Fontys Hogescholen ICT

Project Proposal

Loan Prediction by Zhaklin Yanakieva

Zhaklin Yanakieva

Eindhoven, 08/03/2021

Project definition

Background

The recent significant increase in loans has generated interest in understanding the key factors predicting the non-performance of these loans.[1] The idea behind this ML project is to build a model that will classify how much loan the user can take, depending on certain data that will be required by the person, signing for a loan, such as name/education/marital status/number of dependents, employment, etc.

Project Goal

This project is going to be a prototype of a real loan predictor, which goal is to predict if a certain person is suitable for a loan.

Project Domain

The domain of this project is determined to be: *Prediction of a loan*

In order to explore this domain the following research questions were brought forward:

- What is required to receive a loan?
- What makes people have the desire/need to have a loan?

Also the following research methods were applied:

- Literature study
- Stakeholder analysis

---

[1] https://www.researchgate.net/publication/318816798_Project_Report_Student_Loan_Repayment_Prediction

Domain research

Literature study

What is required to receive a loan?[2]

Are You Aware of These Bank Loan Requirements?

1. Purpose of Loan
2. Business Experience
3. Business Plan
4. Credit History
5. Personal Information
6. Financial Statements
7. Collateral
8. Cash FlowHow to Qualify for a Personal Loan

[3]There are many steps to take to qualify for a personal loan, with the first being to make sure that it's right for you. For example, if you want to borrow money to remodel your house or buy a car, a home equity loan or an auto loan may come with a lower interest rate. Unlike unsecured personal loans based solely on your creditworthiness, these loans are secured by the home you want to fix up or the car you want to buy.

Although paying for a family vacation or consolidating debt fits into the personal loan category, you may also want to check into a 0% introductory APR credit card. If you go that route, however, be sure that you can pay off the balance before the 0% rate expires.

What makes people have the desire/need to have a loan?

[4]Personal loans are borrowed money that can be used for large purchases, debt consolidation, emergency expenses and much more. These loans are paid back in monthly

---

[2] https://www.forafinancial.com/blog/working-capital/8-bank-loan-requirements/
[3] https://www.investopedia.com/articles/personal-finance/010516/how-apply-personal-loan.asp
[4] https://www.bankrate.com/loans/personal-loans/top-reasons-to-apply-for-personal-loan/

installments over the course of typically two to six years, but it can take longer depending on your circumstances and how diligent you are with making payments.

Here are the top nine reasons to get a personal loan and when they make sense:

1. Debt consolidation.
2. Alternative to a payday loan.
3. Home remodeling.
4. Moving costs.
5. Emergency expenses.
6. Appliance purchases.
7. Vehicle financing.
8. Wedding expenses.
9. Vacation costs.

Stakeholders

Name	**Details**
Students	People who need a loan in order to finish their education and also are in need of a maintenance loan for a living.
Labour force	Working people who either need a loan for new purchases, or for living costs.
Self-employed	Working for oneself as a freelance or the owner of a business rather than for an employer.
Banks	Institutions which decide whether a person can be approved for a loan or not.

Why only these stakeholders?

Planning

In total: 6 weeks of learning and coding

First week:

Research the domain

Data requirements

Introduction to python

Second week:

Collect data

Understand data

Prepare data

Find a way to evaluate the model (test plan)

Third week:

Research on models

Choose a few models to experiment with

Decide which models to use

Fourth week:

Research frameworks

Decide which framework fits best

Fifth week:

First steps into coding – create a model

Define and train the model

Make several iterations and keep track of the performance

Sixth week:

Beta testing, feedback and improvement

Last fixes

Ethical considerations

In this part of the project, we are going to use the "The Rights Approach"[5] – a method which is focused on the individual's right to choose for herself or himself. It is a violation of human dignity to use people in ways they do not freely choose, so what should be taken into account is: the right of privacy and the right to what is agreed. In these cases, the Departed has the right to choose if certain information will be included into the making of the Grief bot and therefore, has a right what was demanded/desired to be met.

Ethical dilemmas:[6]

- **Is the development of "loan predictor" ethical?**

  I consider the development of this project to be ethical because it benefits people without harming anyone. Also different levels of consent required from the people assigning for a loan can be enforced.
- **What are the actions the involved stakeholders are carrying out to address the ethical concerns?**

  I assume that part of the stakeholders - students, labour force, self-employed, will not have to take the ethical concerns into account, however, the institutions that approve them for a loan will be responsible for this.
- **What consent will be processed?**

  The data that will be required so as the predictor to be manufactured will be based on the name, loan data, age, etc. In this case, the data will be processed in a way to create a result if the person is suitable or not for a loan.
- **Is there a violation of moral rights involved in the development of the "loan predictor"?**

[5] https://www.scu.edu/ethics/ethics-resources/ethical-decision-making/thinking-ethically/
[6] https://www.nature.com/articles/s41599-020-0501-9

As soon as the privacy of the client is met, which means that only the person that is applying for a loan and the bank that gives it have the right to see the data, there is no violation.

Impact assessment

NAME: Loan Predictor

DATE: March 8, 2021 12:46 AM

DESCRIPTION OF TECHNOLOGY

The recent significant increase in loans has generated interest in understanding the key factors predicting the non-performance of these loans. The idea behind this ML project is to build a model that will classify how much loan the user can take, depending on certain data that will be required by the person, signing for a loan, such as name/education/marital status/number of dependents, employment, etc.

IMPACT ON SOCIETY

In their lives, at least once, people had the opportunity to have a loan. The prediction project will help lenders (banks) and people who want a loan, know if they are suitable for a loan. It will have a more beneficial than harmful effect to society. There can be some stigmatising effects for people who are in need for a loan, but do not cover the requirements.

HATEFUL AND CRIMINAL ACTORS

The data that will be processed is going to be available only to the institutions that give out the loans, so in the case of creating this project, no one’s privacy will be hurt.

PRIVACY

The technology should take the name/education/marital status/number of dependents, employment. Taking into account these labels, accurate calculations will be made to determine the loan status of a person.

HUMAN VALUES

The technology is rather beneficial to the users than harmful. It does happen to appear certain drawbacks for people who are unemployed or self-employed because it is usually more difficult to determine their loan status according to the data they apply. However, it is not impossible for them to be approved for a loan, so the project will be as beneficial for them as it is for the other people (students, labour force).

STAKEHOLDERS

- Students
- Labour force
- Self-employed
- Banks

DATA

Dependending on the available data, the research will be made, but there are always limits. This is clear to me, so the technology will be made with the awareness of these limitations and the users will be notified about them before beginning their experience with the application.

INCLUSIVITY

Due to political issues or historical issues, the banks are biased and therefore, there is some bias in the built-in of the Loan predictor.

Exploratory Data Analysis

You can find the exploratory data for test analysis here.

Conclusion

The emergence of this technology has risks and ethical concerns if it is managed properly it will lead to better quality of life for human society. Be that as it may, in the event that we hit the nail on the head, we will release the full advantage of AI for mankind. The proposal demonstrates that we ought to not really believe a machine learning algorithm. It is obviously not moral to utilize a machine to make decisions when we don't confide in it for using good ones.

Taking into account the data set, a couple of models were used in order to calculate the accuracy in the most efficient way. From the research, it could be concluded that the prototype of the project is feasible.

Bibliography

Forafinancial, 26th July 2019,

https://www.forafinancial.com/blog/working-capital/8-bank-loan-requirements/.

Investopedia, 22nd January,

https://www.investopedia.com/articles/personal-finance/010516/how-apply-personal-loan.asp.

Bankrate, 11th January 2021,

https://www.bankrate.com/loans/personal-loans/top-reasons-to-apply-for-personal-loan/.

Research gate, July 2017, https://www.researchgate.net/publication/318816798_Project_Report_Student_Loan_Repayment_Prediction.

Edu, August 2015, https://www.scu.edu/ethics/ethics-resources/ethical-decision-making/thinking-ethically/. Accessed March 2021.

Nature, 17th June 2017, https://www.nature.com/articles/s41599-020-0501-9. Accessed March 2021.

[Notes:
https://rstudio-pubs-static.s3.amazonaws.com/346171_9878e90ce337422aab6788680424f486.html
NB!https://medium.com/@rahulshuklawork/prediction-of-loan-approval-with-machine-learning-539cbd2aad31

NB!https://github.com/arbasith/ProjectCapstone/blob/master/capstonev2%20-%20Part%201(Classification).ipynb]