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### **Abstract**

Conversion of Arabic script into phonetic rules is one of the major obstacles facing the researchers on Arabic text-to-speech systems and speech recognition. Although Arabic is one of the oldest languages that its sounds and phonological rules were extensively studied and documented (more than 12 centuries ago), these valuable studies need to be compiled from scattered literatures and formulated in a modern mathematical frame work.

The objective of this paper is to present to the interested researchers a mathematical formulation for a comprehensive set of these rules.

text-to-speech

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.laugh, through, good, geography :

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grapheme

) diacritics

linguistic knowledge

syntax

pragmatics

semantics

morphology

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partial

diacritization

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acoustic characteristics

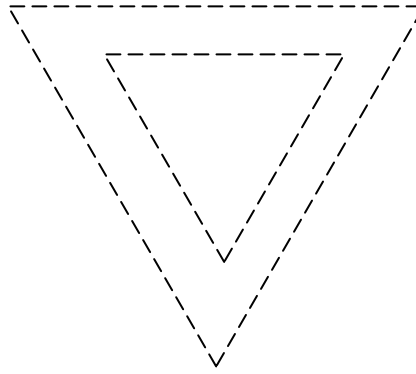
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Emphatic Stop*			t <sup>ʕ</sup>	d <sup>ʕ</sup>							
Fricative		f	θ ð	s z	ʃ			χ	ʁ	ħ	h
Emphatic fricative**			ð <sup>ʕ</sup>	s <sup>ʕ</sup>							
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/u:/ = / / /i:/ = / / /a:/

:transformational phonological rules

allophones

( )

(coarticulation)

(prosody/suprasegmental)

fundamental

amplitude

duration

frequency (F<sub>0</sub>)

graphemes

allophones

phonemes

phonological rules

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phonetic symbols

graphemes

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