National College of Ireland

Configuration Manual

MSc Research Project
Data Analytics

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MSc Project Submission Sheet

School of Computing

Student Name: Pranavi Pusapati

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Programme: Data Analytics **Year:** 2021

Module: Configuration Manual

Supervisor: Jorge Basilio

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Project Title: Loan Under writing prediction using Deep learning techniques

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Configuration Manual

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1. Introduction

The following configuration manual illustrates the requirements for implementing the system which was designed for predicting the loan under writing by using the Deep Learning models and dropout function. Further, the manual will thoroughly explain the software and hardware requirements that were used for the successful implementation of the project.

2. System Configuration

Following are the hardware and software configuration which were used for the implementation of this Project.
The hardware configurations used for implementation are as follows:

2.1. Hardware Requirement

Table 1: Hardware Requirements

Hardware	Configurations
System	Lenovo Z580 Idea pad
Operating System	Windows 10 (64 Bits) Pro
RAM	4 GB
Hard Disk	1 TB
Graphics Card	NVIDIA RTX 2060 (6 GB)
Processor	Intel Core i5-3230M

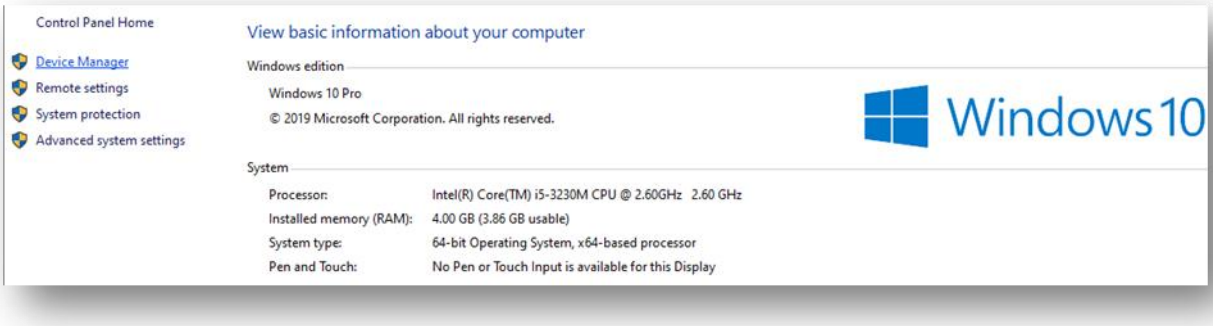


Figure 1: Operating System Configurations

2.2. Software Requirement

Table 2: Software Requirements

Software	Version
Python	3.8 (64 Bits)
Google Colab Community	2021.2 (64 Bits)

Figure 2: Google Collaboratory with Python

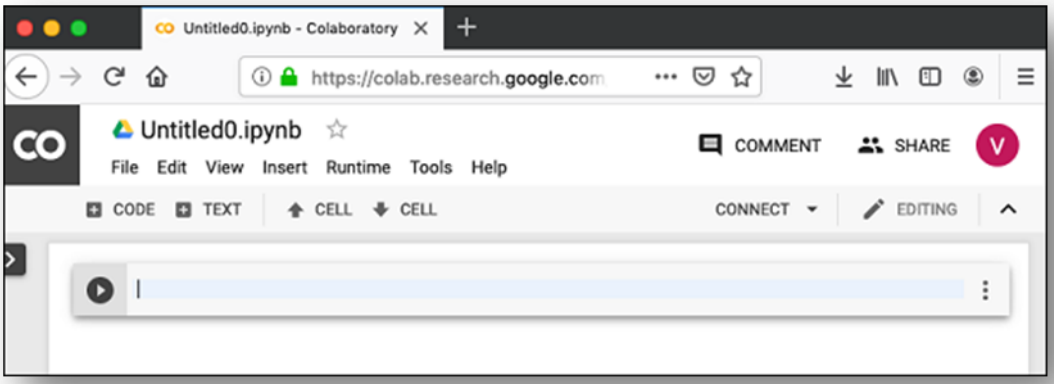


Figure 3: Python code files in Google Colab

3. Project Implementation

3.1. Data Collection

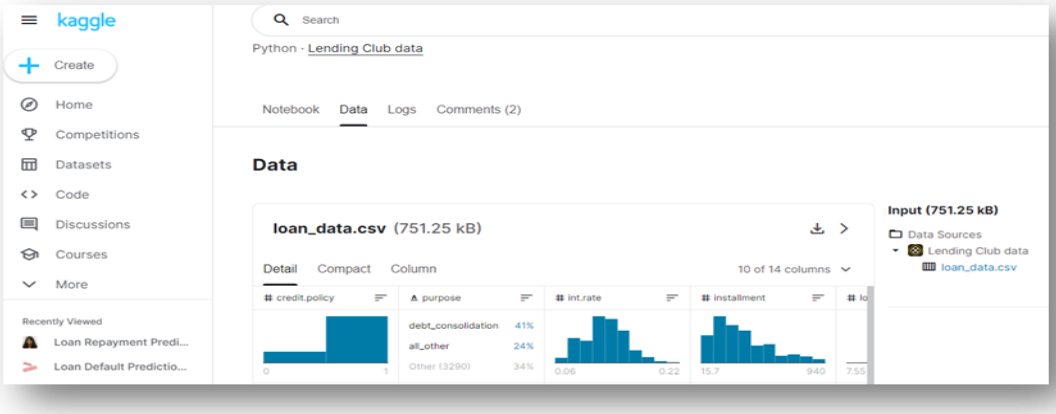


Figure 4: Data Collection from the source

```
<class 'pandas.core.frame.DataFrame'>
RangeIndex: 9578 entries, 0 to 9577
Data columns (total 14 columns):
 #   Column             Non-Null Count  Dtype
---  ------             --------------  -----
 0   credit.policy      9578 non-null   int64
 1   purpose            9578 non-null   object
 2   int.rate           9578 non-null   float64
 3   installment        9578 non-null   float64
 4   log.annual.inc     9578 non-null   float64
 5   dti                9578 non-null   float64
 6   fico               9578 non-null   int64
 7   days.with.cr.line  9578 non-null   float64
 8   revol.bal          9578 non-null   int64
 9   revol.util         9578 non-null   float64
 10  inq.last.6mths     9578 non-null   int64
 11  delinq.2yrs        9578 non-null   int64
 12  pub.rec            9578 non-null   int64
 13  not.fully.paid     9578 non-null   int64
dtypes: float64(6), int64(7), object(1)
memory usage: 1.0+ MB
```

Figure 5: Data description analysis

3.2. Data Description

credit_policy: 1 if the customer meets the credit underwriting criteria and 0 otherwise.
purpose: The purpose of the loan such as: credit_card, debt_consolidation, etc.
int_rate: The interest rate of the loan (proportion).
installment: The monthly installments ($) owed by the borrower if the loan is funded.
log_annual_inc: The natural log of the annual income of the borrower.
dti: The debt-to-income ratio of the borrower.
fico: The FICO credit score of the borrower.
days_with_cr_line: The number of days the borrower has had a credit line.
revol_bal: The borrower's revolving balance.
revol_util: The borrower's revolving line utilization rate.
inq_last_6mths: The borrower's number of inquiries by creditors in the last 6 months.
delinq_2yrs: The number of times the borrower had been 30+ days past due on a payment in the past 2 years.
pub_rec: The borrower's number of derogatory public records.

not_fully_paid: indicates whether the loan was not paid back in full (the borrower either defaulted or the borrower was deemed unlikely to pay it back).

3.3. Data Pre-processing

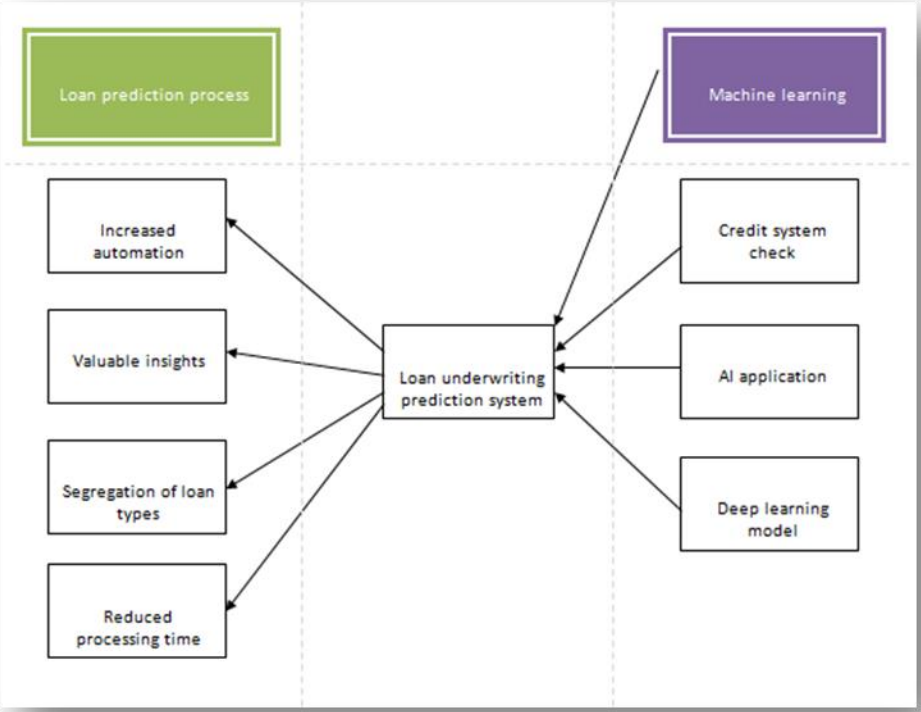


Figure 6: Conceptual framework

S.R.	Feature selection based on customer behavior	Description of features
1	loan_policy	1 If the customer meets the loan underwriting criteria, and 0 otherwise
2	type_of_purpose	This refers to the purpose of the loan
3	int_rate	The interest rate of the loan
4	days_	The no. of days to loan sanctioned
5	inq_	The loan holder inquiries
6	no_of_installment	The monthly installments owed by loan holder if the loan is sanctioned
7	loan_fully_paid_or_not	This indicates whether the loan was fully paid *r* or not

Figure 7: Feature selection and description

4. Model Building

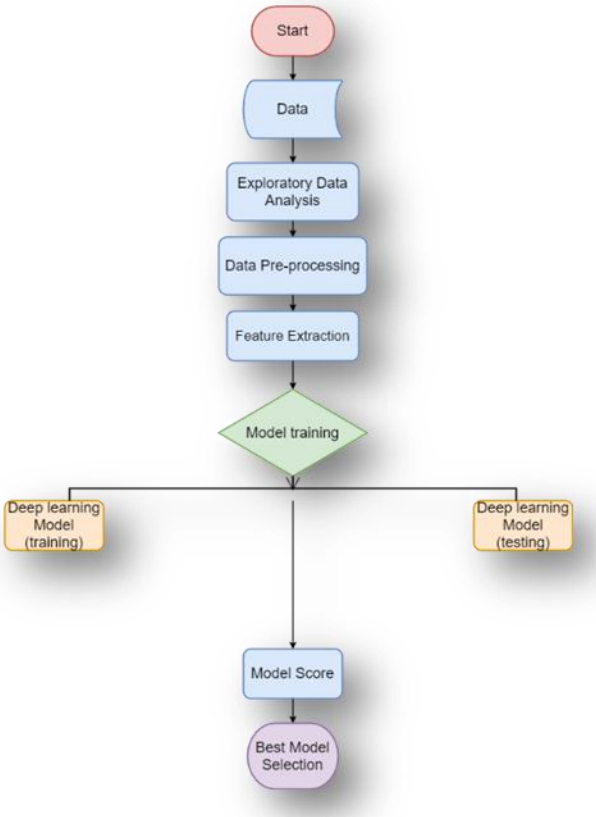
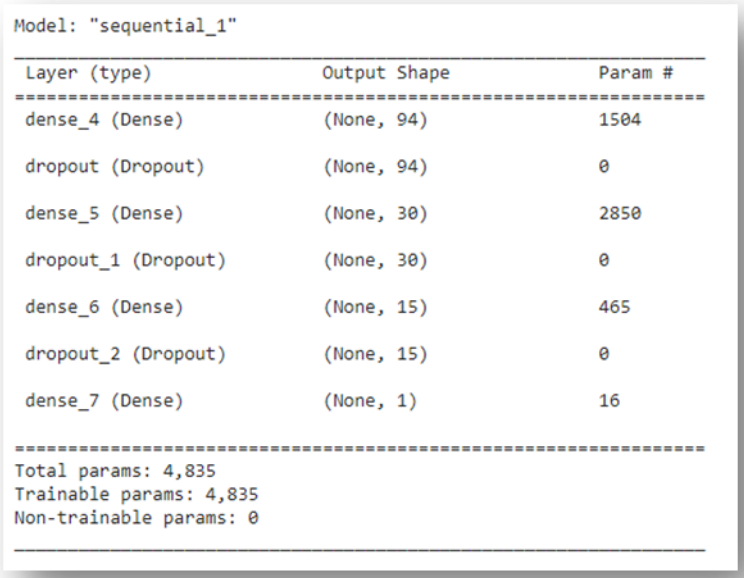


Figure 8: Methodology Diagram

```
Model: "sequential"
_________________________________________________________________
 Layer (type)                Output Shape              Param #
=================================================================
 dense (Dense)               (None, 94)                1504

 dense_1 (Dense)             (None, 30)                2850

 dense_2 (Dense)             (None, 15)                465

 dense_3 (Dense)             (None, 1)                 16

=================================================================
Total params: 4,835
Trainable params: 4,835
Non-trainable params: 0
_________________________________________________________________
```

Figure 9: Model summary for deep learning model without dropout function



```
Model: "sequential_1"
_________________________________________________________________
 Layer (type)                Output Shape              Param #
=================================================================
 dense_4 (Dense)             (None, 94)                1504

 dropout (Dropout)           (None, 94)                0

 dense_5 (Dense)             (None, 30)                2850

 dropout_1 (Dropout)         (None, 30)                0

 dense_6 (Dense)             (None, 15)                465

 dropout_2 (Dropout)         (None, 15)                0

 dense_7 (Dense)             (None, 1)                 16

=================================================================
Total params: 4,835
Trainable params: 4,835
Non-trainable params: 0
_________________________________________________________________
```

Figure 10: Model summary for deep learning model with dropout function

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