Credit Card Approval Predictors

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Introduction

The project aims to analyze the "Credit Card Approval - With Target" dataset and identify the **factors that affect credit card payment.**

Data cleaning

Several steps were conducted to ensure consistency and better analysis:

- Imported libraries such as Pandas to work with the data.
- Reduced the original dataset from 537,667 rows and 19 columns to 50,000 rows and 12 columns, focusing on a subset of the data.
- Removed columns irrelevant for the analysis, including ID, FLAG_EMAIL, FLAG_PHONE, etc., using the df.drop function.
- Replaced similar rows with more meaningful labels using the df.replace function.
- Renamed columns to provide a more recognizable and descriptive set of labels for better understanding and analysis.
- Checked for missing values in the dataset to identify any incomplete or null data points.

The analysis is conducted on a sample of 50,000 from the original dataset of around 537,667 rows

Removed columns irrelevant for analysis

Replaced similar rows with meaningful labels

Renamed columns with recognisable and descriptive set

Checked for missing values

Factors that may impact credit card payment
Research questions

Does age or gender have an influence on the credit card loan payment?

Does owning a car or a house influence credit card payments?

Does having children have an influence of credit card payment?

Does being employed have an influence of credit card payment?

Does annual income or job type have an influence on credit card payment?

Does *Age* influence credit card payment?

Age

The dataset analysed four different age groups:
- 25 and younger
- Between 26 and 40 years
- Between 41 and 64 years
- 65 and older

Conducted chi-square test to test the following hypothesis:

Null hypothesis: There is no relationship between age and credit card payment status

Alternative hypothesis: There is a relationship between age and credit card payment status

Result: Reject the Null Hypothesis (p value is less than 0.05 for all age groups)

Credit Status Distribution by Age Group
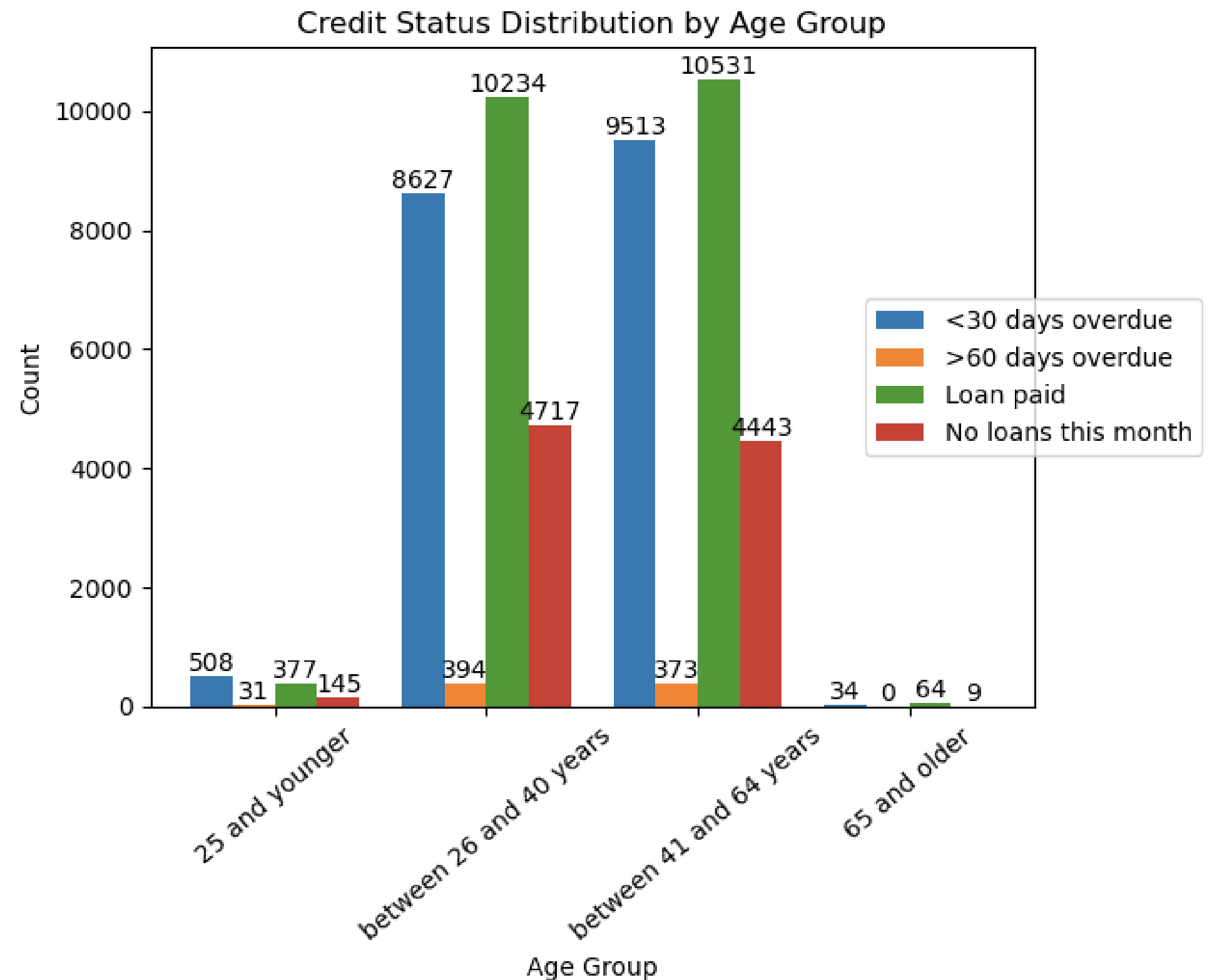
Does *Gender* influence credit card payment?

Gender

The dataset analysed between:
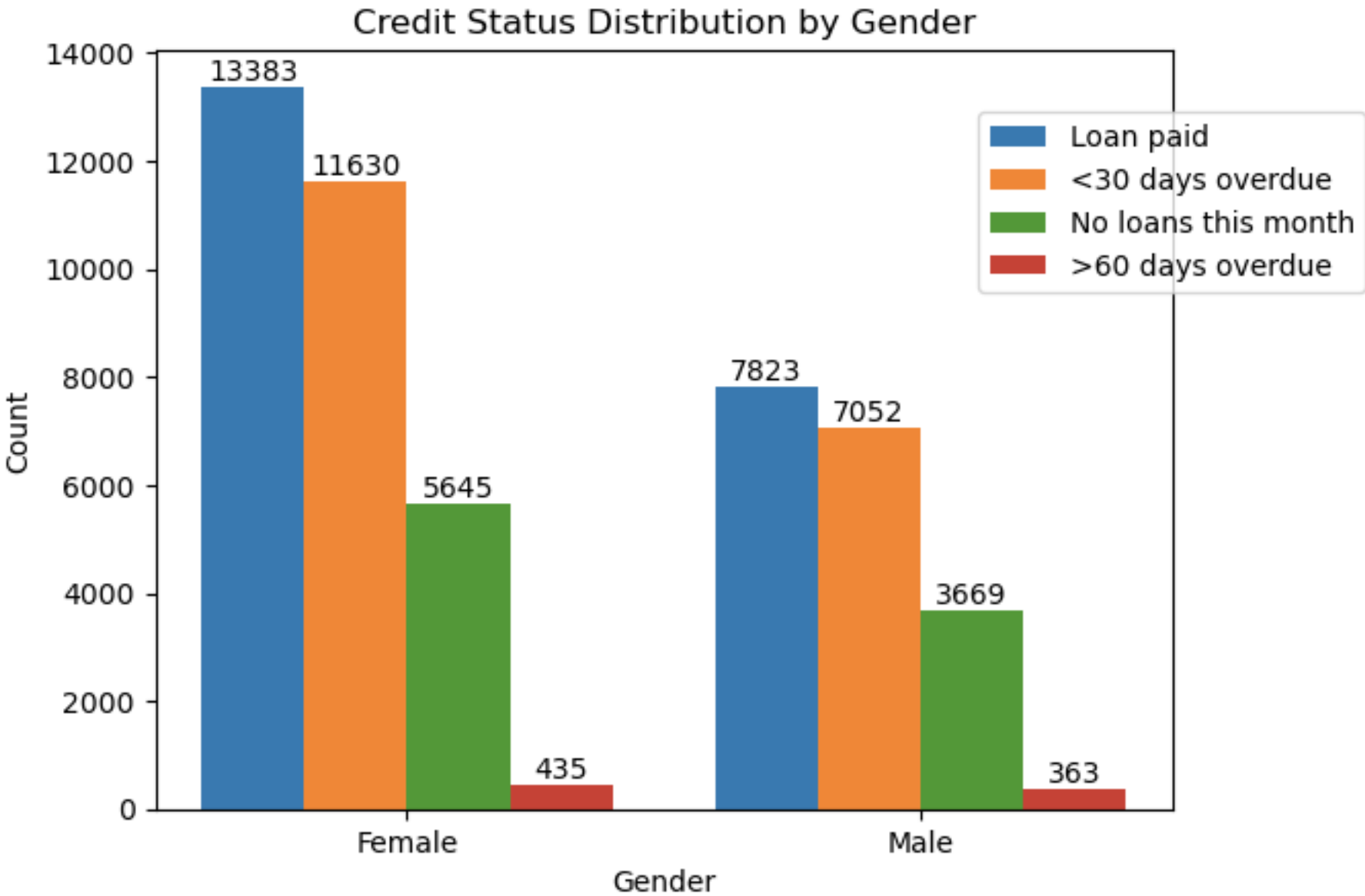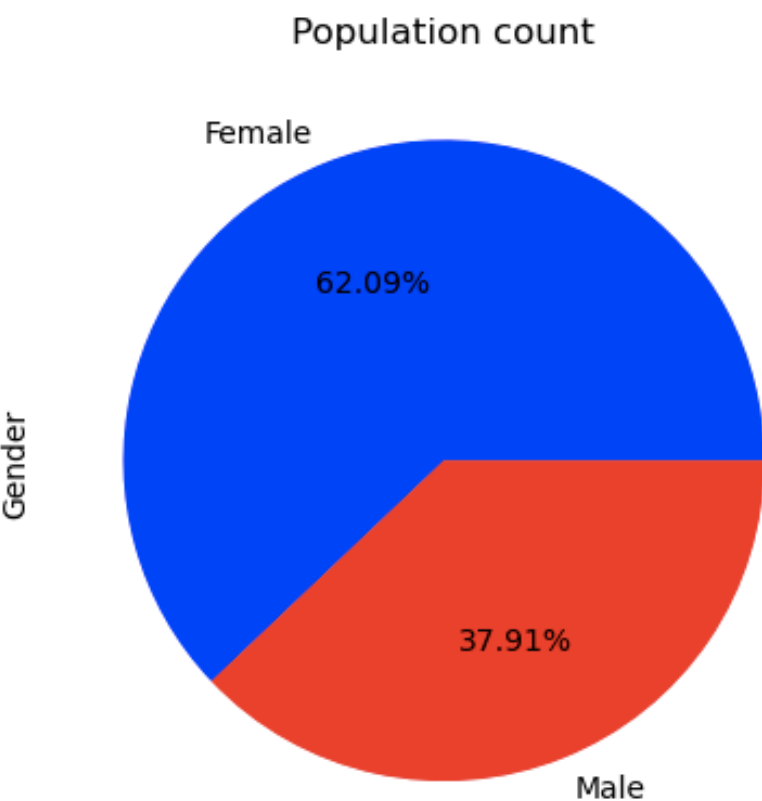- Female
- Male

Conducted chi-square test to test the following hypothesis:

Null hypothesis: There is no relationship between gender and credit card payment status
Alternative hypothesis: There is a relationship between gender and credit card payment status

Result: Reject the Null Hypothesis (p value is less than 0.05 for all gender)

Population count

Credit Status Distribution by Gender

Does *owning a house* influence credit card payment?

Homeowners

The dataset analysed between:
- People who own house(s)
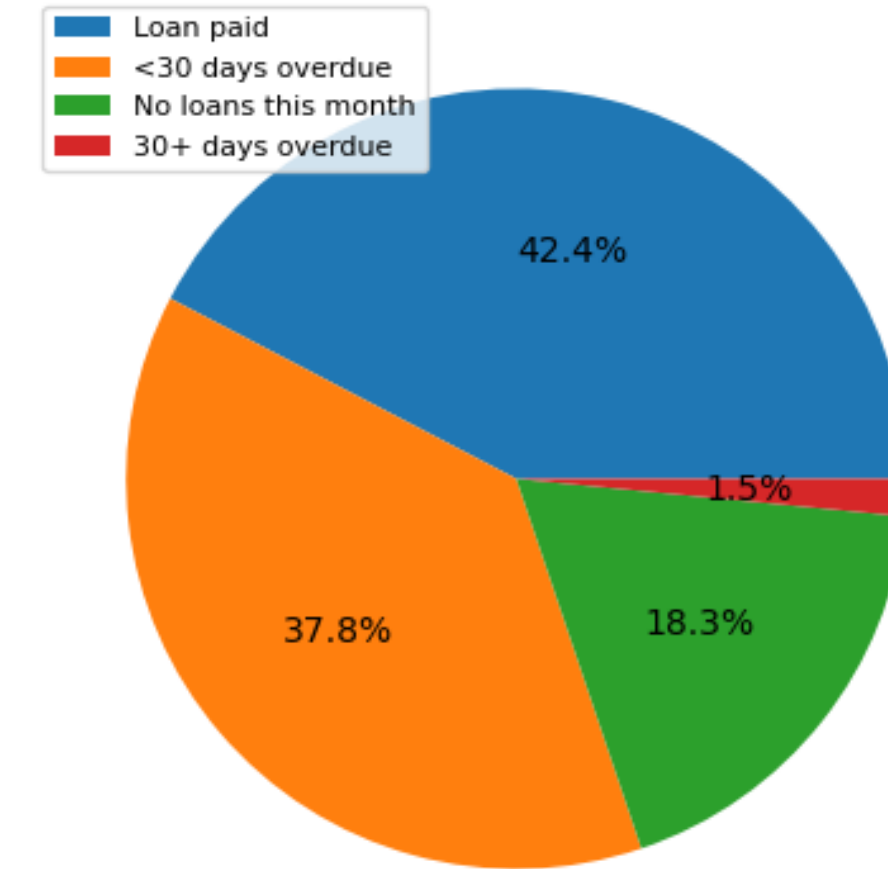- People who do not own house(s)

Conducted Chi-squared test on the proportion of Credit Status of homeowners and non-homeowners to test the following hypothesis:

Null hypothesis: There is no relation in Credit Status of homeowners and non-homeowners
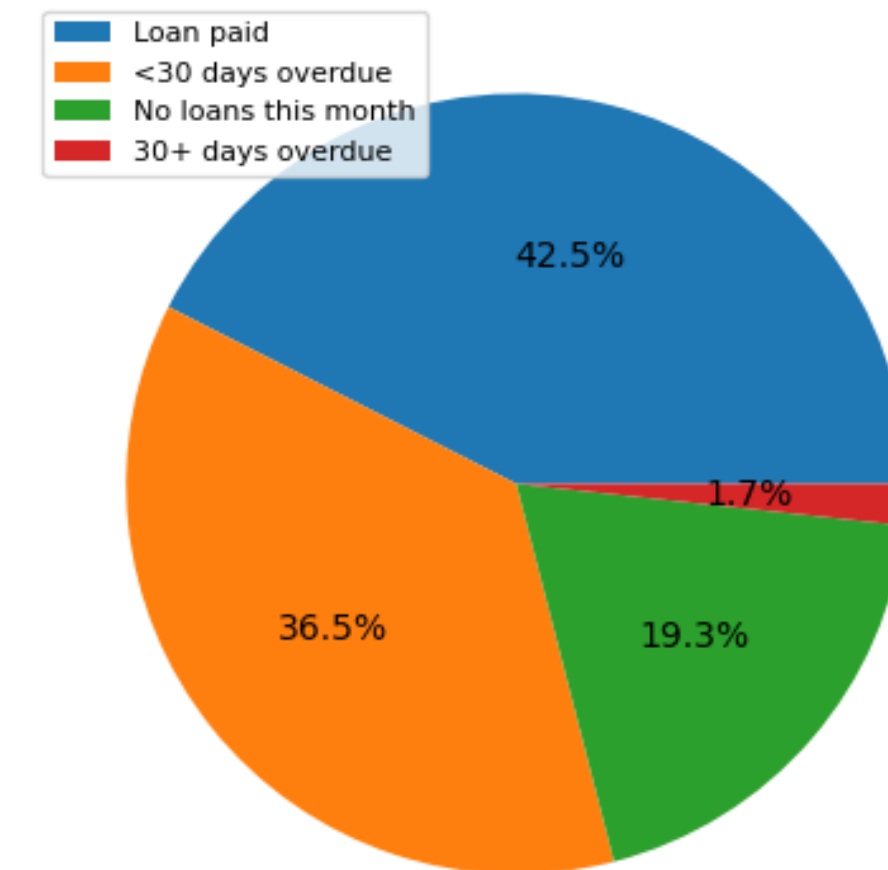
Alternative hypothesis: There is a relation in Credit Status of homeowners and non-homeowners

Result: Accept the Null Hypothesis (Critical value > Chi-square statistic and p-value close to 1)

Credit Status of people who own a house

Loan paid
<30 days overdue
No loans this month
30+ days overdue

42.4%
1.5%
37.8%
18.3%

Credit Status of people who do NOT own a house

Loan paid
<30 days overdue
No loans this month
30+ days overdue

42.5%
1.7%
36.5%
19.3%

Does *owning a car* influence credit card payment?

Car owners

The dataset analysed between:
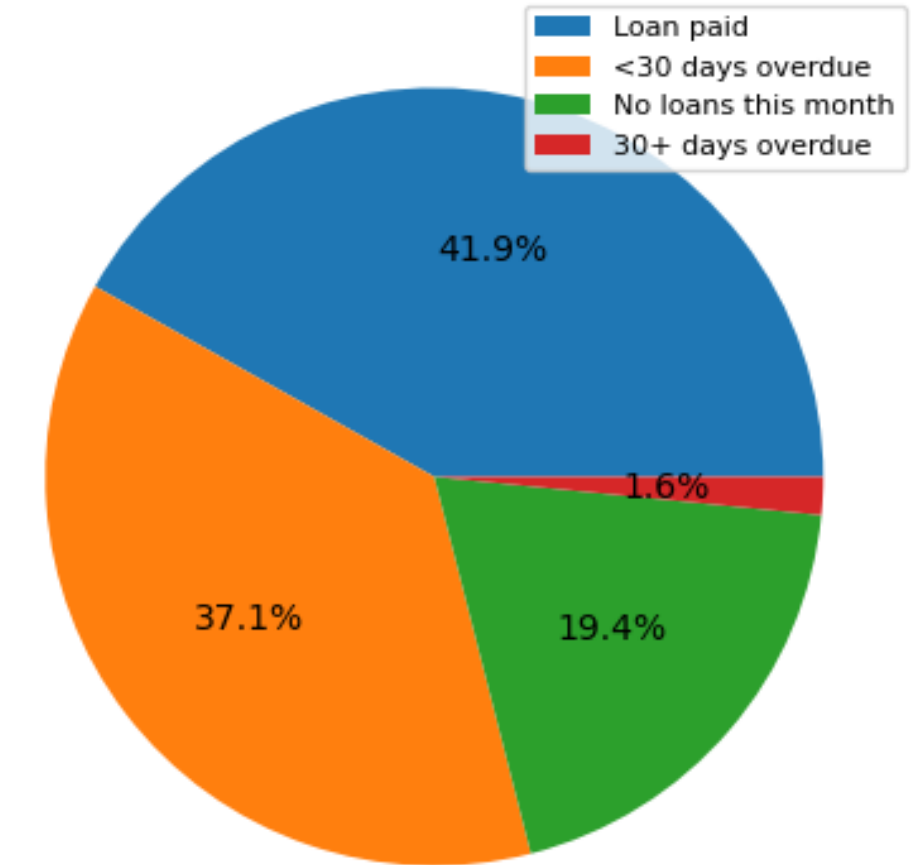- People who own car(s)
- People who do not own car(s)

Conducted Chi-squared test on the percentage of Credit Status of car owners and non-car owners to test the following hypothesis:

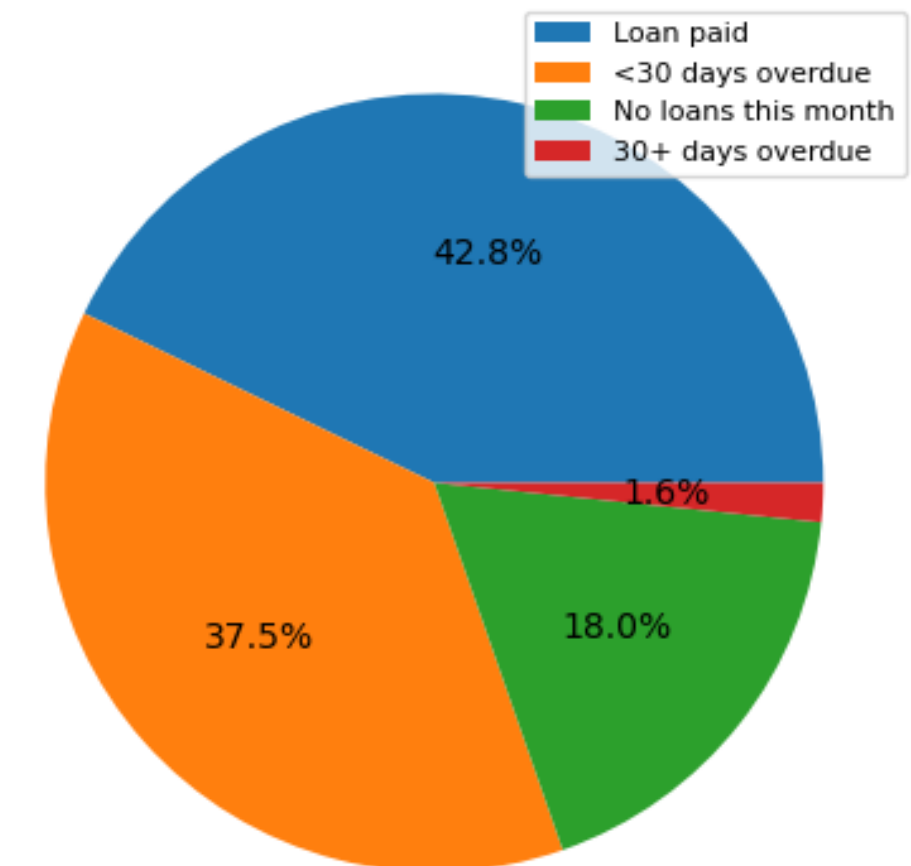**Null hypothesis: There is no relation in Credit Status of car and non car owners**
Alternative hypothesis: There is a relation in Credit Status of car and non car owners

Result: Accept the Null Hypothesis (Critical value > Chi-square statistic and p-value close to 1)

Credit Status of people who own a car

Legend:
- Loan paid
- <30 days overdue
- No loans this month
- 30+ days overdue

41.9%
1.6%
37.1%
19.4%

Credit Status of people who do NOT own a car

Legend:
- Loan paid
- <30 days overdue
- No loans this month
- 30+ days overdue

42.8%
1.6%
37.5%
18.0%

Credit Status of people who own both a house and a car

Credit Status of people who do not own a house nor a car

Does *owning a car and a house* influence credit card payment?

Home and Car owners

The dataset analysed between:

- People who own car(s) and own house(s)
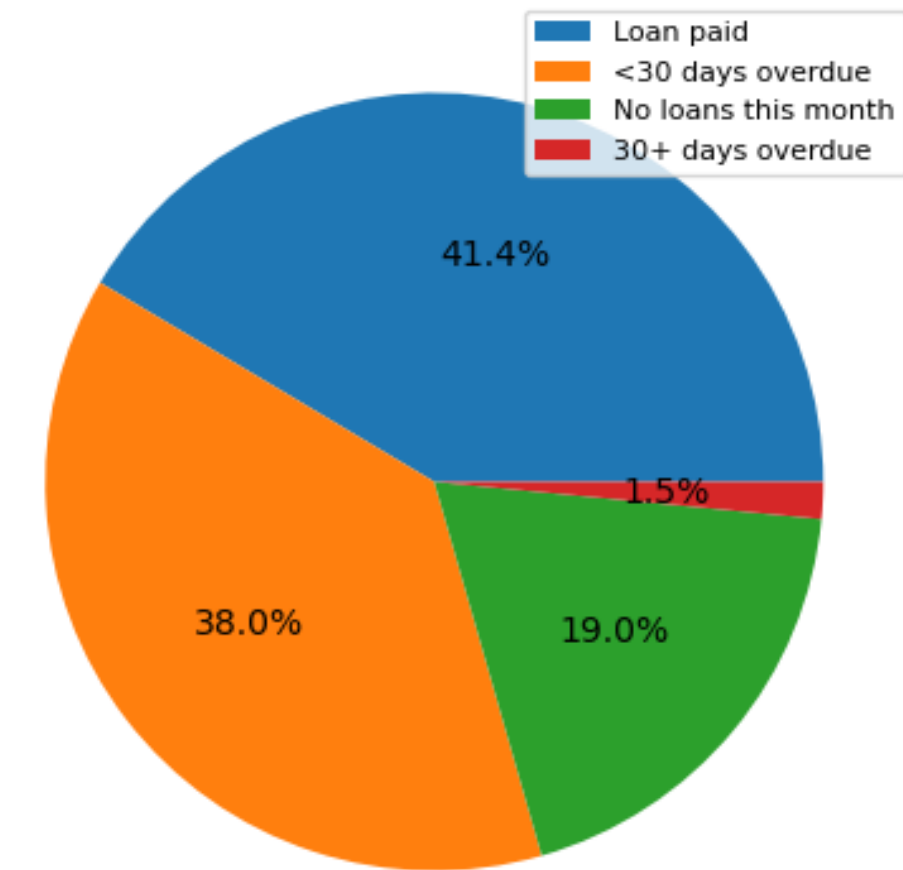- People who do not own car(s) nor own house(s)

Conducted Chi-squared test on the proportion of Credit Status of car and home owners and non-car and homeowners to test the following hypothesis:

Null hypothesis: There is no relation in Credit Status of car and homeowners and non car and homeowners
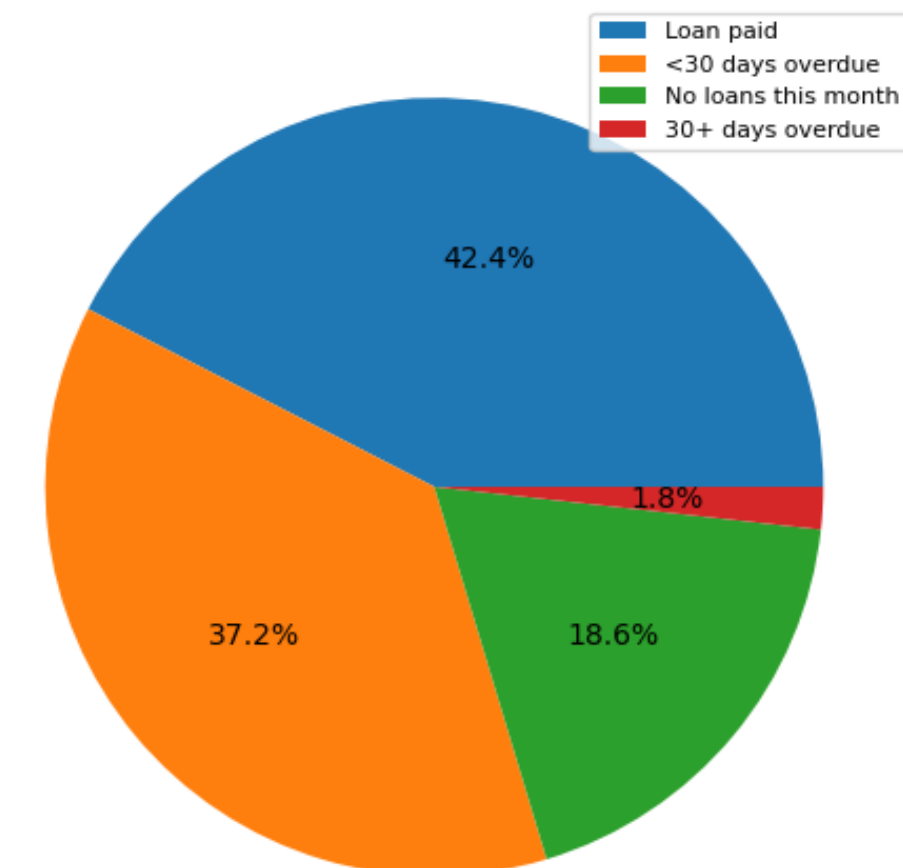**Alternative hypothesis: There is a relation in Credit Status of car and homeowners and non car and homeowners**

Result: Accept the Null Hypothesis (Critical value > Chi-square statistic and p-value close to 1)

Does employment play a role in credit card payment behavior?
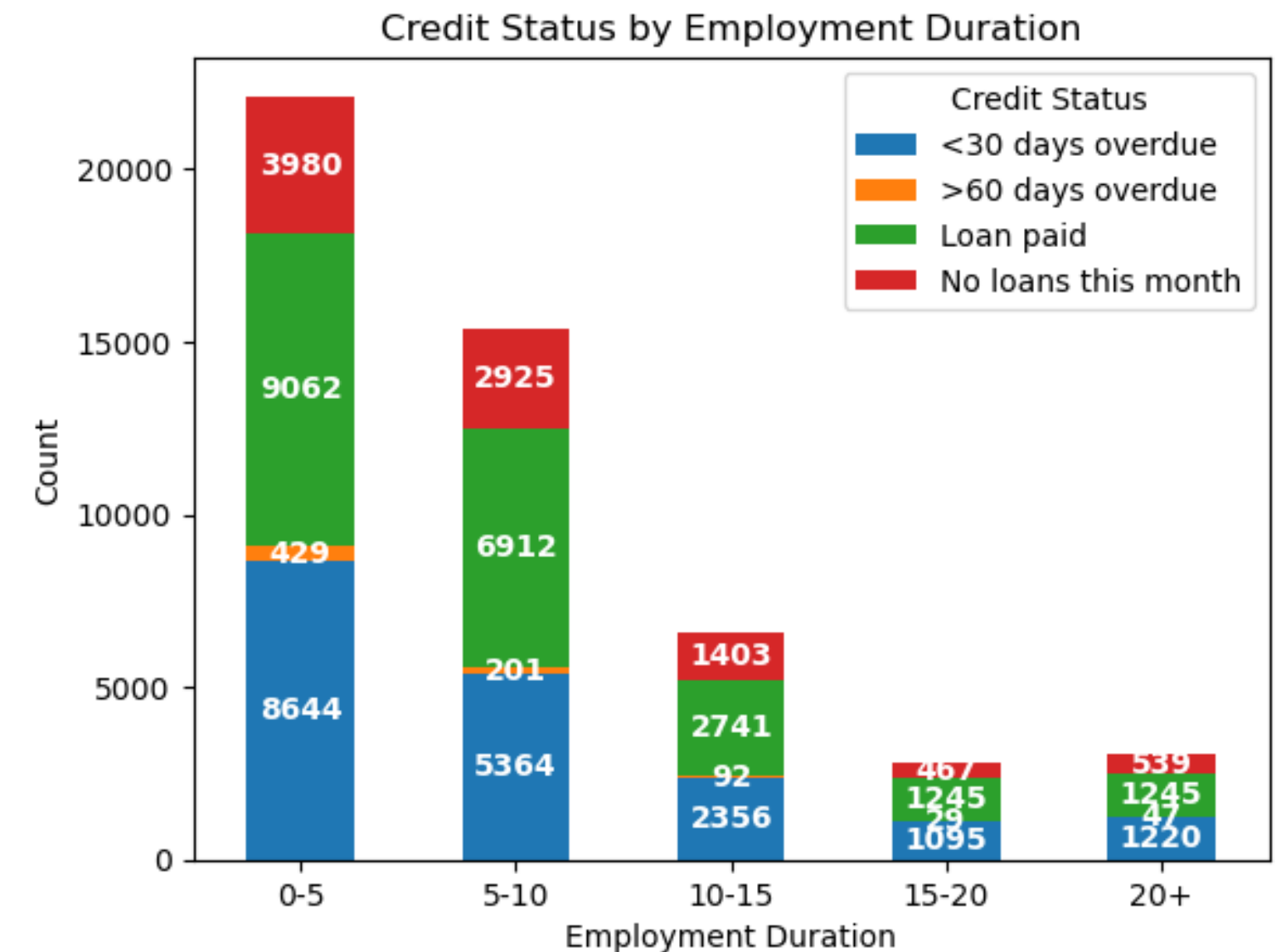
Employment

The dataset analysed between:
- People who are employed
- People who are not employed

Conducted chi-square test to the following hypothesis:

Null hypothesis: There is no relation between years employed and credit status

Alternative hypothesis: There is a relation between years employed and credit status

Result: Reject the Null Hypothesis (p-value <0.05)

Credit Status by Employment Duration

Does *having children* influence credit card payment?

Having children

The dataset analyzed between:
- People who have children
- People who do not have children

Conducted chi-square test to the following hypothesis:

Null hypothesis: There is no relation between credit status and having children

Alternative hypothesis: There is a relationship between credit status and having children

Result: Accept the Null Hypothesis (p-value >0.05)

Credit Status by Children
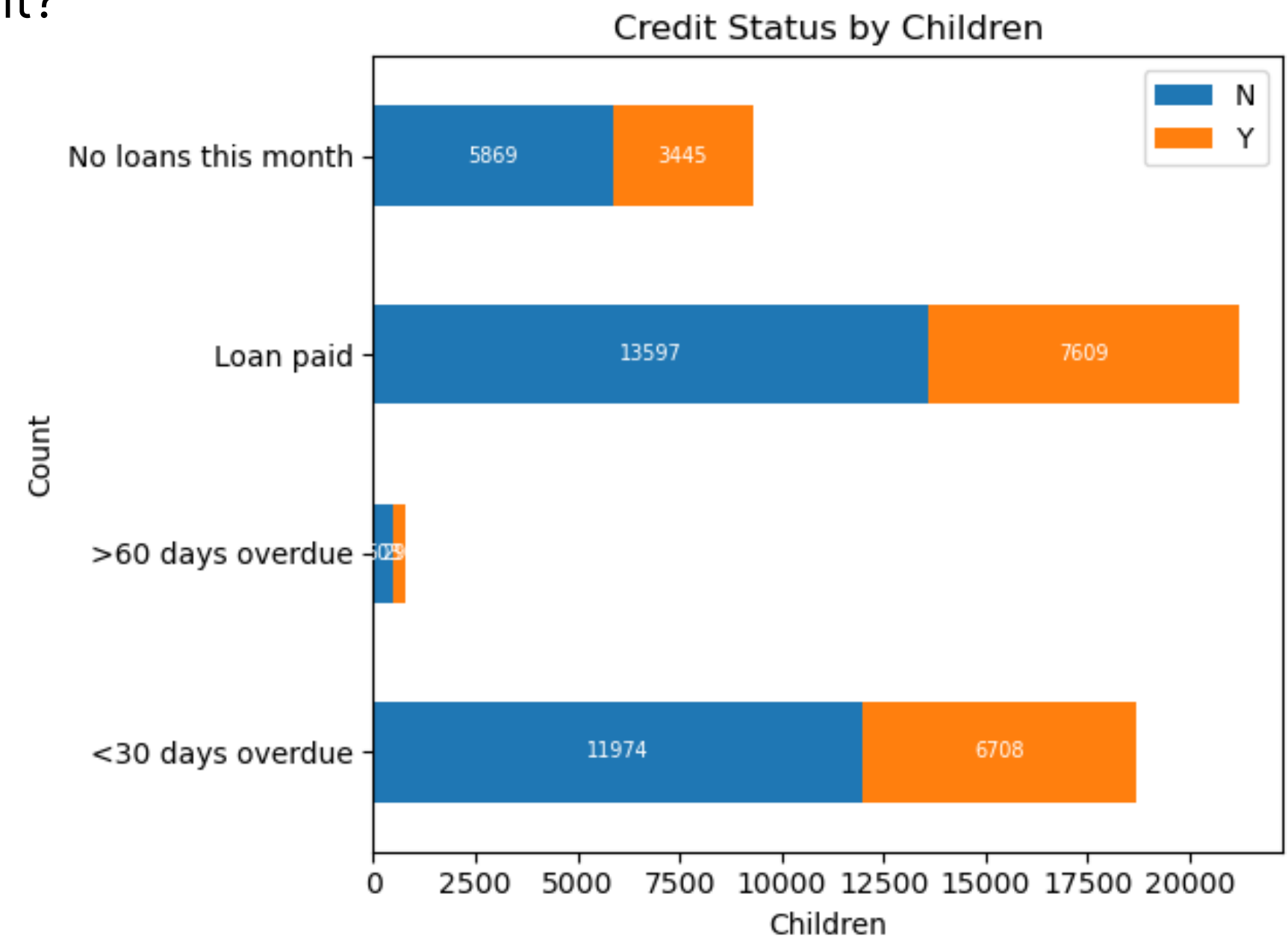
Does *annual income* influence credit card payment?
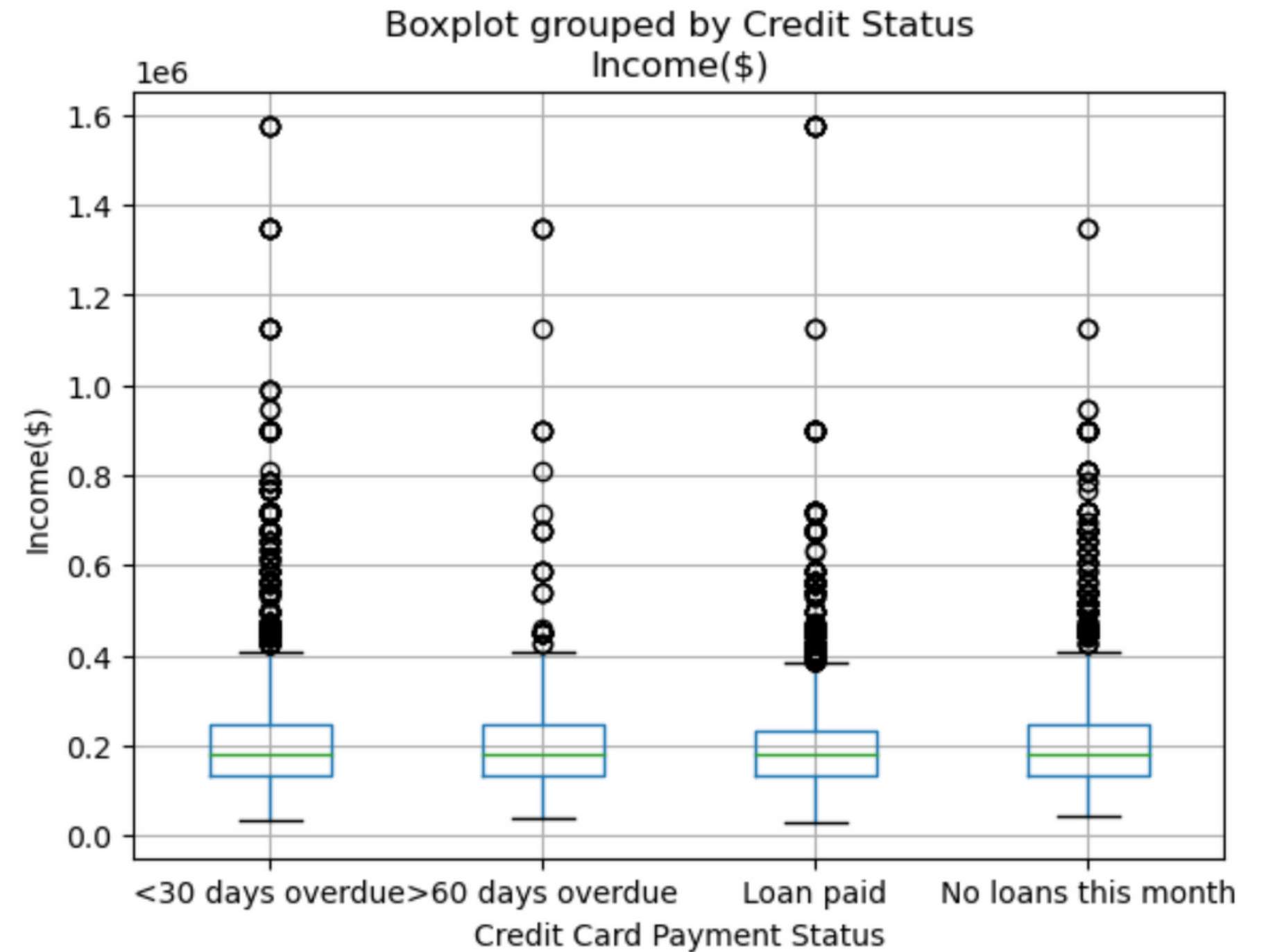
Annual Income

The dataset analysed among:
- various income levels
- credit card status

Conducted Chi-square test to test the following hypothesis:

Null hypothesis: There is no relation between income and credit card payment
Alternative hypothesis: There is a relation between income and credit card payment

Result: Reject the Null Hypothesis (p value is less than 0.05 for all income levels)

Boxplot grouped by Credit Status
Income($)

Does *job type* influence credit card payment?

Job type

The dataset analysed among:
- Core staff
- Drivers
- High skill tech staff
- Labourers
- Managers
- Medicine staff
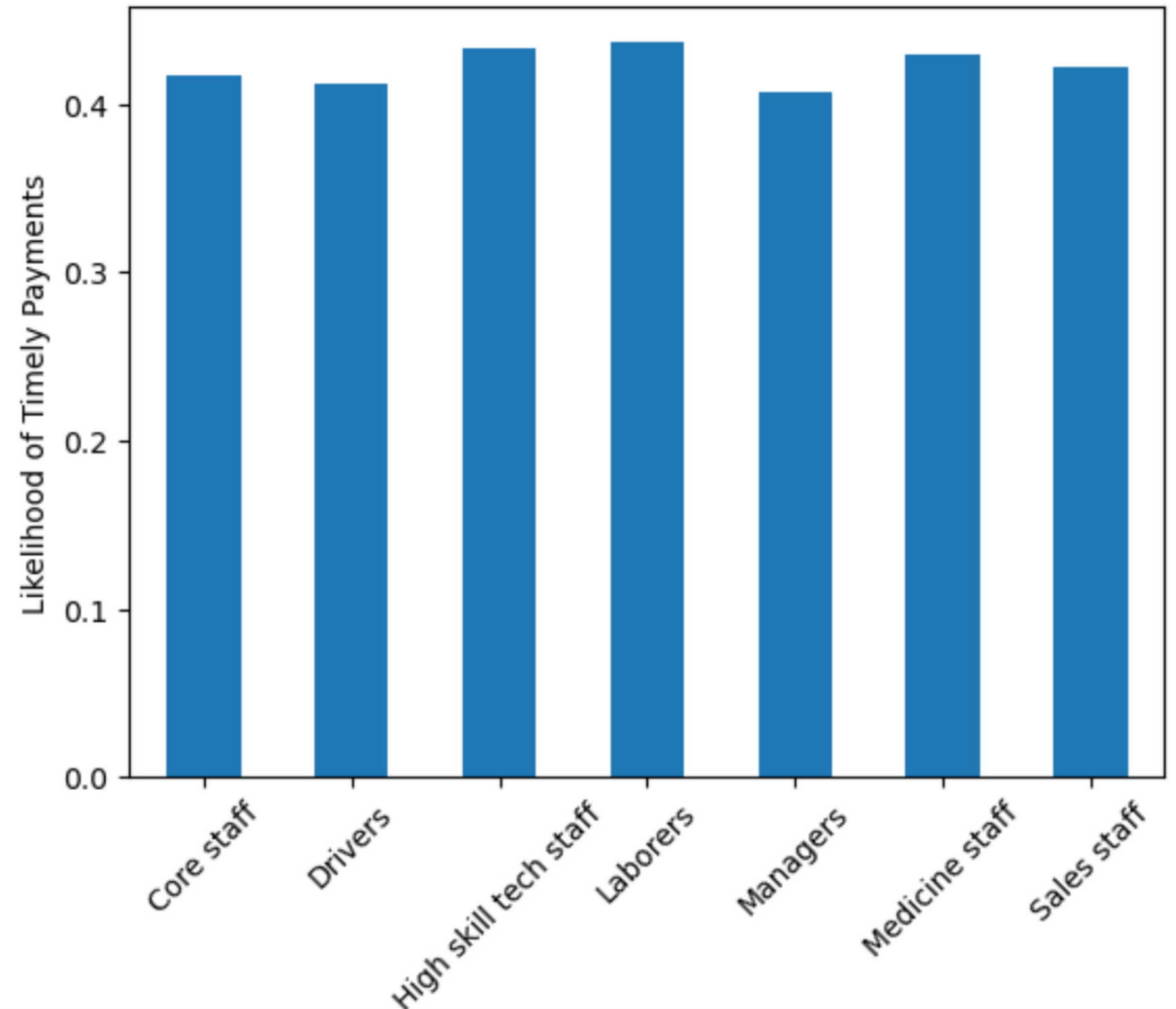- Sales staff

vs
- Loan paid

Conducted Chi-square test to test the following hypothesis:

Null hypothesis: There is no relation between job type and timely payments
Alternative hypothesis: There is a relation between job type and timely payment

Result: Reject the Null Hypothesis (p value is less than 0.05 for all job types)

Likelihood of Timely Credit Card Payments by Job Position

Does *job type and annual income* influence credit card payment?

Job type and income

The dataset analysed among:
- different job type
- income levels

Conducted Chi-square test to test the following hypothesis:

Null hypothesis: There is no relation between job type and annual income
Alternative hypothesis: there is a relation between job type and annual income

Result: Reject the Null Hypothesis (p value is less than 0.05 for all job type and income levels)

Boxplot grouped by Position
Relationship between Job Position and Income
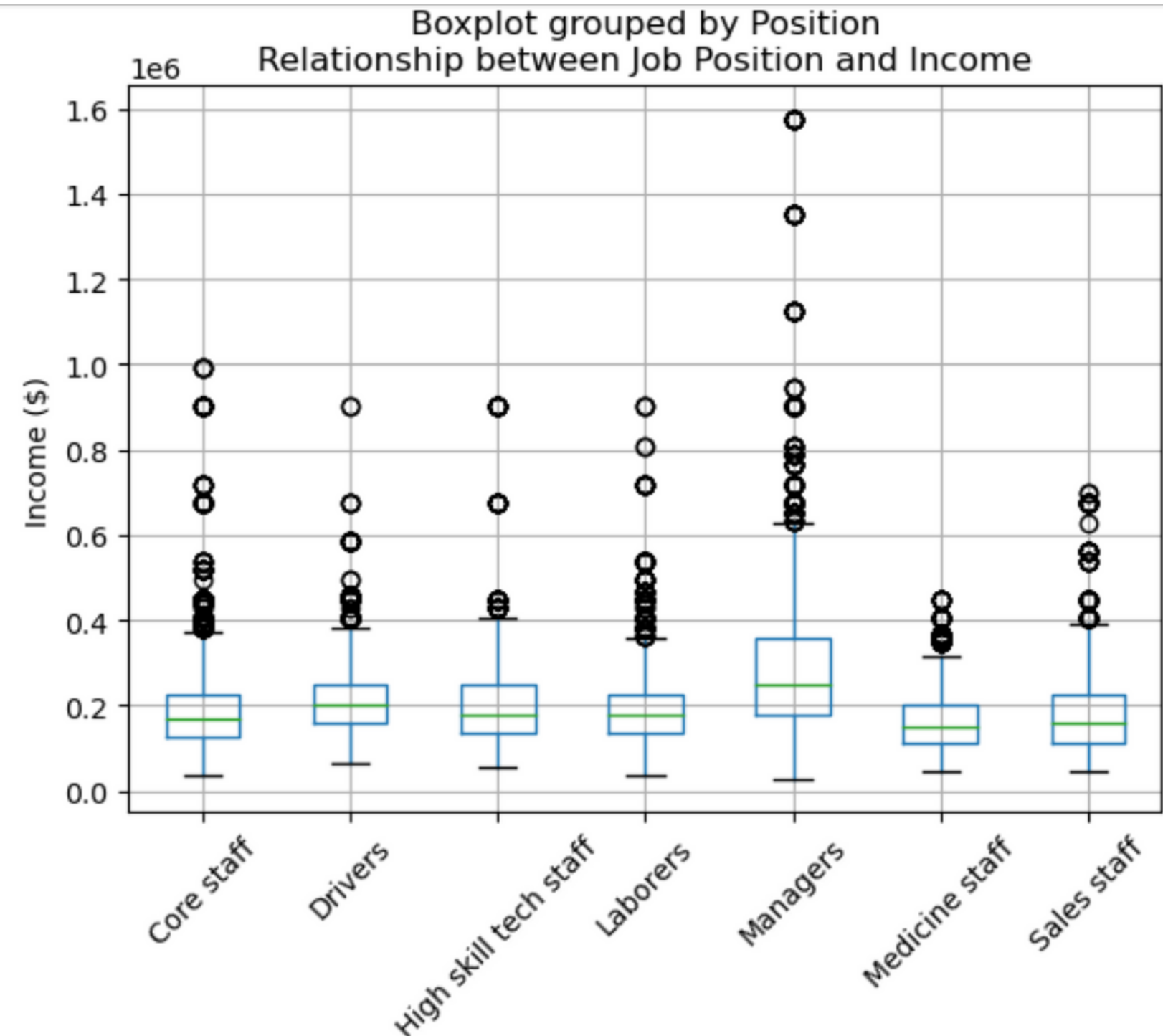
Conclusion

Age and Gender

There is a relationship between age and credit card payment status

There is a relationship between gender and credit card payment status

House and car ownership

There is no relation in Credit Status of homeowners and non-homeowners

There is no relation in Credit Status of car and non car owners

There is no relation in Credit Status of car and homeowners and non car and homeowners

Having children

There is no relationship between credit status and having children

Being employed

There is a relationship between years employed and credit status

Annual income and job type

There is a relationship between annual income and credit status.

There is a relationship between job type and loan paid.

There is a relationship between job types and income

The analysis of the predictors can assist companies that issue credit cards to see how certain attributes influence credit card payments