

# Air quality measurement and logging in taxi ranks and inside of taxis

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# Abstract

## **English**

The English abstract.

## **Afrikaans**

Die Afrikaanse uittreksel.

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# Nomenclature

## Variables and functions

$p(x)$	Probability density function with respect to variable $x$ .
$P(A)$	Probability of event $A$ occurring.
$\varepsilon$	The Bayes error.
$\varepsilon_u$	The Bhattacharyya bound.
$B$	The Bhattacharyya distance.
$s$	An HMM state. A subscript is used to refer to a particular state, e.g. $s_i$ refers to the $i^{\text{th}}$ state of an HMM.
$\mathbf{S}$	A set of HMM states.
$\mathbf{F}$	A set of frames.
$\mathbf{o}_f$	Observation (feature) vector associated with frame $f$ .
$\gamma_s(\mathbf{o}_f)$	A posteriori probability of the observation vector $\mathbf{o}_f$ being generated by HMM state $s$ .
$\mu$	Statistical mean vector.
$\Sigma$	Statistical covariance matrix.
$L(\mathbf{S})$	Log likelihood of the set of HMM states $\mathbf{S}$ generating the training set observation vectors assigned to the states in that set.
$\mathcal{N}(\mathbf{x} \mu, \Sigma)$	Multivariate Gaussian PDF with mean $\mu$ and covariance matrix $\Sigma$ .
$a_{ij}$	The probability of a transition from HMM state $s_i$ to state $s_j$ .
$N$	Total number of frames or number of tokens, depending on the context.
$D$	Number of deletion errors.
$I$	Number of insertion errors.
$S$	Number of substitution errors.



**Acronyms and abbreviations**

AE	Afrikaans English
AID	accent identification
ASR	automatic speech recognition
AST	African Speech Technology
CE	Cape Flats English
DCD	dialect-context-dependent
DNN	deep neural network
G2P	grapheme-to-phoneme
GMM	Gaussian mixture model
HMM	hidden Markov model
HTK	Hidden Markov Model Toolkit
IE	Indian South African English
IPA	International Phonetic Alphabet
LM	language model
LMS	language model scaling factor
MFCC	Mel-frequency cepstral coefficient
MLLR	maximum likelihood linear regression
OOV	out-of-vocabulary
PD	pronunciation dictionary
PDF	probability density function
SAE	South African English
SAMPA	Speech Assessment Methods Phonetic Alphabet

# Chapter 1

## Introduction

### **1.1. Background**

The majority of South Africa's public sector uses taxis as a means of transport. Millions of commuters use taxis frequently and depend on them for all of their mobility needs. Instead of using expensive and inconvenient formal public transportation like buses and trains, they offer an accessible and affordable substitute. As a result, the effects of cab air quality on human health and the impact of taxi exhaust emissions have become critical issues in South Africa. [1]

### **1.2. Project Statement**

### **1.3. Project Scope**

### **1.4. Objectives**

### **1.5. Report Overview**

# Chapter 2

## Summary and Conclusion

# Bibliography

- [1] M. Hachem, N. Saleh, A.-C. Paunescu, I. Momas, and L. Bensefa-Colas, “Exposure to traffic air pollutants in taxicabs and acute adverse respiratory effects: A systematic review,” *Science of The Total Environment*, vol. 693, p. 133439, 2019. [Online]. Available: <https://www.sciencedirect.com/science/article/pii/S0048969719333595>

# Appendix A

## Project Planning Schedule

This is an appendix.

# Appendix B

## Outcomes Compliance

This is another appendix.