Effective Research Proposal Writing

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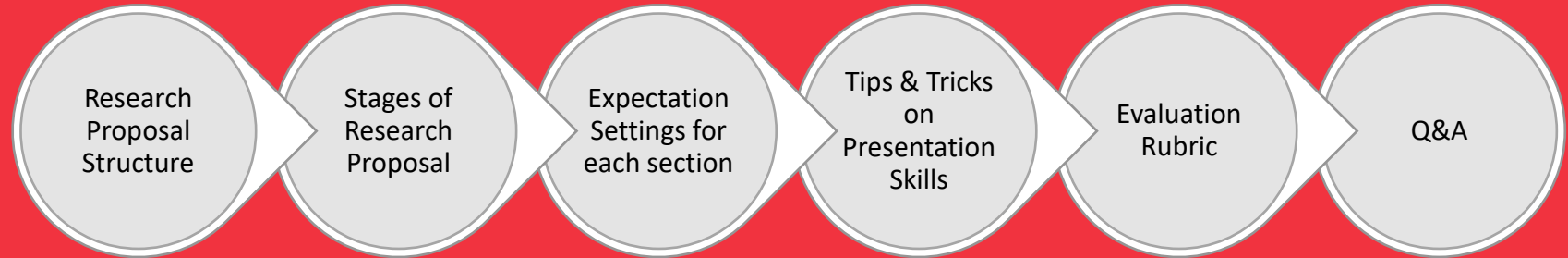1

Agenda

Research Proposal Structure

Stages of Research Proposal

Expectation Settings for each section

Tips & Tricks on Presentation Skills

Evaluation Rubric

Q&A

Research Proposal Structure

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Introduction

Related Works

Stages for Research Proposal

Read Papers

Work on defining your significance of the study

Write your Introduction/ Background

Identify Research Gaps/Problems that exist

Define your scope of work

Write your Abstract

Define what you are going to do

Gauge Resources Required

Include your Research Plan

Define your objectives

Define your research Methodology

Checklist
•Revisit & Refine
•Improve Technical Writing
•Take care of Formatting
•Take care of References

In which order you write your proposal?

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Note: Slide is taken from live session on Research Proposal Structure, upGrad by Dr. Manoj Jayabalan

Problem Statement/ Related Work

Explore published thesis, scientific papers.(peer reviewed)

Avoid blogs and newspaper articles in systematic literature reviews

Look for Survey paper, if there is none. You have a good chance of publishing the same based on SLR. You can check out related survey papers instead.

Try to build a story line, talk about research gaps and challenges

Explore flowcharts and figures

Explain yourself: do not write something you are not confident about

Do not include generic details

You can screen papers by their abstract and if that entice you read introduction, conclusion/future recommendation as well

S. No	Year	Title	Author(s)	Dataset	Problem(s)	Purpose	Preprocessing	Algorithms	Evaluation	Summary	Remarks
											Include future recommendations

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What
you
want
to do?

Research Question

What
are
you
doing?

Aim

How
are
you
doing
it?

Objectives

How to set your objectives

Specific objectives are expected to be around three listed in order of importance

Objective is not methodology! For achieving your objectives you may use one or more methods

Your methodology is based on your objective. Thus be careful while choosing them!

clear: it provides enough specifics that one's audience can easily understand its purpose without needing additional explanation.

focused: it is narrow enough that it can be answered thoroughly in the space the writing task allows.

concise: it is expressed in the fewest possible words.

complex: it is not answerable with a simple "yes" or "no," but rather requires synthesis and analysis of ideas and sources prior to composition of an answer.

arguable: its potential answers are open to debate rather than accepted facts.

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Aim & Objectives - Sample

Aim and Objectives

Clear aim

The main aim of this research is to propose a model to predict the occurrence of breast cancer based on their risk factors. The identification of the breast cancer incidence using the well-studied risk factors allows for a quick and cost-effective diagnosis and the recurrence of this disease can also be predicted based on the disease model generated.

Primary goal

The research objectives are formulated based on the aim of this study, which are as follows:

Analyzing → • To analyze the pattern and relationship between the risk factors of breast cancer via visualization to improve the comprehensibility of diagnosis for clinicians and patients.

Pre-processing → • To suggest a suitable balancing technique that can be applied on the imbalanced dataset.

Models → • To compare between the predictive models to identify the most accurate model to classify breast cancer occurrence based on its risk factors.

Model evaluation → • To evaluate the performance of the classifiers based on the balancing techniques.

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Aim & Objectives - Sample

Aim and Objectives

Clear aim — The main aim of this research is to develop a personalised blood glucose prediction model using only non-CGM data. The goal of this research is to contribute to the vast majority of diabetic patients that do not use CGM for self-monitoring of blood glucose levels. — Primary goal

The research objectives are formulated based on the aim of this study, which are as follows:

LR ⟶ • To investigate the performance of existing blood glucose prediction models developed using non-CGM data

Model ⟶ • To develop a personalised prediction model using only non-CGM data

Model evaluation ⟶ • To evaluate the performance of the proposed blood glucose prediction model

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Aim & Objectives - Sample

Research Aim and Objectives

Clear aim ⎧ The aim of this research is to propose an approach to enhance the projecting capability of the Lee-Carter model and fit the model to the Mauritian mortality data from 1984 to 2018[1]. The goal of this study is to forecast the mortality rate of Mauritius and provide solutions to insurance companies and pension providers to alleviate the effects of ageing population. ⎭ Primary goal

The objectives of the research are outlined as follows.

LR ⟶ • To investigate state-of-the-art approaches to the Lee-Carter model used in modelling and forecasting mortality rate.

Pre-processing ⟶ • To determine the optimum technique to estimate the parameters of the Lee-Carter model.

Models ⟶ • To propose a deep-learning model to forecast the mortality index parameter.

Model evaluation ⟶ • To evaluate the performance of the Lee-Carter model.

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Research Methodology

You need to address "HOW?"

Describe how will you address different objectives

Be consistent with the order of importance

For each objective there should be a method

For each method, cite the proper reference.

You can include following:

- Workflow
- Dataset Description
- Data Preprocessing
- Transformation/Augmentation
- Modelling Techniques
- Evaluation Metrics

Hardware Requirements

Software Requirements

Significance of the study

- Reflect importance of your work
- Expected outcome
- National & International Implications

Scope of the study

- In scope
- Out of Scope
- Reason for defining the scope

Introduction/Background

Theme of your research in brief

Set the context of the problem and hypothesis

Should develop into motivation/purpose of the study

Introduction is not a literature review but its a glimpse of the total information

Last but not least present your general objective

Abstract

Research Proposal

- Introduction
- Objectives
- Methodology
- Perspective

Read abstract from scientific abstracts(observe journal rules)

Do not use reference/citations or any graphic element in abstract

Word limit 250-300 words

Be short, Concise and deep

Gantt Chart

Risk & Contingency Plans (If any)

Presentation & Formatting Guidelines

Table caption should be above the table

Figure caption should be below the figure

Do not start a section with figure or table

Subsection should not follow Section immediately

Justify your text

Follow RP Formatting Guide

Read and Read more scientific articles

Improve Vocabulary

Literature experience

Make records

Make notes

Writing with clarity

Avoid slangs and popular idiomatic expression

Use consistence tense

Be simple

Avoid too long sentence

Avoid very long paragraphs

Refer: Writing for computer Science by Justin Zobel

Evaluation Rubric

S.No	Criteria	Weightage
1.	Aim & Objectives	10
2.	Background/Introduction	10
3.	Problem Statement/Related Work	15
4.	Methodology	30
5.	Expected outcomes (Significance and Scope)	5
6.	Required resources	5
7.	Plan of work	10
8.	References	5
9.	Presentation and quality of report	10

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Thank You !