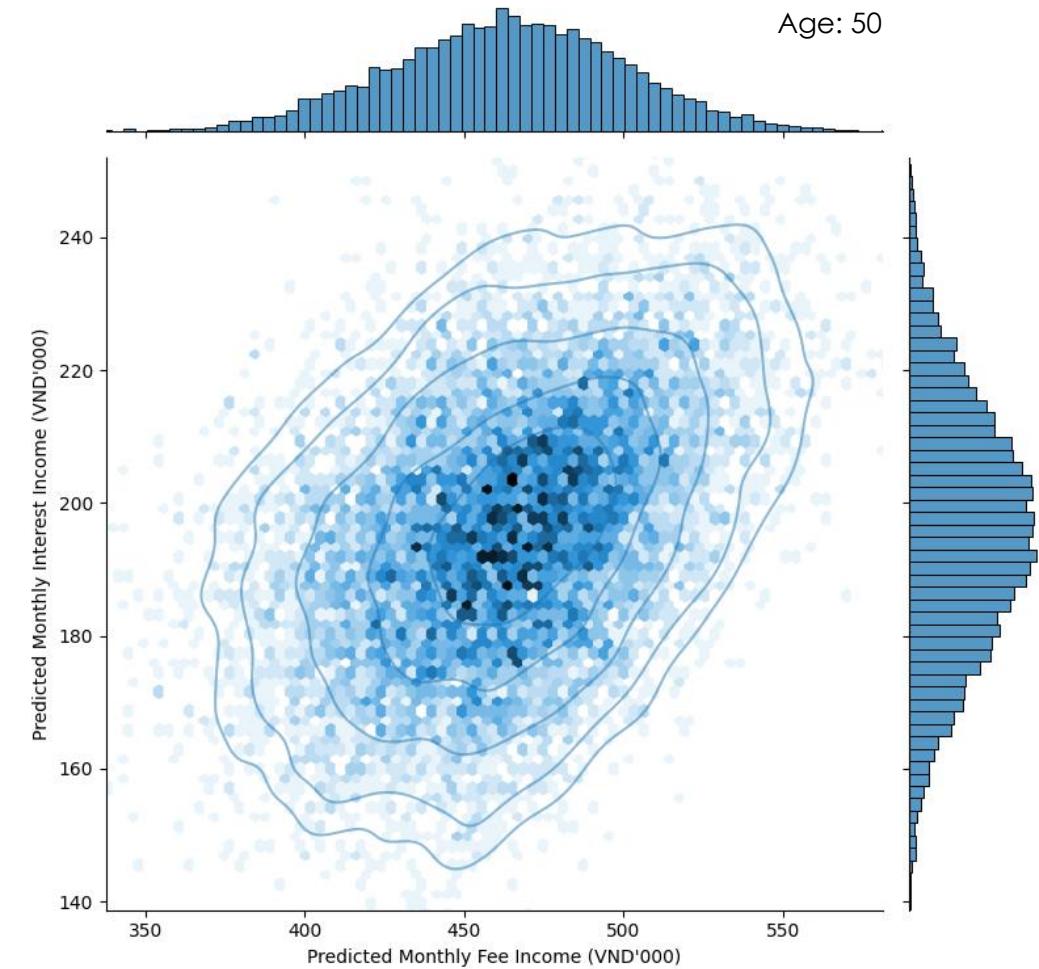
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[click to go back to key findings](#)

Monthly Income Prediction  
Location: Hai Phong, Age: 45, Gender: Female, Account: Margin



Monthly Income Prediction  
Location: Ho Chi Minh City, Age: 50, Gender: Female, Account: Margin



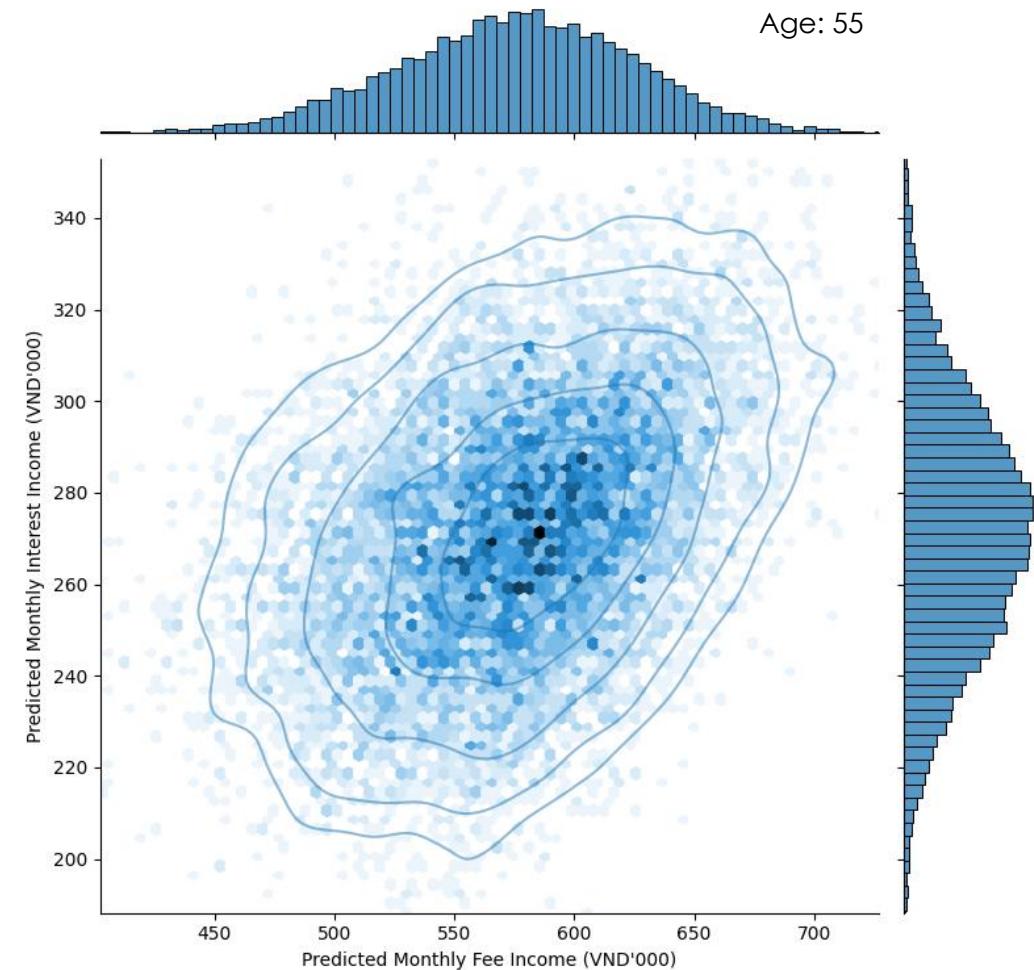
# INCOME PREDICTION

ACCOUNT TYPE: MARGIN, LOCATION: HAI PHONG, GENDER: FEMALE

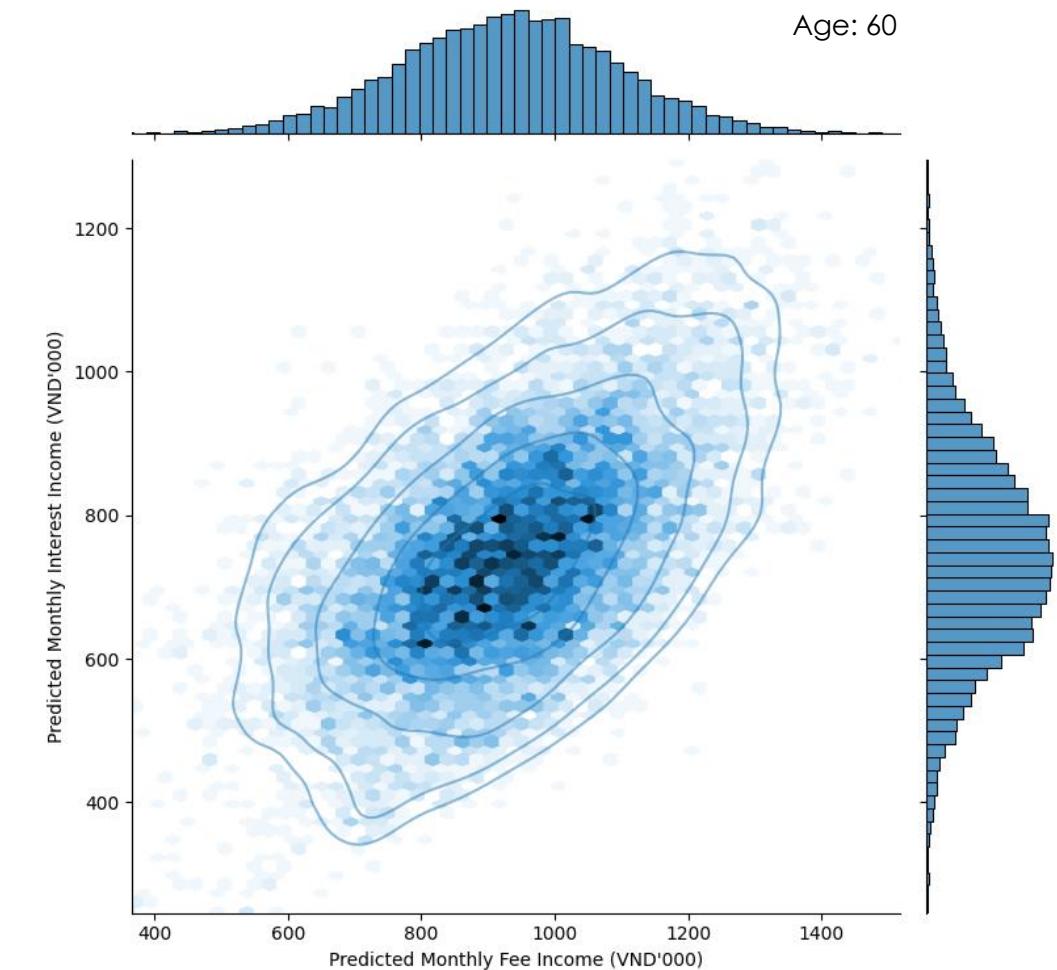
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[click to go back to key findings](#)

Monthly Income Prediction  
Location: Ho Chi Minh City, Age: 55, Gender: Female, Account: Margin



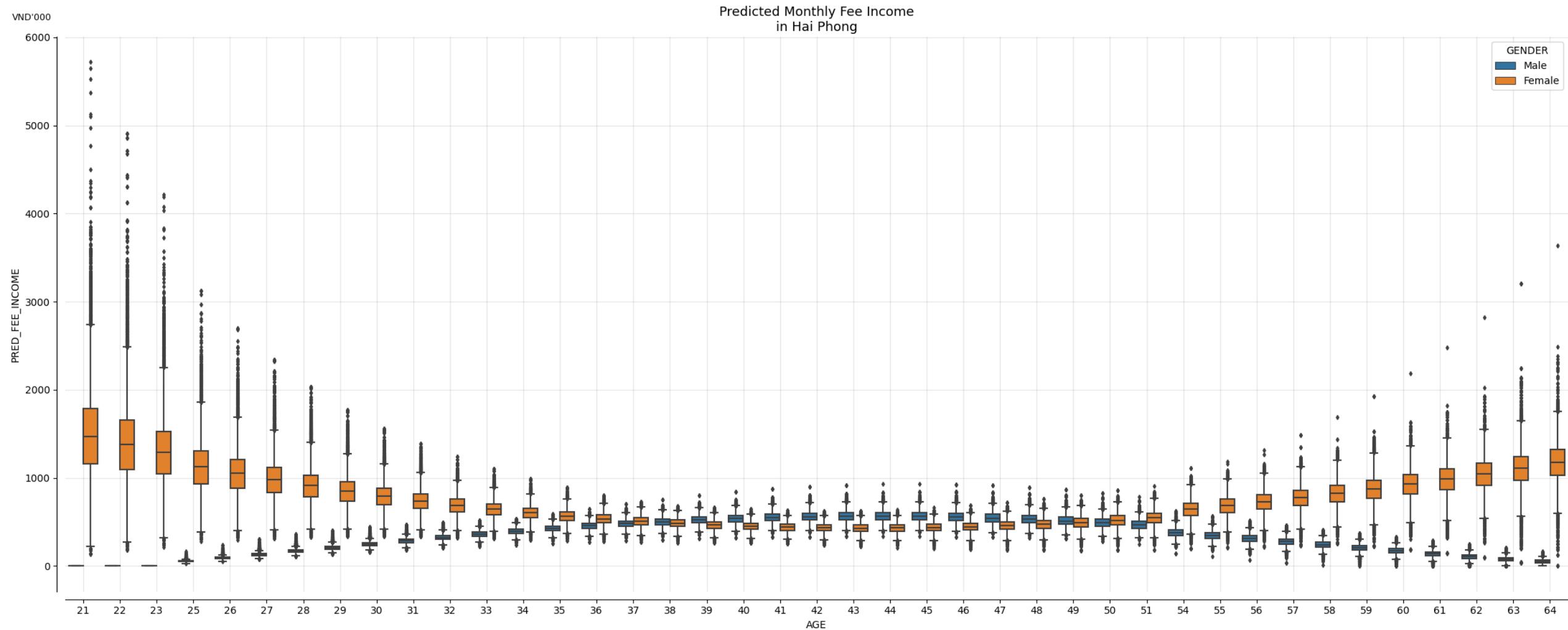
Monthly Income Prediction  
Location: Hai Phong, Age: 60, Gender: Female, Account: Margin



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[click to go back to key findings](#)

# PREDICTION RESULT SUMMARY: FEE INCOME

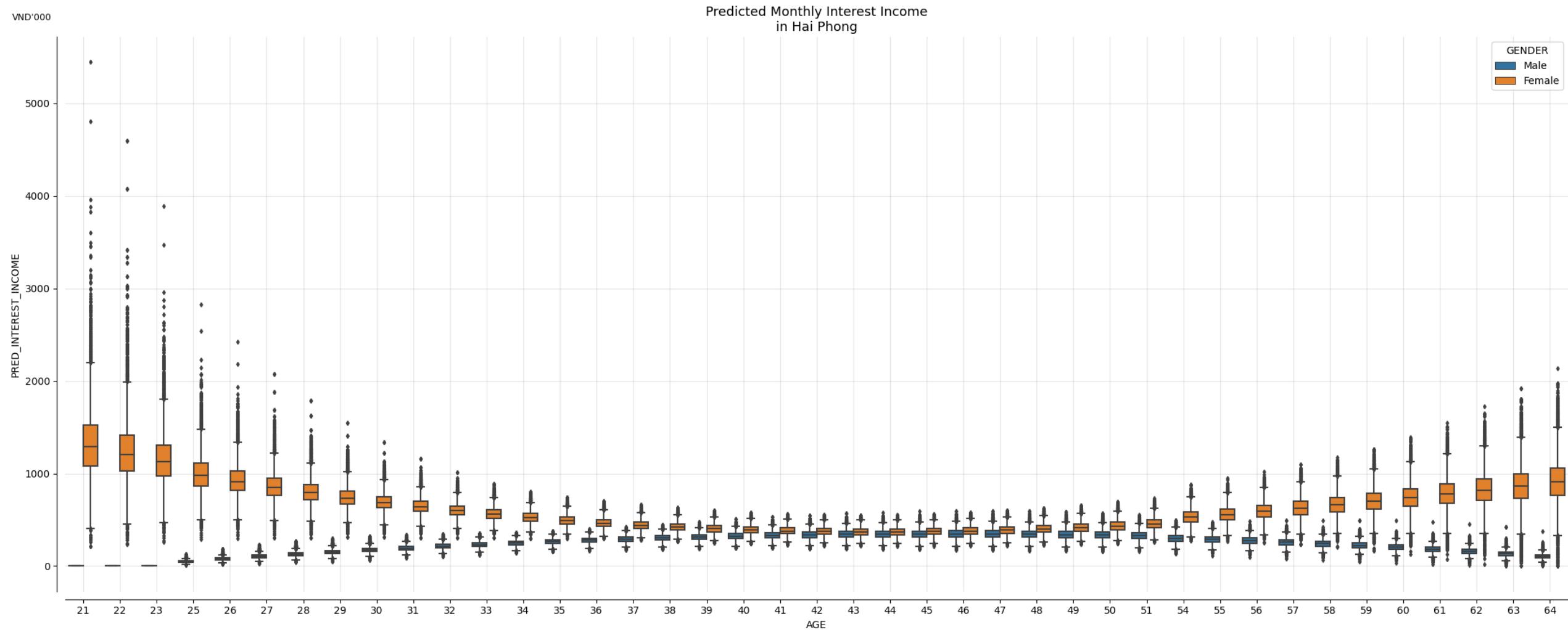
LOCATION: HAI PHONG, ACCOUNT TYPE: MARGIN

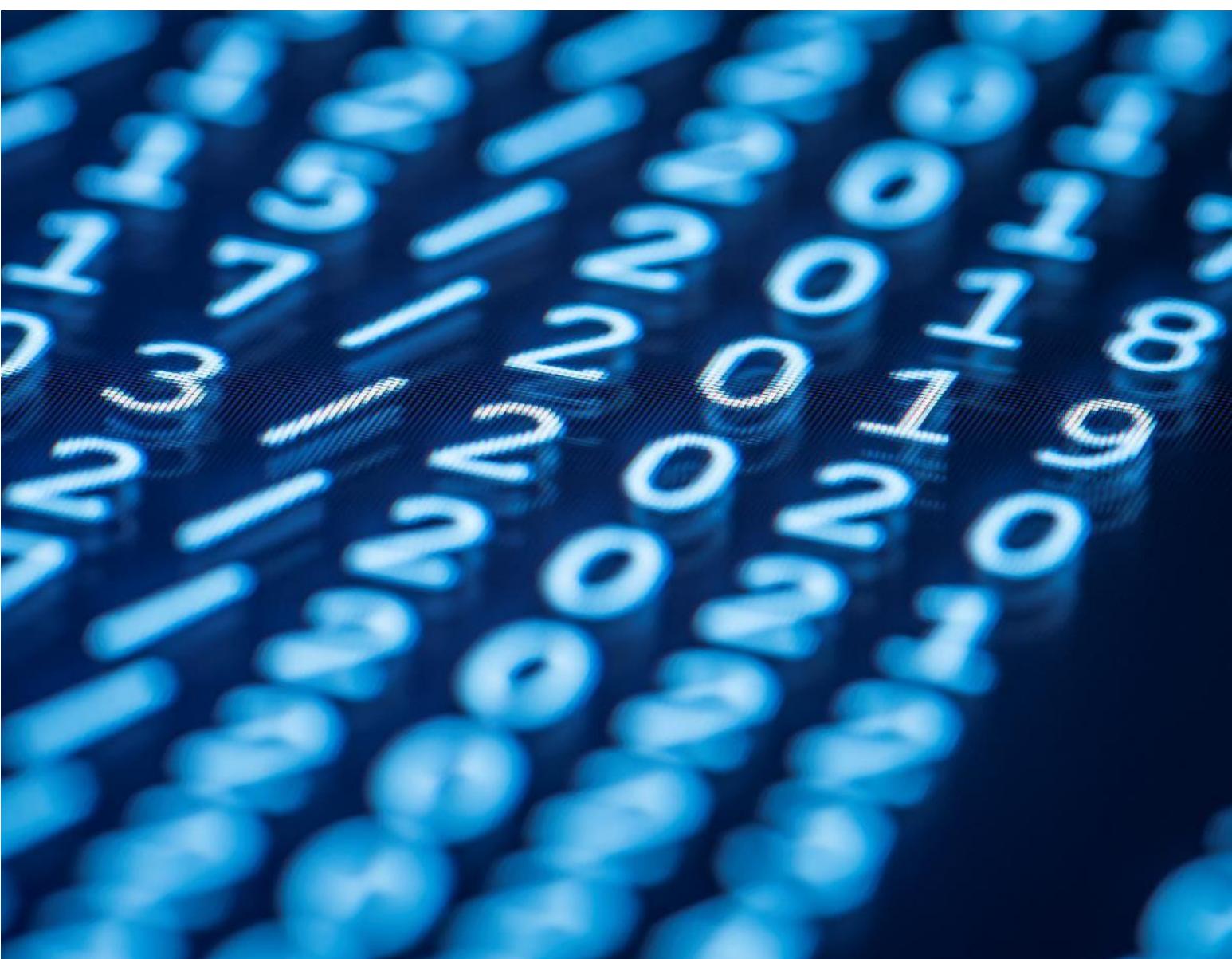


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# PREDICTION RESULT SUMMARY: INTEREST INCOME

LOCATION: HAI PHONG, ACCOUNT TYPE: MARGIN





THANK YOU

HIEPDANG@PHS.VN