ELIGIBILITY PROPAGATION IN MULTI-LAYER RECURRENT SPIKING NEURAL NETWORKS

WERNER VAN DER VEEN

Faculty of Science and Engineering
University of Groningen

June 2021 – classicthesis v4.6

CONTENTS

LIST OF FIGURES

LIST OF TABLES

LISTINGS

ACRONYMS

1 METHOD

1.1 DATA PREPROCESSING

1.1.1 *The TIMIT speech corpus*

TIMIT is a speech corpus that contains phonemically transcribed speech (Garofolo et al., 1993). It contains 6300 sentences, 10 spoken by each of the 630 speakers. The male and female speakers lived in 8 different geographical regions in the United States during their childhood years, see Table 1.1.

DIALECT REGION	#MALE	#FEMALE	TOTAL
1 (New England)	31 (63%)	18 (27%)	49 (8%)
2 (Northern)	71 (70%)	31 (30%)	102 (16%)
3 (North Midland)	79 (67%)	23 (23%)	102 (16%)
4 (South Midland)	69 (69%)	31 (31%)	100 (16%)
5 (Southern)	62 (63%)	36 (37%)	98 (16%)
6 (New York City)	30 (65%)	16 (35%)	46 (7%)
7 (Western)	74 (74%)	26 (26%)	100 (16%)
8	22 (67%)	11 (33%)	33 (5%)
All	438 (70%)	192 (30%)	630 (100%)

Table 1.1: Distibution of speakers' dialect regions and sexes. Speakers of dialect region 8 moved around a lot during their childhood.

The sentence text can be categorized into 2 *dialect* sentences, 450 *phonetically compact* sentences, and 1890 *phonetically-diverse* sentences.

The dialect sentences, which are spoken by all speakers, are designed to expose the dialectical variants of the speakers. The phonetically compact sentences are designed to include many pairs of phones. The phonetically diverse sentences are taken from the Brown Corpus (Kucera, Kučera, and Francis, 1967) and the Playwrights Dialog (Hultzsch et al., 1964) in order to maximize the number of allophones (i. e., different phones used to pronounce the same phoneme). Table 1.2 lists an overview of the distribution of the number of speakers per sentence type.

Each of the sentences is encoded in wavefile (`.wav`) format, and comes with a corresponding text file indicating what phones are pronounced in the wavefile, and between which sample points.

synonym

1.1.2 *Engineering features*

SENTENCE TYPE	#SENTENCES	#SPEAKERS	TOTAL
Dialect	2	630	1260
Compact	450	7	3150
Diverse	1890	1	1890
Total	2342		6300

Table 1.2: Distribution of sentence types.

APPENDIX A

BIBLIOGRAPHY

Garofolo, John S et al. (1993). "DARPA TIMIT acoustic-phonetic continous speech corpus CD-ROM. NIST speech disc 1-1.1." In: *STIN* 93, p. 27403.

Hultzsch, Eugen et al. (1964). *Tables of transitional frequencies of English phonemes*. Urbana: University of Illinois Press.

Kucera, Henry, Henry Kučera, and Winthrop Nelson Francis (1967). *Computational analysis of present-day American English*. Brown university press.