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Master's Degree Project Report

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2026-02-15

Contents

1 Abstract

Provide a concise summary of the project (150–300 words):

- Background
- Objective
- Methods
- Key results
- Conclusion

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2 1. Introduction

2.1 1.1 Background

Introduce the scientific or technical context of your project.

2.2 1.2 Problem Statement

Clearly define the research problem.

2.3 1.3 Objectives

- Primary objective
- Secondary objectives

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3 2. Materials and Methods

3.1 2.1 Dataset Description

Describe:

- Data source
- Number of samples
- File format (FASTQ, BAM, etc.)

- Sequencing platform
- Read length

3.2 2.2 Tool Parameters

Input Parameter	Value
Raw read data from current history	
Contaminant list	
Adapter list	
Submodule and limit specifying file	
Disable grouping of bases for reads > 50 bp	FALSE
Lower limit on sequence length shown in report	N/A
Length of k-mer analyzed	7

3.3 2.3 Data Preprocessing

Describe all preprocessing steps:

- Quality filtering
- Adapter trimming
- Removal of low-quality reads
- Deduplication (if applicable)

3.4 2.4 Statistical / Computational Analysis

Describe:

- Quality metrics evaluated
- K-mer analysis
- Statistical methods
- Software tools used

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4 3. Results

4.1 3.1 Quality Control Metrics

Interpretation:
Explain what the results show.

4.2 3.2 GC Content Analysis

Interpretation:
Discuss GC distribution and potential bias.

4.3 3.3 Adapter Contamination

Interpretation:
Explain findings.

4.4 3.4 K-mer Analysis

Interpretation:
Discuss overrepresented sequences.

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5 4. Discussion

Interpret your findings:

- Major quality issues
- Comparison with expectations
- Technical or biological implications
- Impact on downstream analysis

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6 5. Limitations

Discuss:

- Data limitations
- Parameter sensitivity
- Computational constraints

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6. Conclusion

Summarize:

- Overall data quality
- Suitability for downstream analysis
- Final recommendations

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7. Reproducibility

```
## R version 4.5.0 (2025-04-11)
## Platform: x86_64-pc-linux-gnu
## Running under: Debian GNU/Linux 13 (trixie)
##
## Matrix products: default
## BLAS/LAPACK: /usr/lib/x86_64-linux-gnu/libmkl_rt.so;  LAPACK version 3.8.0
##
## locale:
##  [1] LC_CTYPE=en_US.UTF-8 LC_NUMERIC=C         LC_TIME=C
##  [4] LC_COLLATE=C         LC_MONETARY=C        LC_MESSAGES=C
##  [7] LC_PAPER=C           LC_NAME=C            LC_ADDRESS=C
## [10] LC_TELEPHONE=C       LC_MEASUREMENT=C     LC_IDENTIFICATION=C
##
## time zone: Europe/Amsterdam
## tzcode source: system (glibc)
##
## attached base packages:
## [1] stats     graphics  grDevices utils     datasets  methods   base
##
## other attached packages:
## [1] dplyr_1.1.4   ggplot2_4.0.0 knitr_1.50
##
## loaded via a namespace (and not attached):
```

```
##  [1] vctrs_0.6.5        cli_3.6.5          rlang_1.1.6        xfun_0.53
##  [5] generics_0.1.4     S7_0.2.0           glue_1.8.0         htmltools_0.5.8.1
##  [9] scales_1.4.0       rmarkdown_2.30     grid_4.5.0         evaluate_1.0.5
## [13] tibble_3.3.0       fastmap_1.2.0      yaml_2.3.10        lifecycle_1.0.4
## [17] compiler_4.5.0     RColorBrewer_1.1-3 pkgconfig_2.0.3    rstudioapi_0.17.1
## [21] farver_2.1.2       digest_0.6.37      R6_2.6.1           tidyselect_1.2.1
## [25] dichromat_2.0-0.1  pillar_1.11.1      magrittr_2.0.4     withr_3.0.2
## [29] tools_4.5.0        gtable_0.3.6
```

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9 8. References

Add references here (BibTeX recommended if submitting PDF).
