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The goal of the tool by Piton, Lagji and Përnska (2007; 2008), is to cover the inflection of Albanian. Their analysis can consist of more than one graphical token, and (2) to account for the position of a token in a sentence, i.e. its syntactic function. There is a need for an Albanian tagset that can adequately represent these morphosyntactic phenomena.

2. Morphosyntactic Annotation

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2. Multi-word units

In the context of part-of-speech tagging of Albanian texts, a big challenge is the treatment of multi-word units, i.e. two or more graphical tokens that together make up a single linguistic token. A frequent phenomenon are multi-word units having a preposed article or particle as their first part. These preposed articles or particles can also lead to word-class changes, e.g. from adverb (gjakët, engl. long) to adjective (e gjatë, engl. long). Before Standard Albanian was regulated in 1972, these combinations with preposed articles or particles were written as single graphic tokens by some authors, cf. for example Kristofofidhi (1904, p. 77)\(^2\) where we can find the form e-gjatë-a [= romanised: e-gjatë-a] that stands for e gjatë (indefinite) or e gjata (definite). The reasoning behind this way of writing the multi-word units was probably to make them easier to read, i.e. to render words that belong together (linguistic tokens) as single graphical tokens.

In written Standard Albanian, there are a lot of cases of "small words", i.e. articles, particles, determiners etc., that were separated from the words they belong to. There are even some grammatical functions that are realized with the help of separately written particles, e.g. graduation of adjectives: i madh, engl. big, më i madh, engl. bigger, më i madhi, engl. the biggest, cf. section 3.2.

3. The tagset

Traditional grammars, e.g. Leonard Newmark and Prifti (1982), Buchholz and Fiedler (1987) or Demiraj et al. (1995), give ten parts of speech for Albanian: Nouns, verbs, adjectives, adverbs, pronouns, prepositions, conjunctions, numerals, particles and interjections. Part-of-speech tagsets for use in automatic tagging are usually much more fine-grained, cf. for example Santorini (1990). In the following sections we will discuss all traditional word-classes and will propose a refined tagset.

3.1. Nouns

Nouns have the following morphological categories:

- **Case (nominative, accusative, dative, genitive and ablative):** The inflectional suffixes for the dative, genitive and ablative forms are identical. The distinction between them can only be made from context.

- **Definiteness (indefinite and definite):** Indefinite forms like (një) djalë, engl. (one) boy, can be distinguished from definite forms like djali, engl. (the) boy.

- **Gender (feminine and masculine):** A lot of Albanian nouns change gender in the plural form, cf. Demiraj et al. (1995) and Fiedler (2003). The word art/arti, engl. an art/the art, for example, is masculine in the singular and feminine in the plural (art/artet, engl. arts/the arts). Fiedler (2003) calls them heterogeneous nouns. This phenomenon makes checking for congruence difficult without a morphological component.

- **Number (singular and plural):** There are a couple of "complex" nouns that consist of either a preceding article combined with a noun, e.g. e hënë, engl. the woman, as in e hënë është dîtë pushimi, engl. **saturday is a free day**, or of a preceding article combined with an article-adjective, e.g. i madhi, engl. the bigger one, as in i madhi është më i lirë se i vogli., engl. the bigger one is cheaper than the smaller.

A tagset must be able to differentiate between single-word nouns like hënë/hënë, engl. (a) moon/the moon, and "complex" or multi-word nouns like e hënë e hënë, engl. a mon-day/the monday. Also, nouns derived from adjectives and/or verb participles can have a preposed article, e.g. the noun i pasuri, engl. the rich, which is derived from the adjective i pasur, engl. the rich, which is in turn derived from the participle form pasur of the verb kam, engl. have.

Similarly, the participle form pyetur of the verb pyes, engl. ask, when preceded by the article i, becomes the adjective i pyetur as in Personi i pyetur foli gjaité, engl. The asked person spoke for long. If the suffix i is added to the adjective, it will become the noun i pyeturi as in I pyeturi foli gjaité, engl. The asked [person] spoke for long. If it is preceded by the particle së instead of the article i, it will become the adjective së pyeturi as in Në fund ai s’mbroë së pyeturi, engl. In the end he didn’t stop asking.

Depending on the morphological analysis component or the morphological resource, processing heterogeneous nouns, e.g. lemmatising them or generating word forms from lemmata, can be problematic. For this reason, there is an extra tag for them.

In the tagset we do not mark number (singular/plural), gender (masculine/feminine), definiteness (definite/indefinite) or case because the goal is not to include a full morphological analysis of nouns but rather to mark those pieces of information that cannot be retrieved using a morphology component or morphological resource.

| # | Tag | Name | Example |
|---|-----|------|---------|
| 1 | N   | Noun | hënë    |
| 2 | NArt| N. w. prep. art. | (e) hënë; (të) rinjtë |
| 3 | HgN | Heterog. N. | art, -i sg. m. vs. -e, -et pl. f. |
| 4 | NE  | Name | Peja; Drini; Joni; |

Table 1: The proposed noun tags

As an example, consider the sentence Të rinjtë janë nga Peja., engl. The youths are from Peja., which is analysed as Të \Art rinjtë\NArt janë\Noun \Prep Peja\NE .\Punct

3.2. Adjectives

Apart from a few exceptional cases, adjectives have the same morphological categories as nouns. In addition, they have the following properties:

- **Position in the noun phrase:** In the unmarked case, adjectives follow the noun, but they can also occur before the noun, as preposed adjectives, e.g. i vetmi shkencëtar vs. shkencëtari i vetmi, engl. the only scientist.
Some adjectives have a preposed article, others do not. Both need to be congruent to the noun they modify. This is marked in the inflectional suffixes and in the preposed article. There are also a few noninflected adjectives, e. g. blu, engl. blue.

- Graduation: Adjectives in Albanian have three grades, positive, comparative, and superlative. Graduation is realized as a combination of the base word with the comparative particle më, e. g. positive i mirë engl. good, comparative më i mirë and superlative më i mirë. This particle has its own tag, cf. Section 3.10.

We propose five tags for describing adjectives in Albanian. There are separate tags for adjectives that occur before nouns, for adjectives with preposed articles, and for non-inflectional adjectives.

| #  | Tag   | Name           | Example               |
|----|-------|----------------|-----------------------|
| 5  | Adj   | Adjective      | [djalë] trim          |
| 6  | PPAdj | Preposed adj.  | trimi [djalë]        |
| 7  | AdjpArt | Adj. w. art. | [djalë] i mirë       |
| 8  | AdjpPPArt | PPAdj. w. art. | i mirë [djalë]     |
| 9  | AdjpNf | Noninfl. adj.  | blu/neto              |

Table 2: The proposed adjective tags

The sentence Ata studiojnë artet e bukura në Akademinë e Arteve, engl. They study fine arts at the College of Arts., for example, is tagged as Ata\Pron studiojnë\V artet\HgN\Art bukura\AdjpPPArt në\Prep Akademinë\N\Art Arteve\N.\Punct.

### 3.3. Numerals

Numerals in Albanian are subclassified in cardinal and ordinal numbers. Ordinal numbers have the same properties as nouns, for adjectives with preposed articles, and for non-inflected adjectives.

| #  | Tag   | Name           | Example               |
|----|-------|----------------|-----------------------|
| 10 | NumC  | Cardinal number | dy [fitore]          |
| 11 | NumO  | Ordinal number  | [fitore] e dytë      |

Table 3: The proposed numeral tags

As an example, consider the sentence Sot ishte fitorja e dytë e tij brenda një jave, engl. This was his second victory within one week., that is tagged as Sot\Adv ishte\V fitorja\N e\Art dytë\NumO e\Art tij\PossP brenda\Prep një\NumC jave\N.\Punct.

### 3.4. Pronouns

Pronouns can be classified into subtypes according to their specificity. An interrogative pronoun or a personal pronoun is different from a relative pronoun. We have an extra tag for each commonly distinguished type of pronouns. Similar to nouns or adjectives, some pronouns can be preceded by a preposed article. This can, for example, turn the interrogative pronoun cili, engl. who/which into the relative pronoun i cili, engl. who/which. For this reason, article and pronoun need to be treated together.

Table 4 lists all proposed tags that describe pronouns. As can be seen, there are four types of pronouns that are preceded by an article.

| #  | Tag   | Name           | Example               |
|----|-------|----------------|-----------------------|
| 12 | PersP | Personal pron. | ti                    |
| 13 | DemP  | Demonstr. pron. | kylkëta              |
| 14 | DemPPArt | DemPron w. art. | i tillë              |
| 15 | PossP | Possessive pron.| im                   |
| 16 | PossPPArt | PossP w. art. | i tijë vetën        |
| 17 | IntP  | Interrogative pron. | kash    |
| 18 | IntPPArt | Int w. art. | i kujtë cili     |
| 19 | RelP  | Relative pronoun | që         |
| 20 | RelPPArt | RelP w. art. | i cili            |
| 21 | IndefP | Indefinite pron. | dikush    |
| 22 | RefLP | Reflexive pron. | (me) vete |

Table 4: The proposed pronoun tags

### 3.5. Verbs

Verbs have the greatest number of grammatical categories, cf. Leonard Newmark and Prifti (1982). They are as follows:

- person (1st, 2nd, 3rd)
- number (singular and plural)
- voice (active and non-active, i. e. passive, middle, reflexive or reciprocal)
- mood (indicative, subjunctive, optative, admirative and imperative)
- tense (present, past and future)
- aspect (common, perfect, progresive, inchorative, definite and imperfect)
- finiteness (finite and non-finite, i. e. infinitive, participle, gerundive and absolutive)

We will not go into further detail here and will only briefly discuss some properties that are important in the context of constructing a tagset, namely those forms that combine with particles like të or do, cf. also Section 3.10.

- In the passive voice, in some cases, verbs are preceded by the article u. This must be treated as an extra form, having its own tag(s).
- In Albanian, the verbal complex can also include pronominal clitics. The passive particle can be combined with these pronominal clitics, e. g. u + e → u. This must also be treated as an extra form, with separate tag(s). Some of these combinations are written with an apostrophe, e. g. m’u.
- Some constructions, e. g. subjunctive mode, or the future tense, have additional particles, e. g. të and do. These particles are listed in Section 3.10.
Here are some examples:

In the sentence *Libri u botua*, engl. *The book is published*, the verbal complex will be tagged *i PassP botua*\VSPPC.

In the sentence *Ai do ta bleji librin*, engl. *He will buy the book*, the verbal complex will be tagged *do FutP ta bleji*\VSubjPPCL.

In the sentence *Ai nuk do të na i kthejë neve librat sot*, engl. *He will not give back us the books today*, the verbal complex including the negation particle will be tagged *nuk NegP do FutP të SubjP na*\PCL i PC1 kthejë\VSubjPPCL.

Furthermore we differentiate between auxiliar, modal, reflexive and reciprocal verbs as well as the participle form.

### Table 5: The proposed verb tags

| # | Tag | Name    | Example  |
|---|-----|---------|----------|
| 23 | V   | Verb    | tha      |
| 24 | VP  | Verb    | thëné    |
| 25 | VSPPC | V. w. SPart and cl. | ta tha |
| 26 | VpP | V. w. passive particle | u tha |
| 27 | VPC | V. w. cl. | i tha |
| 28 | VpPC | V. w. pass. part. and cl. | ua tha |
| 29 | VAux | Auxiliary verb | kam      |
| 30 | VMod | Modal verb | mund     |
| 31 | VRefl | Reflexive verb | lahem    |
| 32 | VRecp | Reciprocal verb | përshëndeten |

3.6. Adverbs

Some adverbs, like members of other word-classes mentioned above, can occur with a preceding article, e.g. *së voni*, engl. *last/late*. There are also adverbs that consist of multiple graphical tokens, e.g. *kohë pas kohe*, engl. *from time to time*. All the individual graphical tokens of such multi-word adverbs will be tagged as parts of a multi-part adverb, e.g. *kohë\AdvMP pas\AdvMP kohe\AdvMP*. The graphical tokens that make up the adverb are adjacent, therefore this approach is sufficient to infer that a sequence of AdvMP tags constitutes a single multi-word adverb.

### Table 6: The proposed adverb tags

| # | Tag | Name    | Example  |
|---|-----|---------|----------|
| 33 | Adv  | Adverb   | mirë    |
| 34 | AdvA | Adverb w. prep. part. | së shpëjti |
| 35 | AdvMP | Multi-token Adverb | kohë pas kohe |

3.7. Conjunctions

In addition to coordinating and subordinating conjunctions, there are some two-part conjunctions where the two parts are in a non-contact position in the sentence, e.g. *aq...sa* as in *aq mirë sa ne u befasuan*, engl. *so good that we were suprised*. In order to be able to identify those tokens as being parts of a multi-word unit, we introduce separate tags for the first and the second part of such two-part conjunctions.

### Table 7: The proposed conjunction tags

| # | Tag   | Name          | Example          |
|---|-------|---------------|------------------|
| 36 | CConj | Coordinating conj. | dhe              |
| 37 | SConj | Subordinating conj. | që             |
| 38 | ConjP1 | Conj. part one | edhe[1]... edhe ... |
| 39 | ConjP2 | Conj. part two | edhe ... edhe[2]... |

3.8. Prepositions

The members of this word-class could be subcategorized according to their grammatical and semantic roles, potentially benefiting downstream processes like parsers. However, we decided not to make any further distinctions as these are not always clear-cut.

### Table 8: The proposed preposition tag

| # | Tag | Name | Example  |
|---|-----|------|----------|
| 40 | Prep | Preposition | me; pa; nga; për; |

3.9. Interjections

Interjections are not inflected in Albanian. Since it is a closed word-class, its members can be listed in a lexicon.

### Table 9: The proposed interjection tag

| # | Tag | Name | Example  |
|---|-----|------|----------|
| 41 | Intj | Interjection | o; hm; uh; ii; |

3.10. Particles

Some particles influence not only one or two words (local influence), but the whole sentence (global or sentence-level influence), e.g. negation particles like *nuk*, engl. *not*. The negation particle *s’* occurs in amalgamated form with the word which it belongs to, e.g. *s’punon*, engl. *it doesn’t work* as opposed to *punon*, engl. *it works*.

Negation in Albanian can be realized as double negation, as in *nuk fiton dot or s’fiton dot*, engl. *he can not win (in any way)*. Compare this to simple negation: *nuk fiton or s’fiton*, engl. *he can not win*. In contrast to words like *assesi*, engl. *no way*, which are adverbs and can replace *dot*, we propose to tag the latter as *NegPartD* because it is a semantically unspecified general negation in the role of double negation. In cases where *dot* does not act as double negation marker, e.g. in *E bën dot këtë punë?*, engl. *Can you really (= dot) do this job?*, it will be tagged as an adverb.

The particle *do* has a separate status because it occurs in the verbal complex for building a future tense. We also propose a separate tag for the particle *po* in its function as aspect marker, e.g. *ai po punon*, engl. *he is working vs. ai punon*, engl. *he works.*

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Po cannot only be an aspect marker but has several meanings and functions, e.g. *po aq*, engl. *same.*
He gave us back the books.

word forms from other word-classes. Here are some exam-
ple forms taken from the verbal complex:

The tag SubjPPCl is used for words that are a blend of a subjunctive particle and a pronominal clitic, e.g. the word te that is a blend of të and e. As an example, consider the sentence Ai do ta lexojë librin., engl. He will read the book. Here, the verbal complex is tagged do\FutP ta\SubjPPCl lexojë\VSubjPPCl.

| # | Tag      | Name            | Example                      |
|---|----------|-----------------|------------------------------|
| 42 | Part     | Particle        | ja                           |
| 43 | AdjComPart | Comp. part.     | më [i mirë]                 |
| 44 | FutP     | Future part.    | do                           |
| 45 | NegP     | Neg. part.      | nuk/mosëšjo                 |
| 46 | ProhP    | Prohib. part.   | mos                          |
| 47 | NegPartS | Neg. part. s'   | s'punon                     |
| 48 | NegPartD | Neg. part. dot  | [s'nuk . . .] dot            |
| 49 | SubjP    | Subj. part. tê | tê                           |
| 50 | JustP    | Juss. part. le  | le                           |
| 51 | InfP     | Infin. part. për | pën                          |
| 52 | GerP     | Gerund. part. duke | duke [punuar]             |
| 53 | PartPa   | Part. pa        | pa [punuar]                  |
| 54 | QPA      | Question part. A/a | A [punon]?                  |
| 55 | CondP    | Cond. part. nê/po | nê/po . . .                 |
| 56 | PartPCl  | Particle and clitic | m'u [i. e. më+u]       |
| 57 | Asp      | Progress. part. po | po [lexon]                  |

Table 10: The proposed particle tags

The “small words” are a challenge for the tagging process, because there is a lot of overlap and ambiguity both within the closed classes and between some function words and word forms from other word-classes. Here are some examples for such syncretisms:

- The word-form do is either a particle (FutP) or a form of the verb dua, engl. to wish (V), e is either a conjunction (CCconj) or an article (Art).
- The particle mos can occur in the verbal complex as a negative particle (NegP), e.g. për të mos thënë, engl. not to say, or it can be a prohibitive particle (ProhP) as in Mos eçni sphalt, engl. Do not walk so fast!
- The word-form duke can occur in the verbal complex as a gerundive particle (GerP), e.g. duke punuar, engl. (while) working, or it can be a finite passive form of the verb dukem (VypP) as in U duke bukar!, engl. You looked beautiful!
- The particle për can occur in the verbal complex, with the subjunctive particle tê (SubjP) to construct an infinitive of an verb, e.g. për të thënë, engl. to say as in Ne kemi për të thënë diçka., engl. We will say something.
- The particle le can either occur with the subjunctive particle tê (SubjP) to construct the jussive mood of a verb, e.g. le të vrapojmë, engl. let’s walk. Le can also occur as a finite form of the verb lë (V) as in Ti le librat aje, . engl. You have left the books there.

3.11. Articles and clitics

Preposed articles have their own tag, Art. This tag is used for all preposed articles of nouns, adjectives and pronouns. Similar to two-part conjunctions there are also pairs of clitics. However, the clitics that can make up the first part of a pair can also occur on their own. Therefore, we have separate tags for clitics that occur on their own or as the first part of a pair (PCI, e.g. Ai i\PCI ktheu librat., engl. He gave back the books.) and clitics that occur as the second part of a pair (PCIP2, e.g. Ai na\ PCI i\PCI2 ktheu ne ve librat., engl. He gave us back the books.). The tag SubjPPCl is used for words that are a blend of a subjunctive particle and a pronominal clitic, e.g. the word

| # | Tag      | Name        | Example                  |
|---|----------|-------------|--------------------------|
| 58 | Art      | Article     | iëltësë                  |
| 59 | PCI      | Pronominal clitic | i                  |
| 60 | PCIP2    | Second part of pron. cl. | e [in: na e] |
| 61 | SubjPPCl | Subjunct. part. and PCI | ta [i. e. tê+e] |

Table 11: The proposed particle and clitic tags

3.12. Abbreviations

All abbreviations are tagged with the tag Abbr.

| # | Tag | Name       | Example          |
|---|-----|------------|------------------|
| 62 | Abbr | Abbreviation | d.m.th.; etj.; km.; TVSH |

Table 12: The proposed abbreviation tag

3.13. Foreign words

Foreign words are to be marked with the symbol FW. Usually, these are words which cannot be recognized by a morphology component or looked up in a lexical or morphological resource.

| # | Tag | Name       | Example  |
|---|-----|------------|----------|
| 63 | FW  | Foreign word / Non-Alb. | web     |

Table 13: The proposed tag for foreign words

3.14. Punctuation

We distinguish between two groups of punctuation marks: (1) potentially sentence-ending punctuation like periods or exclamation marks, and (2) other punctuation.

| # | Tag | Name | Example |
|---|-----|------|---------|
| 64 | Punct | Punctuation basic | . ? ! |
| 65 | Punct2 | Punctuation extended | , : ; - - - - - - - - |

Table 14: The proposed punctuation tags

3.15. Non-linguistic elements

Non-linguistic elements like § or % also have their own tag. Usually, these are various kinds of symbols like A+.

| # | Tag | Name     | Example |
|---|-----|----------|---------|
| 66 | NLE | Non-linguistic element | · § % ... |

Table 15: The proposed tag for non-linguistic elements
3.16. Emoticons

Emoticons are used in a wide variety of texts, e.g. e-mails or chats, to represent, for example, laughter, irony, or other emotions. We put all of them in one group and tag them as EM. The primary goal is to separate those entities from the rest of text.

| # | Tag | Name   | Example |
|---|-----|--------|---------|
| 67 | EM  | Emoticon | :)      |

Table 16: The proposed emoticon tag

4. Evaluation corpus

We are currently in the process of manually annotating a sample of approximately 2000 sentences. Half of those sentences have been selected randomly from texts of different genres, the other half has been selected manually in order to allow for a wider variety of linguistic phenomena in the sample corpus.

Since the corpus has not been completely tagged, yet, the tagset might still be slightly revised or refined during the tagging process. Once the sample corpus is completely annotated, we will perform evaluation experiments with automatic part-of-speech taggers.

5. Conclusions and future work

With regard to the morphological complexity of its inflectional system, Albanian is comparable to German. The tagset presented here consists of 67 tags and aims to adequately represent the morphosyntactic properties of the Albanian language. In particular, combinations of preposed articles or particles with words of other word-classes are treated in a linguistically sensible way. This should also benefit downstream processes like chunkers or parsers.

A number of morphological properties of certain word-classes are not accounted for by the tagset, e.g. gender (nouns) or number (nouns, verbs). Those properties were left out on purpose, (1) because they would have dramatically increased that tagset, and (2) because they are readily available from morphological analyzers like Trommer and Kallulli (2004), Piton and Lagji (2008) or Kabashi (2015).

We would like to stress once more that the evaluation corpus will leverage automatic part-of-speech taggers and semi-automatically annotate a larger corpus of Albanian texts. That larger corpus might then be used to train reasonably good tagger models to allow for fully automatic tagging.

Morphosyntactic part-of-speech tagging is an important building block of NLP tool chains and we hope that the tagset presented here will be useful in developing tools for more sophisticated analyses like syntactic parsers for Albanian.

6. Bibliographical References

Buchholz, O. and Fiedler, W. (1987). Albanische Grammatik. VEB Verlag Enzyklopädie, Leipzig.

Cloeør, J. (1999). Tagsets. In van Halteren (1999), pages 37–54.

Demiraj, Sh., Agalliu, F., Agoni, E., Dhrimo, A., Hysa, E., Lafe, E., and Likaj, E. (1995). Morfologija, volume 1 of Gramatika e Gjuhës Shqipe. Akademia e Shkencave e Republikës së Shqipërisë, Tirane.

Fiedler, W. (2003). Albanisch. In Thorsten Roelcke, editor, Variationstypologie / Variation Typology, pages 749–797. de Gruyter.

Grefenstette, G. (1999). Tokenization. In van Halteren (1999), pages 117–133. van Halteren, H., editor. (1999). Syntactic Wordclass Tagging. Kluwer Academic Publishers, Dordrecht.

Hasanaj, B. (2012). A Part of Speech Tagging Model for Albanian. Lambert Academic Publishing, Saarbrücken.

Kabashi, B. (2004). Analiza automatike e fjaleformave të gjuhës shqipe. In Seminari XXIII Nërkombëtar për Gjuhën, Letërsinë dhe Kulturën Shqiptare, pages 129–135. Universiteti i Prishtinës, Prishtinë.

Kabashi, B. (2015). Automatische Verarbeitung der Morphologie des Albanischen. FAU University Press, Erlangen.

Kadriu, A. (2013). NLTK tagger for Albanian using iterative approach. In Proceedings of the 35th International Conference on Information Technology Interfaces (ITI).

Kristoforidhi, K. (1904). Λεξικόν της Αλβανικής Γλώσσας. Άρις, Athens.

Leech, G. and Wilson, A. (1999). Standards for tagsets. In van Halteren (1999), pages 55–80.

Leonard Newmark, P. H. and Prifti, P. (1982). Standard Albanian – A Reference Grammar for Students. Stanford University Press, Stanford, CA.

Piton, O. and Lagji, K. (2008). Morphological study of Albanian words, and processing with NooJ. In Xavier Blanco et al., editors, Proceedings of the 2007 International NooJ Conference, pages 189–205. Cambridge Scholars Publishing.

Piton, O., Lagji, K., and Pernaska, R. (2007). Electronic dictionaries and transducers for automatic processing of the Albanian language. In Zoubida Kedad, et al., editors, Applications of Natural Language to Information Systems, NLDB 2007, pages 407–413. Springer, Berlin, Heidelberg.

Santorini, B. (1990). Part-of-speech tagging guidelines for Albanian. In van Halteren (1999), pages 129–133. van Halteren, H., editor. (1999). Syntactic Wordclass Tagging. Kluwer Academic Publishers, Dordrecht.

Trommer, J. and Kallulli, D. (2004). A morphological study of the Albanian language. In Zoubida Kedad, et al., editors, Proceedings of the 12th International Conference on Applications of Natural Language to Information Systems, NLDB 2007, pages 407–413. Springer, Berlin, Heidelberg.

van Halteren, H., editor. (1999). Syntactic Wordclass Tagging. Kluwer Academic Publishers, Dordrecht.

Hasanaj, B. (2012). A Part of Speech Tagging Model for Albanian. Lambert Academic Publishing, Saarbrücken.

Kabashi, B. (2004). Analiza automatike e fjaleformave të gjuhës shqipe. In Seminari XXIII Nërkombëtar për Gjuhën, Letërsinë dhe Kulturën Shqiptare, pages 129–135. Universiteti i Prishtinës, Prishtinë.

Kabashi, B. (2015). Automatische Verarbeitung der Morphologie des Albanischen. FAU University Press, Erlangen.

Kadriu, A. (2013). NLTK tagger for Albanian using iterative approach. In Proceedings of the 35th International Conference on Information Technology Interfaces (ITI).

Kristoforidhi, K. (1904). Λεξικόν της Αλβανικής Γλώσσας. Άρις, Athens.

Leech, G. and Wilson, A. (1999). Standards for tagsets. In van Halteren (1999), pages 55–80.

Leonard Newmark, P. H. and Prifti, P. (1982). Standard Albanian – A Reference Grammar for Students. Stanford University Press, Stanford, CA.

Piton, O. and Lagji, K. (2008). Morphological study of Albanian words, and processing with NooJ. In Xavier Blanco et al., editors, Proceedings of the 2007 International NooJ Conference, pages 189–205. Cambridge Scholars Publishing.

Piton, O., Lagji, K., and Pernaska, R. (2007). Electronic dictionaries and transducers for automatic processing of the Albanian language. In Zoubida Kedad, et al., editors, Applications of Natural Language to Information Systems, NLDB 2007, pages 407–413. Springer, Berlin, Heidelberg.

Santorini, B. (1990). Part-of-speech tagging guidelines for Albanian. In van Halteren (1999), pages 129–133. van Halteren, H., editor. (1999). Syntactic Wordclass Tagging. Kluwer Academic Publishers, Dordrecht.

Hasanaj, B. (2012). A Part of Speech Tagging Model for Albanian. Lambert Academic Publishing, Saarbrücken.

Kabashi, B. (2004). Analiza automatike e fjaleformave të gjuhës shqipe. In Seminari XXIII Nërkombëtar për Gjuhën, Letërsinë dhe Kulturën Shqiptare, pages 129–135. Universiteti i Prishtinës, Prishtinë.

Kabashi, B. (2015). Automatische Verarbeitung der Morphologie des Albanischen. FAU University Press, Erlangen.

Kadriu, A. (2013). NLTK tagger for Albanian using iterative approach. In Proceedings of the 35th International Conference on Information Technology Interfaces (ITI).

Kristoforidhi, K. (1904). Λεξικόν της Αλβανικής Γλώσσας. Άρις, Athens.

Leech, G. and Wilson, A. (1999). Standards for tagsets. In van Halteren (1999), pages 55–80.