

THIS IS THE TITLE OF YOUR SPECIAL PROBLEM

A Special Problem
Presented to
the Faculty of the Division of Physical Sciences and Mathematics
College of Arts and Sciences
University of the Philippines Visayas
Miag-ao, Iloilo

In Partial Fulfillment
of the Requirements for the Degree of
Bachelor of Science in Computer Science by

LASTNAMEA, FirstName1
LASTNAMEB, FirstName2
LASTNAMEZ, FirstName3

Firstname LASTNAME
Adviser

December 24, 2022

Abstract

From 150 to 200 words of short, direct and complete sentences, the abstract should be informative enough to serve as a substitute for reading the entire SP document itself. It states the rationale and the objectives of the research. In the final Special Problem document (i.e., the document you'll submit for your final defense), the abstract should also contain a description of your research results, findings, and contribution(s).

Suggested keywords based on ACM Computing Classification system can be found at https://dl.acm.org/ccs/ccs_flat.cfm

Keywords: Keyword 1, keyword 2, keyword 3, keyword 4, etc.

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Chapter 1

Introduction

1.1 Overview of the Current State of Technology

The ability to read is a fundamental skill that is necessary for success in many areas of life. Unfortunately, there are many adults in the Philippines who have never learned to read or who have difficulty reading due to various reasons such as illiteracy, limited education, or learning disabilities. These individuals often face significant barriers to employment, education, and social participation, leading to a cycle of poverty and marginalization.

In 2019, the Philippines achieved a literacy rate of 96.5 % for the segment of the population aged 10 and over according to the PSA's Functional Literacy, Education and Mass Media Survey (FLEMMS), as reported in an article from Business World entitled, "Literacy rate estimated at 93.8% among 5 year olds or older — PSA." Literacy was defined as the ability to read and write "with understanding of simple messages in any language or dialect." However, the same article notes that this was the same rate observed in 2013, a matter described as alarming by University of Asia and the Pacific Senior Economist Cid L. Terosa, stating that even minimal improvements should be expected especially after six years.

More recently, according to a report published by UNICEF in collaboration with UNESCO and the World Bank, the percentage of 10-year-olds in low- and middle-income countries who are unable to read is as high as 70%. This figure has likely been affected by school closures brought about by the COVID-19 pandemic. The same report also stated that only 10% of children in the Philippines were able to read simple text as of March 2022. Alarming, a separate report

published by the World Bank in 2021 found that the rate of learning poverty - defined as the inability to read simple text by age 10 - in the Philippines was at 90%. These statistics highlight the urgent need to address the education crisis in the Philippines and the need to further augment the country's current literacy situation.

To address this problem, we propose the development of an automatic reading miscue detection system called Readable, specifically targeting the Hiligaynon language. Hiligaynon, also known as Ilonggo, is an Austronesian language spoken in the Western Visayas region of the Philippines, particularly in the provinces of Iloilo, Guimaras, Negros Occidental, and Capiz. It is one of the major languages of the Philippines, spoken by millions of people as a first or second language. Our reading miscue detection system will utilize machine learning techniques including automatic speech recognition (ASR). ASR is a technology that allows computers to automatically recognize and transcribe spoken language, and it has made significant advances in recent years. However, it can still be challenging to achieve high levels of accuracy for some languages and accents, especially those that are underrepresented in ASR training data. By targeting local languages like Hiligaynon and designing our ASR system to work well for these languages, we can help ensure that our reading tutor is accessible and effective for non-reading adults in the Philippines.

While there are some similar applications like Google Read Along available for reading instruction, they may not be accessible or relevant for many non-reading adults in the Philippines due to language barriers or lack of internet connectivity. By targeting local languages like Hiligaynon and utilizing the benefits of natural language processing and machine learning techniques, our automatic reading tutor can provide personalized and effective reading instruction that is accessible and relevant for non-reading adults in the Philippines. By providing accessible, effective, and scalable reading education in Hiligaynon, we hope to improve the lives and prospects of non-reading adults in the Philippines and break the cycle of poverty and illiteracy. Children with strong literacy skills grow more consistently and confidently in their studies, and reading literacy is a crucial gateway to other learning areas such as the humanities, mathematics, and the sciences. By addressing learning poverty and promoting reading literacy, we can help ensure that children in the Philippines have the opportunity to reach their full potential and succeed in their studies.

1.2 Problem Statement

Given the current educational crisis our country is facing (UNICEF, UNESCO, & Bank, 2022) and with the aim to further improve the current state of literacy rate of our country (Hernandez, 2020), the development of automatic reading tutor systems which entails building reading miscue detection systems and other related programs becomes relevant. Furthermore, the limited resources available for Hili-gaynon in the context of speech processing technologies opens a good opportunity to attempt to make a contribution for the said domain of interest.

1.3 Research Objectives

1.3.1 General Objective

This subsection states the over-all goal that must be achieved to answer the problem. Address the following: Given your research challenge or opportunity, how do you intend to solve it? What is the output of your research?

1.3.2 Specific Objectives

This subsection is an elaboration of the general objective. It states the specific steps that must be undertaken to accomplish the general objective. These objectives must be **S**pecific, **M**easurable, **A**ttainable, **R**ealistic, **T**ime-bounded. A specific objective start with “to <verb>” for example: to design/survey/review/analyze.

Studying a particular programming language or development tool (e.g., to study Windows/Object-Oriented/Graphics/C++ programming) to accomplish the general objective is inherent in all thesis and, therefore, must not be included here.

1. To review related literature, compare and contrast existing algorithms (on what problem?);
2. To develop a new algorithm (for what purpose?)
3. To analyze the algorithm (based on what criteria?)

1.4 Scope and Limitations of the Research

This section discusses the boundaries (with respect to the objectives) of the research and the constraints within which the research will be developed.

1.5 Significance of the Research

This section explains why research must be done in this area. It rationalizes the objective of the research with that of the stated problem. Avoid including sentences such as “This research will be beneficial to the proponent/department/college” as this is already an inherent requirement of all BSCS majors. Focus on the research’s contribution to the Computer Science field.

The following are guide questions that may help your formulate the significance of your research.

- What is the relevance of your work to the computer science community?
 - What will be your technical contributions, in terms of algorithms, or approaches, or new domain?
 - What is your value-added compared to existing systems?
- What will be your contributions to society in general?
 - Who will benefit from your system?
 - Who are your target users and how will this system benefit them?

Chapter 2

Review of Related Literature

This chapter discusses the features, capabilities, and limitations of existing research, algorithms, or software that are related/similar to the Special Problem.

The reviewed works and software must be arranged either in chronological order, or by area (from general to specific). Observe a consistent format when presenting each of the reviewed works. This must be selected in consultation with the adviser.

DO NOT FORGET to cite your references.

2.1 Theme 1 Title

This chapter contains a review of research papers that:

- Describes work on a research area that is similar or relevant to yours
- Describes work on a domain that is similar or relevant to yours
- Uses an algorithm that may be useful to your work
- Uses a software / tool that may be useful to your work

It also contains a review of software systems that:

- Belongs to a research area similar to yours

- Addresses a need or domain similar to yours
- Is your predecessor

2.2 Theme 2 Title

Chapter 3

Research Methodology

This chapter lists and discusses the specific steps and activities that will be performed to accomplish the project. The discussion covers the activities from pre-proposal to Final SP Writing.

3.1 Research Activities

Research activities include inquiry, survey, research, brainstorming, canvassing, consultation, review, interview, observe, experiment, design, test, document, etc. Be sure that for each method, process, or algorithm used, there is a justification why that method was chosen. The methodology also includes the following information:

- who is responsible for the task
- the resource person to be contacted
- what will be done
- when and how long will the activity be done
- where will it be done
- why should be activity be done

3.2 Calendar of Activities

A Gantt chart showing the schedule of the activities should be included as a table. For example:

Table 3.1 shows a Gantt chart of the activities. Each bullet represents approximately one week worth of activity.

Table 3.1: Timetable of Activities

Activities (2009)	Jan	Feb	Mar	Apr	May	Jun	Jul
Study on Prerequisite Knowledge			••	••••			
Review of Existing Racing Strategies	••	••••	••••	••••			
Identification of Best Features				••••	••		
Development of Racing Strategies				••	••••	••	
Simulation of Racing Strategies				••	••••	•••	
Analysis and Interpretation of the Results					••••	••••	•
Documentation	••	••••	••••	••••	••••	••••	••

Chapter 4

Preliminary Results/System Prototype

This chapter presents the preliminary results or the system prototype of your SP. Include screenshots, tables, or graphs and provide the discussion of results.

Appendix A

Appendix

Appendix B

Resource Persons

Dr. Firstname1 Lastname1

Adviser

Affiliation1

emailaddr@domain.com

Mr. Firstname2 Lastname2

Role2

Affiliation2

emailaddr2@domain.com

Ms. Firstname3 Lastname3

Role3

Affiliation3

emailaddr3@domain.net

References

- Hernandez, J. (2020, 10). *Literacy rate estimated at 93.8PSA*. Retrieved from <https://www.bworldonline.com/economy/2020/10/29/325932/literacy-rate-estimated-at-93-8-among-5-year-olds-or-older-psa/>
- UNICEF, UNESCO, & Bank, W. (2022, 3). *Where are we on Education Recovery?* (Tech. Rep.).