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DEFINING ALLOPHONIC BASE OF SYNTHEZATOR ACCORDING TO ARTICULATORY FEATURES

The work aiming to create Georgian speech synthezators has been going on for quite a long time in Georgia. As a result, synthezators have been created by different authors and groups. The synthezators have acustic unit bases that have been constructed on the basis of different principles. Our objective is to define a unit base which serves as a basis for a synthezator with a relatively high degree of speech naturalness. In the process of creating a Georgian speech synthezator we chose allophones as acoustic units due to the fact that in synthesis allophonic base provides an opportunity to get maximum effect with minimal number of speech units.

The Georgian alphabet consists of 33 symbols which correspond to 33 speech sounds /phonemes/. The very number is increased by an interval between the words - '_', which, like a regular phoneme, has an important role in a speech flow; consequently, we are dealing with 34 symbols and their corresponding speech sounds /phonemes/. Sets of symbols and phonemes in Georgian are interrelated.

In order to reduce the capacity of an allophonic base the speech units are grouped according to articulatory features, namely:

The vowels are represented as separate "groups": **"a", "e", "i", "o", "u".**

Sonorants form one class /it is also possible to consider sonorants as two sub-groups: nasal and non-nasal phonemes/: **"mn rl"**.

We have divided other consonantal phonemes into 6 groups, namely: Homogeneous phonemes were grouped into major groups according to places of articulation, for instance, labial and velar /so-called labiovelar sounds: **v, b, g, ǧ**/ voiced consonants form a separate group, while dental-alveolars /**s, c, š, č, t**/ form another group; accordingly, voiceless aspirate /**scščt**/ and voiceless abruptive /**p̣ k̦ q ṭ ć ĉ**/ phonemes are divided into two separate groups.

In order to define the optimal number of **combinatorial** and **positional** / initial, middle and final/ variants of triphones – allophones the right and the left

classes have been defined as well; namely the set of left classes is identified as **LC; LC = { '_', 'a', 'e', 'i', 'o', 'u', 'mnrl', 'dʃjzž', vbgǧ' 'scščt', 'ɸqχ', 'pkħh', 'ʦcĉ'}.**

The set of right classes is identified as **RC; RC = { '_', 'a', 'e', 'i', 'o', 'u', 'vmbgǧ', 'nrlzždʃj', 'pkħhtcčsš', 'ɸqχʦcĉ'}.**

In order to simplify registration and practical use of the classes the concept of similarity of triphones is introduced. Two triphones, **x1s1y1** and **x2s2y2** are similar if **s1 = s2**, **x1** and **x2** belong to one left class, while **y1** and **y2** belong to one right class.

Such relation of similarity is an equivalence relation (reflexive, symmetric and transitive). Therefore, the set of triphones will be divided into disjoint classes of similarity. A capacity of the factor-set is 13*34*10 = 4420. That is exactly the theoretical capacity of the allophonic base under question.

Such formalization allows us to apply mathematical methods for registration of classes and selection of representatives.