Footstrike pattern determination

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Abstract

English

The English abstract.

Contents

List of Figures

List of Tables

Nomenclature

Variables and functions

$p(x)$	Probability density function with respect to variable x.
$P(A)$	Probability of event A occurring.
ε	The Bayes error.
ε_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 ith 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.
μ	Statistical mean vector.
Σ	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 μ and covariance matrix Σ.
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

In the modern day running is one of the most popular physical activities. People all over the world partake in this physical activity. One would think that running is a simple exercise and there are no major injury or health concerns. However, there are some major concerns as running has a high injury rate.

the Gait

1.2. Section heading

This is some section with two table in it: Table 1.1 and Table 1.2.

Table 1.1: Performance of the unconstrained segmental Bayesian model on TIDigits1 over iterations in which the reference set is refined.

Metric	1	2	3	4	5
WER (%)	35.4	23.5	21.5	21.2	22.9
Average cluster purity (%)	86.5	89.7	89.2	88.5	86.6
Word boundary F-score (%)	70.6	72.2	71.8	70.9	69.4
Clusters covering 90% of data	20	13	13	13	13

Table 1.2: A table with an example of using multiple columns.

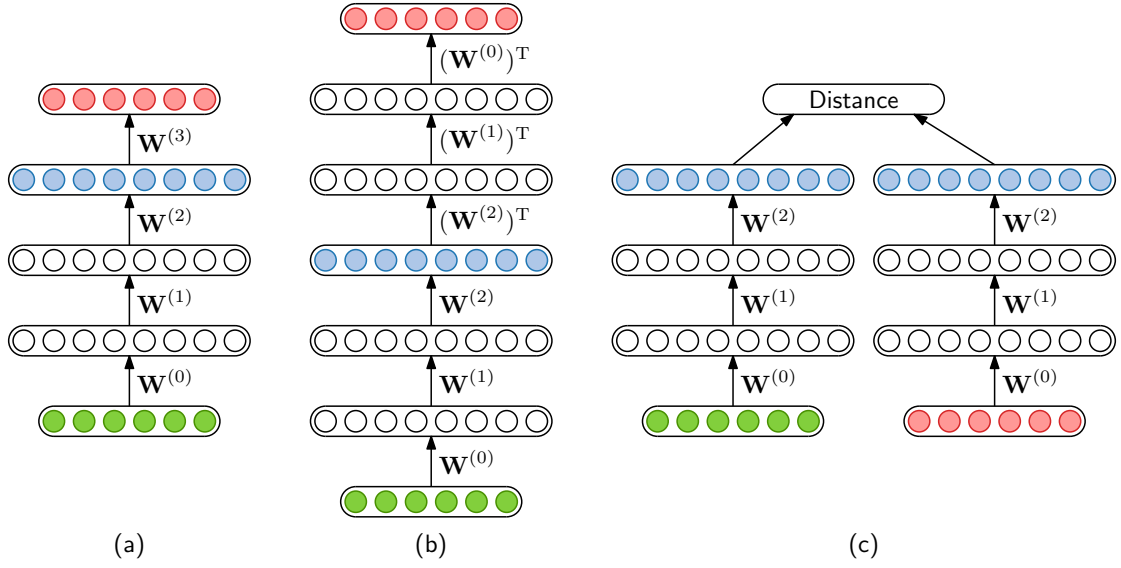| Model	Accuracy (%)		Bitrate
	Intermediate	Output	
Baseline	27.5	26.4	116
VQ-VAE	26.0	22.1	190
CatVAE	28.7	24.3	215

Figure 1.1: (a) The cAE as used in this chapter. The encoding layer (blue) is chosen based on performance on a development set. (b) The cAE with symmetrical tied weights. The encoding from the middle layer (blue) is always used. (c) The siamese DNN. The cosine distance between aligned frames (green and red) is either minimized or maximized depending on whether the frames belong to the same (discovered) word or not. A cAE can be seen as a type of DNN [1].

This is a new page, showing what the page headings looks like, and showing how to refer to a figure like Figure 1.1.

The following is an example of an equation:

$$P(\mathbf{z}|\boldsymbol{\alpha}) = \int_{\boldsymbol{\pi}} P(\mathbf{z}|\boldsymbol{\pi})\, p(\boldsymbol{\pi}|\boldsymbol{\alpha})\, \mathrm{d}\boldsymbol{\pi} = \int_{\boldsymbol{\pi}} \prod_{k=1}^{K} \pi_k^{N_k} \frac{1}{B(\boldsymbol{\alpha})} \prod_{k=1}^{K} \pi_k^{\alpha_k - 1}\, \mathrm{d}\boldsymbol{\pi} \qquad (1.1)$$

which you can subsequently refer to as (1.1) or Equation 1.1. But make sure to consistently use the one or the other (and not mix the two ways of referring to equations).

Chapter 2

Literature Review

2.1. BLE

2.2. Android application

Chapter 3

System Design

Chapter 4

Summary and Conclusion

Bibliography

[1] G. E. Dahl, D. Yu, L. Deng, and A. Acero, "Context-dependent pre-trained deep neural networks for large-vocabulary speech recognition," *IEEE Trans. Audio, Speech, Language Process.*, vol. 20, no. 1, pp. 30–42, 2012.

Appendix A

Project Planning Schedule

This is an appendix.

Appendix B

Outcomes Compliance

This is another appendix.