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| Student Name | Iyalla John Alamina |
| Type of Award | PhD |
| Date of Viva Examination | 9 June 2020 |

Please provide an overview of the examination, including a rationale for the recommended outcome. Any amendments that the student is required to make must be listed separately in the amendments table below.

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| This thesis presents an attempt to design an end-to-end speech model for automatic speech recognition of low resource languages. Some interesting preliminary results are demonstrated.  We examined the candidate for just over two hours, satisfying ourselves that the work reported in the thesis was indeed his own, and that the thesis had been written by him. He demonstrated a good grasp of his research area and associated areas of knowledge, and was able to engage with the examiners in technical debates about some aspects of the work.  We also questioned the candidate at length about the concerns raised in our preliminary reports. The most serious concerns regarded the limited scope of experimental studies and contributions to knowledge. Overall, the thesis partially demonstrates scholarship at the PhD level. The results presented only partially shows the ability of the candidate to implement research that results in new knowledge, resulting in original contributions in the discipline.  The viva exposed some omissions in the thesis (discussed in more detail below), which should be addressed to provide a holistic view of the work. Also, the thesis has an unacceptable number of typographical and grammatical errors which should be corrected.  The recommendation is “Referral to complete major amendments”.  For the amended thesis, please provide the following:   * An electronic copy of the original thesis * An electronic copy of the amended thesis, with the changes highlighted (e.g., in blue font). * A response document, providing a response to each point raised below. |

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| Table of Amendments/ Corrections Required Following Examination  Please ensure this is typed and not hand written and is a joint report of all examiners | |
| **Examiners’ comments** | **Student response** |
| Larger points (chapter 6):   * expand on data preparation (section 6.1) * expand on architecture design in section 6.2 and justify the design used * give full details of the design used * justify all hyperparameters used * provide results for all studies conducted (time, accuracies, etc) * discuss the results | Chapter 6  1. Data prepraration 6.1 extended including k-fold validation explanation, batch and sequence size selection.  2. All Architecture parameters defined in (3.4.1) are expanded on and justifed in (6.2 and 6.3)  3. All Architecture hyperparameters defined in (3.4.1) are justified in (6.2 - 6.4)  4. Training results given in table 6.1 show developed models with lower perplexity  5. Results discussed with relation to design considerations and hyperparameters in 6.6 |
| Larger points (chapter 7):   * provide full details of the models used * explain the process of designing the Bi-RNN model used * provide full details of the hardware used * complete the experiments in table 7.2 and provide the full results, comparative analysis, and discussion of the results * try the model on the low resource language as well and provide the results   replace figures 7.3 and 7.4 with appropriate figures of loss/accuracy curve | Chapter 7  1. Models including sequence relationship design and RNN type selection are discussed in (3.4.1 and 6.2) and details provided in 7.1 to 7.5  2. Bi-RNN Architecture design procedure given in 3.4.1 and detailed in 6.2 and 7.2-7.5. Background information for RNNs and Bi-RNNs covered in Chapter 5.  3. Hardware deatails provided (7.8) show GPU limited memories no greater than 6GB.  4. Analysis of result done (7.8) including GPU configuration and analysis of WERs with respect to model configuration, hyper parameters and research objectives  5. Low resource language (simulation - English,italian compared in Table 7.4)  6. Training losses Figure 7.3 and Figure 7.4 for ASR of English and Italian based on AN4 and Voxforge datasets have been added |
| Other points (abstract, all chapters, bibliography):   * Rewrite the abstract as discussed * Be consistent in using acronyms * Provide list of variables for all equations * Check the location of brackets for all inline citations * Revisit the caption for all figures * Sort out the bibliography * please fix all grammatical and typographical errors identified in the thesis, and please check carefully any new text added to the thesis. It is strongly recommended to have the thesis carefully proofread prior to resubmission. | Other points.  1. Competitive WER of 26% included in Abstract  2. List of acronyms provided on page 15  3. List of variables provided on page 17  4. Captions for figures revisited  5. Bibliography reformatted  6. Proof reading was done |
| Smaller points (chapter 1):   * Bottom of page 18; make it clear why English Language has been used * Section 1.5; rewrite aims and objectives as discussed * Page 20: make sure there is evidence in the thesis for the list of claims provided * Page 20: line 6 must be revised * Section 1.6: revise the contributions to knowledge once larger points listed above have been addressed * Provide research questions in this chapter | Chapter 1  1. Use of English language was justified in the Scope of the study (1.7)  2. Aims and objectives (1.5) aligned to research outcomes. This includes, ASR building blocks and low resource challenges, Building and evaluating resource friendly ASR system  3. Evidence for ASR system built in the results and and analysis given in (6.5, 6.6, 7.7 and 7.8) having a WER of 26% for SVCSR.  4. Objective number 3 revised from from "building robust ASR systems that also system rousource robust" to "building robust systems that address resource concerns" |
| Smaller points (chapter 2):   * Revise the beginning of chapter 2 as discussed * Provide better resolution for figure 2.2 * Bottom of page 31; be consistent with the name of the language * Page 32; check the hat-swap or swap-hat * Page 34; explain AutoSegCriterion | Chapter 2  1. First paragraph revised  2. Figure 2.2 has been reproduced  3. Language name has been corrected on page 31 from "Okrika" to "Wakirike"  4. swap-hat replaced with hat-swap  5. AutoSeg\*\* criterion discussed in section 6.2 |
| Smaller points (chapter 3):   * Sections 3.1; make theses as assumptions only (not claims) * Discuss the knowledge gained in your conclusion chapter * Section 3.3.1: describe the signal data used * Provide details of all processing steps; adjustments, filtering, etc * Figure 3.1 must be refined * Section 3.4.1: provide details of the experiment | Chapter 3  1) Section 3.1 relabelled as assumptions  2) Knowledge gained has been discussed in conclusion chapter (8) under disccusion of research output (8.1)  3) Signal data described in 3.3.1 as a 3 second recording sample data produced by researchers and used in th pilot experiment.  4) The pilot experiment steps according to figure 3.10 were detailed from rescaling, filtering and peak-to-peak counting to segmentation and correlation computation.  5) Figure 3.10 refined to include subplot labels having (a) positive values of waveform (b) filtered values (c) peak counter and (d) trough counter and Extra figure 3.11 provided to show correlation result.  6) Section 3.4.1 expanded to discuss results in Figure 3.13 and figure 3.14 |
| Smaller points (chapters 4-5):   * Provide full details in caption for figure 4.1 * Check all equations in this chapter and make sure all variables have been introduced * Page 84; there is a gap | Chapter 4 and 5  1. Details of caption for figure 4.1  2. Equations checked and Variable list provided on page 17  3. Gap removed |
| Larger points (chapter 8):   * Please revise this chapter by providing a summary of your work and a brief discussion of the results; followed by suggested future work | Chapter 8  Revised with  a) Summary of the work  b) Discussion of results (8.2)  c) Suggested future work (8.3)  d) Conclusion (8.4) |