****

**Project Plan in Bank of Queensland Credit Risk Modelling**

**Name: Vinnie Ng n9648411**

**Dominic Chow n9621351**

**Jing Heng Lim n9776435**

**Joseph Grech** **n9734902**

**Introduction**

Over the past decade, the increase in available data has lead to a substantial rise in the allocation of resources available to developing internal models to quantify the financial risk of personal lending. To this extent it is important to evaluate the accuracy of the model. One such way to do this is to consider the probability of default, which provides an estimate of the likelihood that a borrower will be unable to meet its debt obligations.

This project provides a necessary model in order to comply with strict rules and regulations regarding risk for the Bank of Queensland. Additionally, by building this model, we can reduce the financial risk of the company and by extension increase potential earnings.

It is expected that at the conclusion of this project, a working generalized linear model (GLM) which models the probability of default will be implemented, which scores better than the current model, evaluated across different metrics. This will be presented in the form of a report which outlines current cutting-edge practices for default modelling, details all procedures used, and draws conclusions based on the outcomes of the model.

**Objectives**

The aim of this project is to optimize a loan default credit risk model that provides accurate predictability and decision making for any possible loan default scenario. To do this, a model will be built based on the historical lending data from a bank. Secondly, the aim of building a model that is better than the BoQ’s current model has been set. To prove this, validation of the model will be made by testing the precision and accuracy of the model. The model will then be compared with BoQ’s model.

As part of this process to build the model, research on different approaches that had been previously used by the bank on their credit risk model will be carried out to gain a better insight into the factors surrounding credit risk modelling. Several credit risk modeling methods will be implemented in the model based on our literature resources. Some extensions of the model will be made based on team’s knowledge on credit risk. To justify the model, a comparison between the new credit risk model with the BoQs credit risk model will be carried out. As a result, it is expected some improvement and testing on the new model.

**Assumptions, Exclusions & Constraints**

Certain assumptions have been assessed prior to the project:

* Past data is an indicator of future default status
* The given data is accurate
* All members will follow the project plan timelines, unless otherwise required
* Team members will always have access to file-sharing and source control tools
* All members will provide communication about project status
* Overall market risk will stay constant over time
* The objectives of the project will not shift
* BoQ representatives will be available for clarification

There are a few constraints on the project:

* All deliverables must be submitted on their respective due dates
* Project members have limited time
* Project team must implement a Generalised Linear Model (GLM)
* Project team only have the available data to use for modelling
* Limited resources on bank’s credit risk modelling.

Exclusions

* Data collection
* Live modelling of current customers default chance

**Work Breakdown, Milestones and Schedule**

Gantt Chart has been created using Microsoft Project to present the work breakdown of each product, along with the Milestone. All the work has been scheduled according to the time the group has and distributed evenly. Project has been scheduled with the application of waterfall model. By utilizing waterfall model, project has been divided into different phases according to the product. Each phase consists of a series of tasks. As there is limited time for the project, waterfall model is the most suitable methodology because the deadline can be set at the beginning of the project. Moreover, waterfall model is suitable for a small project like this too. Besides, waterfall model is easy to manage as each phase specific deliverables and review process.

**Deliverables & Product Description**

Alongside this project plan, the main deliverables will consist of a presentation, a technical report, an executive summary, a project plan review, and a zip file containing RMarkdown code files and other supplementary information to the project.

|  |  |  |  |
| --- | --- | --- | --- |
| Deliverables | Content | Purpose | Method of Review |
| Presentation | * Overview of traditional versus modern credit risk models * Methodology used to adopt proposed credit risk model * Notable variables and interactions * Justifications | To provide verbal/visual understanding of the problem, methodology used to undertake problem, and key findings | Feedback from board of directors and client (BoQ) |
| Technical Report | * Introduction * Literature Review * Data Analysis * Methodology * Results and Discussion * Conclusion * References/Appendix | To provide elaboration on process of project and for thorough understanding alongside steps taken to arrive at conclusive findings | Feedback from board of directors |
| Executive Summary | * Summarised content from technical report | To provide a brief piece from technical report for executive reference | Feedback from board of directors |
| Project Plan Review | * Reflection of timeline * Milestones achieved * Contributions * Changes * Future improvements | To ensure goals were met succinctly, measure effectiveness of project timeline and assigned duties, and identify key hurdles | Feedback from board of directors |
| ZIP File | * RMarkdown files * Diagrams * Etc. | To ensure project and code is reproducible as well as to help further understanding of report | N/A |

**Acceptance Testing**

All the product will be reviewed at the end of each product cycle. The review of each product will be carried out according to the criteria given by the stakeholders. Besides, the acceptance test will be carried out to make sure the project is reaching the project objectives. Assumptions and constraints that have been mentioned will be taken into account when the test being carried out. On the other hand, various methodologies will be carried out to verify and validate the final model after the model selection. An accuracy of 85% has been set as the lowest limit of the model prediction to ensure the final product fits the client’s purpose.

*Project Plan*

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Test case description | Expected result | Actual result | Test date | Test pass/fail |
| State the Research Objectives and requirement | Project Objectives should be set based on the client’s requirement and being expressed in SMART terms. |  |  |  |
| Construct Project Milestones | Project Milestone should represent all the completion of each product in the project. |  |  |  |
| Construct Deliverables | Deliverables should represent all the product of this project. |  |  |  |
| Construct Work Tasks | Work Tasks should be generated according to the activities that needs to be done to produce the deliverables |  |  |  |
| Construct Scheduling | Work task should be scheduled in a logical order according to the timeline the team has for the project. Besides, task should be scheduled according to priorities. |  |  |  |
| Construct Critical Path | Critical Path needs to be generated from the schedule according to the priorities of the tasks |  |  |  |
| Construct Constraints | Constraints should include all the assumptions and factors that will limit what the project can achieve. |  |  |  |

*Data Analysis and Model Selection*

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Test case description | Expected result | Actual result | Test date | Test pass/fail |
| Understand and Clean data | Problem/Requirements should be properly break down. Data should be cleaned and modify to help further exploration. |  |  |  |
| Explore and Analyse | Plots and Summaries should be generated to further analyse and explore the data in order to obtain the solution. |  |  |  |
| Select Variable | Variables should be selected by using any of the existing methodologies with justification. |  |  |  |
| Fit GLM | The selected variables should be fit in a few models with appropriate linked function and distribution. |  |  |  |
| Select Model | Fitted Models should be compared by using any of the existing methodologies. |  |  |  |
| Validate Model | Selected model should be validated by obtaining the prediction from the selected model to determine the accuracy. |  |  |  |
| Evaluate Results | Result from the validation should be evaluated according to statistic’s knowledge. Justification needs to be made to support the result. |  |  |  |
| Draw Conclusion | Conclusion needs to be drawn according to the evaluated results. |  |  |  |

*Presentation*

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Test case description | Expected result | Actual result | Test date | Test pass/fail |
| Construct Presentation Slides | Presentation Slide need to be constructed according to the elements that need to be presented to the clients. |  |  |  |

*Technical Report*

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Test case description | Expected result | Actual result | Test date | Test pass/fail |
| Construct Introduction | Introduction should be constructed so that it describes the problem and the context of the client’s requirement. |  |  |  |
| Construct Literature Review | Literature review should be constructed by describing the existing model and the pros and cons of the existing model. |  |  |  |
| Construct Data Analysis | Data Analysis should include summaries of the data exploration. |  |  |  |
| Construct Method | Methods should be explaining the modelling method that has been utilised in the project. Besides, methods should include the method for variable selection, GLM as well as validation. |  |  |  |
| Construct Results | Result should be explaining the model coefficients, assumptions and validation under uncertainty. |  |  |  |
| Construct Model Interpretation | Model Interpretation should be constructed to answer the questions and the requirements given by the clients. |  |  |  |
| Construct References | References needs to include all the cited material. |  |  |  |

*Executive Summary*

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Test case description | Expected result | Actual result | Test date | Test pass/fail |
| Summarise problem and context | A concise version of the problem and context from the technical report. |  |  |  |
| Summarise collected data | A concise summary of the data that has been collected. |  |  |  |
| Summarise reviews literature | A concise summary of the professional has done in the past for any similar project. |  |  |  |
| Justify the chosen method | Evidence that support the chosen model and methods that have been utilized throughout the project. |  |  |  |
| Summarise result | Concise summary of the final result. |  |  |  |
| State uncertainty | Any uncertainty or assumption in the project. |  |  |  |
| Summarise validity and fit of the model | Concise summary of how well the model does. |  |  |  |
| Justify recommendation | Evidence that supports the recommendation given to the client. |  |  |  |

Project Plan Review

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Test case description | Expected result | Actual result | Test date | Test pass/fail |
| Construct Project Management Summary | Concise summary of the overall project management |  |  |  |
| Construct Team Reflection | Reflect and summarise the overall working experience with each member of the team. |  |  |  |