

# Automated Synonym Dictionary Generation Tool for Turkish (ASDICT)

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## Abstract

In this paper, an Automated Synonym Dictionary Generation Tool for Turkish (ASDICT) was briefly described and the development process of the algorithms was given in detail.

By applying the ASDICT onto the data of Contemporary Turkish Dictionary published by Turkish Linguistic Association (TDK: Türk Dil Kurumu), a synonym database was obtained. The synonym dictionary generation process was carried out by applying four processes. As a result of these processes, the definite synonyms were classified as *Definite Synonym* ( $D_d$ ) and put into the *Synonym List* ( $SL_d$ ). Some words, which could not be classified as  $D_d$ , were classified as *Ambiguity* and stored in a file called *Ambiguity File* ( $AF$ ) to be checked out by supervised methods to build a more reliable synonym database.

The synonym database for Contemporary Turkish Dictionary, which is called "*Definite Synonyms Database* ( $DSDB$ )", was built by applying ASDICT, and it is currently available on the official web site of TDK (TDK 2009).

## Keywords

Synonyms, automated, dictionary, Turkish, natural language processing

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## 1. Introduction

A *dictionary* is a collection of words (also called headwords) in a specific language, often listed alphabetically, with definitions, etymologies, phonetics, pronunciations, and other information (Agnes 1999). Dictionaries are commonly printed as the form of a book, but nowadays they can also be used as online via the Internet.

*Specialized dictionaries* are sometimes found in specialized areas, such as idioms, proverbs, synonyms, acronyms, antonyms, etc. Some concept of assets may meet the same or different words in a language. These words, the structure of which are different but have the same meanings, are called *synonyms*. Synonyms may have identical or very similar meanings, which are used for communicating easily by expressing thoughts appropriately. Synonym dictionaries have, at least, the following advantages for both general users and researchers:

- Automated data extraction from a large body of text corpus,
- Query clustering applications to help the search engines which use a question-answer structure (Wen et. al. 2002),
- Automatic indexing procedures to help to assign each word-stem to a concept class (Salton 1971),
- Automatic machine translation studies (Edmonds 1999),
- Automatic author recognition through lexical choice (Reiter et. al. 2002).

Apart from their general use, they have the following advantages for researchers in the field of linguistics specifically:

- Defining verbs' conceptual structures and event types in order to provide more complete verb frames for syntactic parser software (Chu-Ren et. al. 2005),
- Producing more lexically cohesive texts for authors from various fields (Donnelly 1994),
- Revealing the interactional relationship between syntax and semantics (Chief et. al. 2000),
- Helping foreign language teachers in teaching vocabulary and helping learners of a second language in using appropriate vocabulary according to the situation (Martin 1984).

In this paper, the Automated Synonym Dictionary Generation Tool (ASDICT) developed for Turkish was described in details. As data source, The Contemporary Turkish Dictionary, in which word synonym and antonyms are given in different forms and prepared by Turkish Linguistic Association (TDK), was used.

## 2. Automated Synonym Dictionary Generation Tool for Turkish (ASDICT)

**2.1. The structure of the data used for ASDICT:** The basic data source used in this study was The Contemporary Turkish Dictionary, which includes more than 70,000 words, and was published by the Turkish Linguistic Association (TDK). In this dictionary database, word synonym and antonyms are given in different forms. The dictionary database was taken from the Turkish Linguistic Association, the unnecessary fields and tables were removed from the database and the database structure is simplified as given in Table 1.

**Table 1.** *The Structure of the Source Data*

Head Word	Meaning
Bayrak ( <i>Flag</i> )	<p>Bir milletin, belli bir topluluğun veya bir kuruluşun simgesi olarak kullanılan, renk ve biçimle özelleştirilmiş, genellikle dikdörtgen biçiminde kumaş, sancak.</p> <p><i>A usually rectangular piece of fabric of distinctive design that is used as a symbol as of a nation, a particular society or an institution, pennon.</i></p> <p>Öncü</p> <p><i>Pioneer</i></p> <p>Simge, sembol</p> <p><i>Ensign, symbol</i></p> <p>Baklagillerde diğerlerinden daha üstte bulunan, daha büyük olan ve çoğunlukla başka bir renkte ve yuvarlakça olan taç yaprağı.</p> <p><i>Any of the petals of pulse that is positioned above other petals, bigger than other petals and that differs in colour.</i></p> <p>Atletizmdeki bayrak yarışında dört sporunun elden ele geçirdiği kısa, yuvarlak sopa.</p> <p><i>The short, rounded baton that the athletes pass from hand to hand in relay races in athletics.</i></p> <p>Gerektiğinde indirilip kaldırılan, açılıp kapatılan kol.</p> <p><i>A handle that is lowered or raised / opened and closed when needed.</i></p>
Çözümleme	<p>(<i>Analysis</i>)</p> <p>Çözümlemek işi.</p> <p><i>The act of analysing.</i></p> <p>Bir cümledeki kelimelerin hangi kelime türünden olduklarını veya özne, tümlec, yüklem görevlerinden hangisinde bulduklarını belirtme, tahlil.</p>

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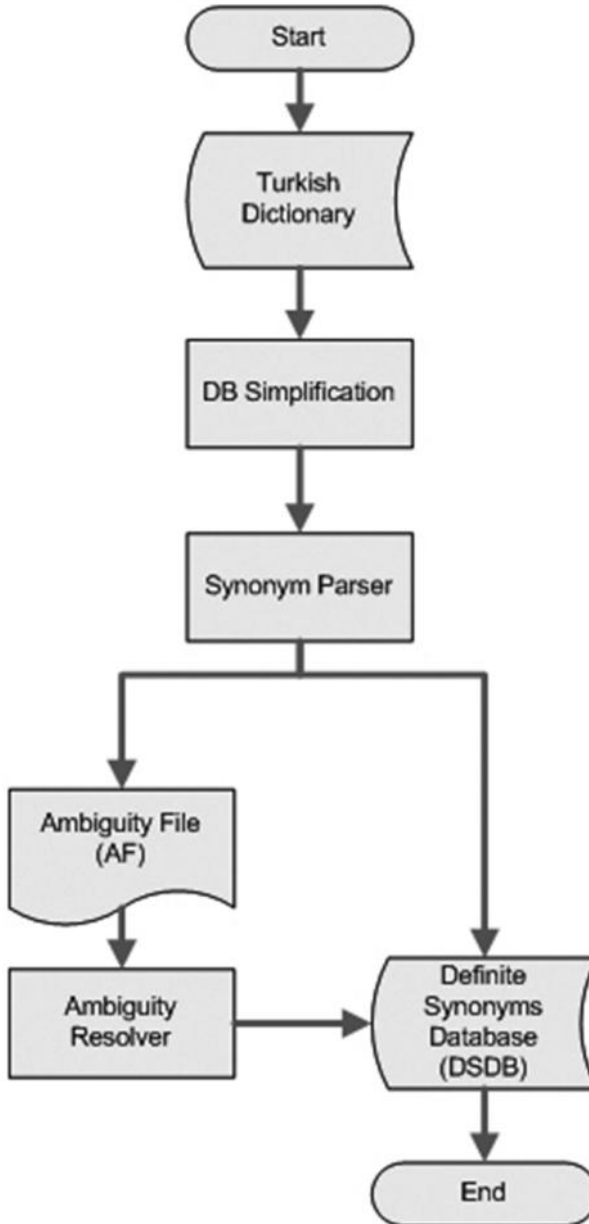
	<p><i>Defining the part-of-speech and the syntactic functions (subject, complement, predicate) of the words in a sentence, test.</i>  <i>Kelimenin kökünü bulup eklerini gösterme.</i>  <i>Defining the root of the word, and showing the affixes.</i>  <i>Bir metni belirli yöntemlere bağlı kalarak gözden geçirme, tahlil.</i>  <i>Reviewing any text abiding by particular methods, test.</i>  <i>Herhangi bir konunun, bir nesnenin düşüncede veya gerçeklikte kurucu parçalarına ayrılmak yoluyla yapısının, işleyişinin ve gelişim yasalarının ortaya konması işlemi.</i>  <i>The process of revealing the structure, functioning and the developmental rules of any issue or physical object in theory or in practice by separating it to its constituents.</i>  <i>Bir maddenin birleşimindeki yalın cisimlerin niteliğini veya niceliğini anlamak için yapılan işlem, tahlil, analiz.</i>  <i>The dissolution performed in order to understand the quality and quantity of the pure forms in the composition of any substance, test, assay.</i>  <i>Bir sayıyı onluk ve birliklerine ayırıp yazma.</i>  <i>Rewriting any number in its decimals and units.</i></p>
Beyaz	<p><i>(White)</i>  <i>Ak, kara, siyah karşıtı.</i>  <i>Hoar, opposite of dark, black.</i>  <i>Bu renkte olan.</i>  <i>Things which are white.</i>  <i>Beyaz ırktan olan kimse.</i>  <i>A person belonging to white race.</i>  <i>Baskıda normal karalıktaki görünen harf çeşidi.</i>  <i>A kind of letter visible in normal darkness at press.</i>  <i>Beyaz zehir.</i>  <i>White poison/heroin.</i></p>
Kara	<p><i>(Dark)</i>  <i>En koyu renk, siyah, ak, beyaz karşıtı</i>  <i>The darkest colour, black, opposite of hoar, white.</i></p>

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As given in Table 1, some words have more than one meaning, and some meanings include both synonyms and antonyms. In general, synonyms are located as separate words in the meaning part, but in some cases, they are located at the end of the descriptive sentence. Therefore, some ambiguities occurred during the synonym extraction process.

**2.2 General flow of ASDICT algorithm:** In this study, depending on both the characteristics of Turkish and the structure of the Turkish Dictionary, an Automated Synonym Dictionary Generation Tool (ASDICT) was developed. The general workflow diagram of the tool is given in Figure 1.

Figure 1. General workflow diagram.

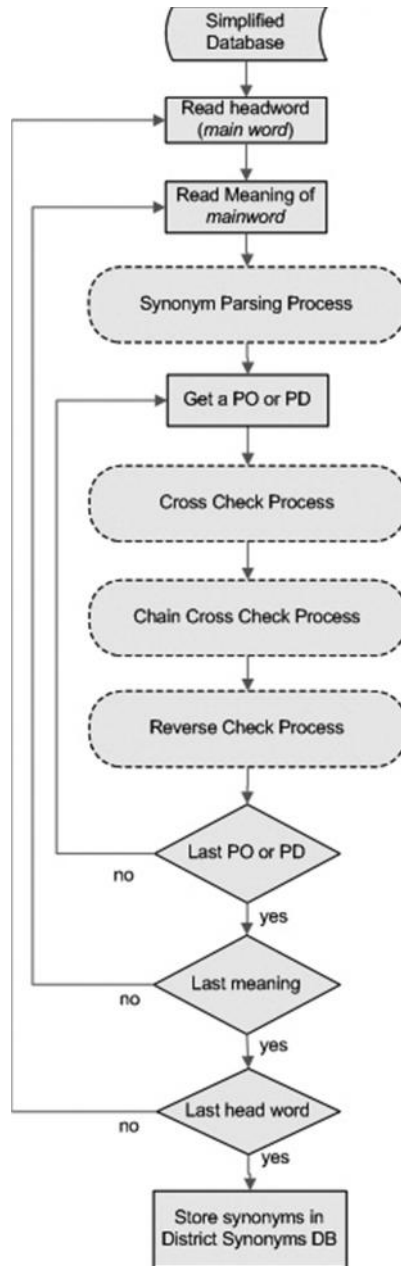


In order to extract synonyms from the database and put them in an order, a synonym parser should be used. By using the simplified dictionary database, including head words and meanings of each word, the *Synonym Parser (SP)* module extracts the synonyms and words causing ambiguities.

The words which are definitely classified as *synonyms* are stored in another database for further processes and the words or phrases classified as *ambiguities* are stored in a file for resolving process which is carried out by supervised techniques.

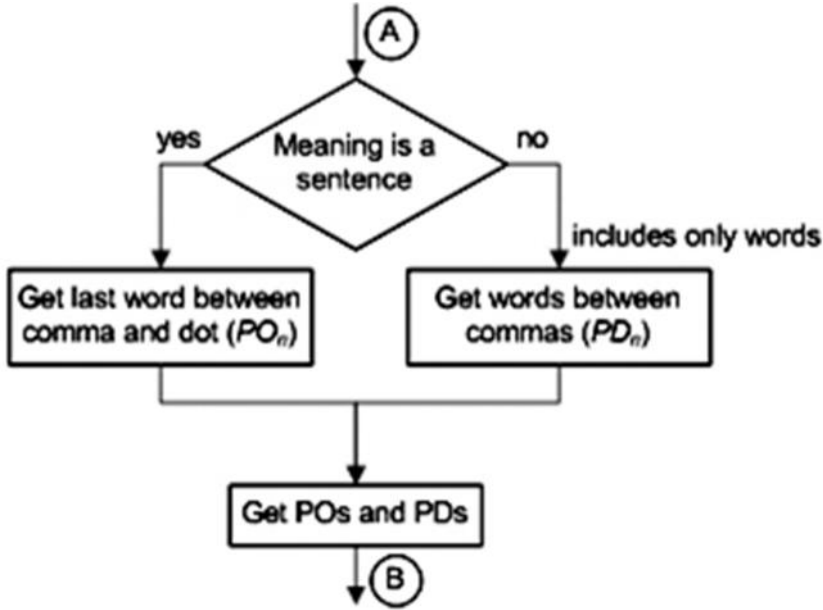
In the dictionary database simplification step, the meanings of the head-words were taken one by one from different tables in the current Turkish dictionary database, and a new simplified database was generated. After generating the simplified database, the synonym parsing process is applied by *Synonym Parser (SP)* module. The flowchart of the SP module is given in Figure 2.

**Figure 2.** *General workflow diagram of Synonym Parser (SP) module.*



**2.3. Description of ASDICT:** In the first step of the process, which can be defined as synonym parsing, meanings of head words are taken one by one and examined (Figure 3).

**Figure 3.** Workflow diagram of Synonym Parsing Process.



The head word, which its synonym is to be searched, is denoted as *main word*. Each meaning of the main word is parsed and controlled if it is a whole sentence, a single word or a sequence of single words separated by commas (“,”). A word in the meaning of the main word is accepted as a *pre-definite* ( $PD_n$ ) synonym, when it is located in the meaning part alone, or a single word between commas. Otherwise, it is accepted as a sentence and an additional parsing process is required.

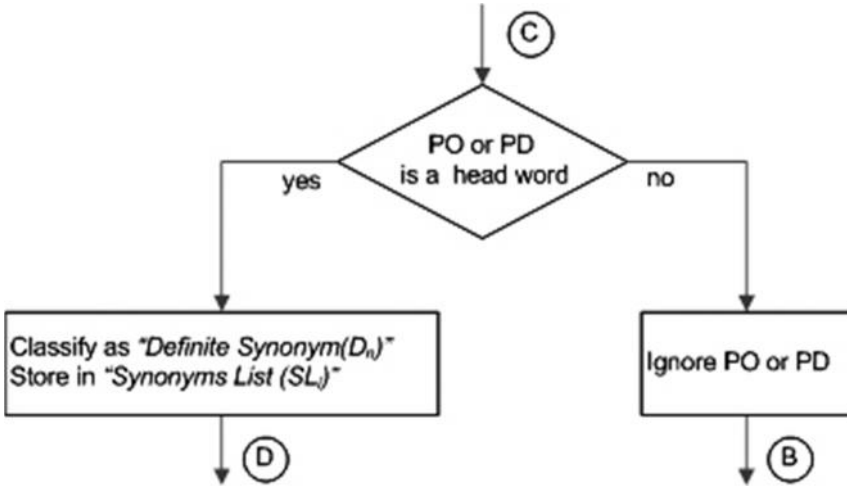
In this process, the sentence is examined from the point of punctuation marks. The part of the sentence between the last comma and the end of sentence mark (“.”, “!”, “...” ) is taken as a phrase. This part is considered as a *possible* ( $PO_n$ ) synonym and will be controlled in the further steps.

For the data given in Table 1, the words “öncü (pioneer)”, “simge (ensign)”, “sembol (symbol)” were selected as pre-definite synonyms for the main word “bayrak (flag)”, and the word “sancak (pennon)” was selected as *possible synonym*.



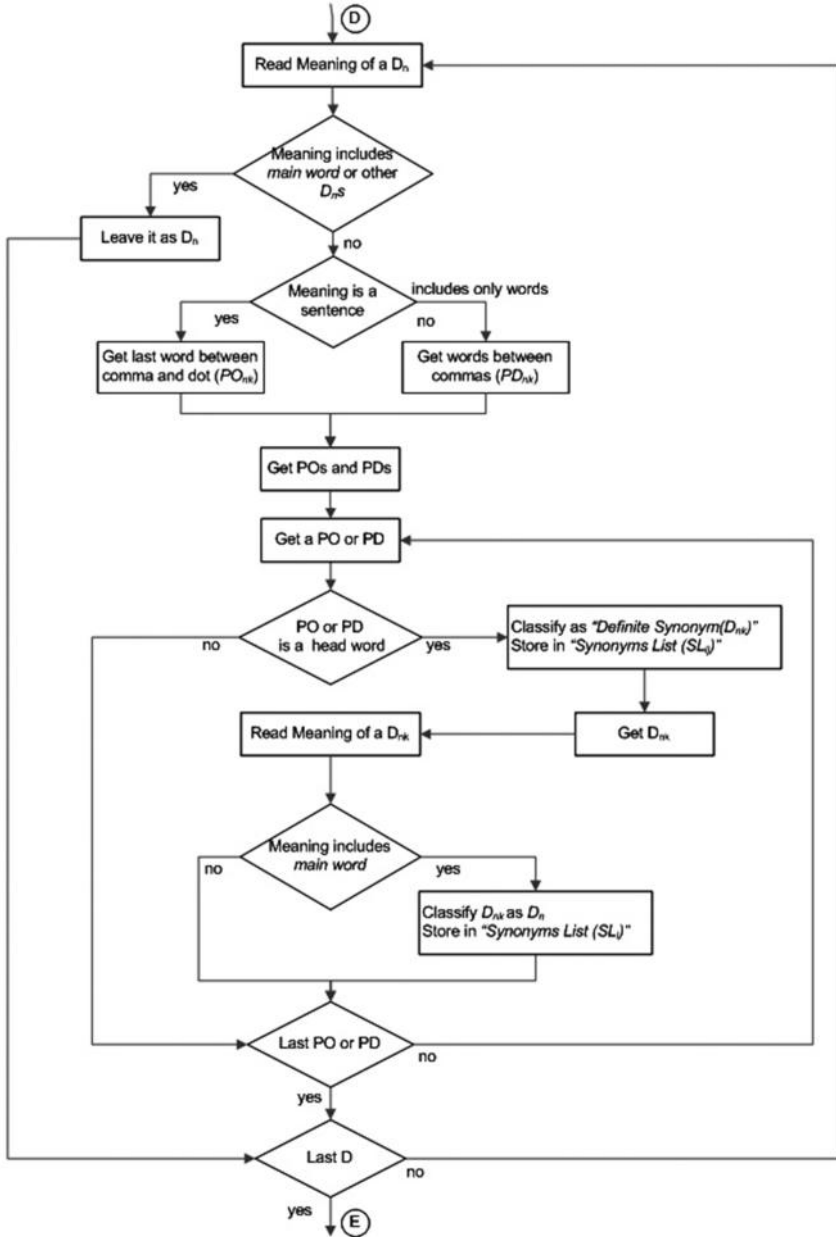
After the synonym parsing process, all  $PD_n$  and  $PO_n$  synonyms are cross-checked with the head words in the dictionary (Figure 4). If it is found as a head word in the dictionary, then it is classified as *Definite* ( $D_n$ ) synonym and put into the *Synonym List* ( $SL_i$ ), otherwise it is discarded.

**Figure 4.** Workflow diagram of “Cross Check Process”.



After a  $PD_n$  or  $PO_n$  synonym is classified as  $D_n$  synonym, the synonym chain cross check process is applied (Figure 5). In this process, meaning of each  $D_n$  is checked as if it includes the main word or any of other  $D_n$ s. When the meaning of the  $D_n$  does not include either main word or any of the  $D_n$ s in the  $SL_i$ , the secondary checking process is carried out. In this process, at first, the  $PD_{nk}$  and  $PO_{nk}$  synonyms for each  $D_n$  in the  $SL_i$  are found and a secondary level synonym list was created ( $SL_{ij}$ ). After that, the chain cross check process is applied for the  $SL_{ij}$ . If any of the  $PD_{nk}$  or  $PO_{nk}$  synonyms of the  $D_n$  includes only the main word in their meanings as a  $PD_{nkm}$  and  $PO_{nkm}$  synonym, then  $PD_{nk}$  or  $PO_{nk}$ , of which includes main word, is classified as  $D_n$ .

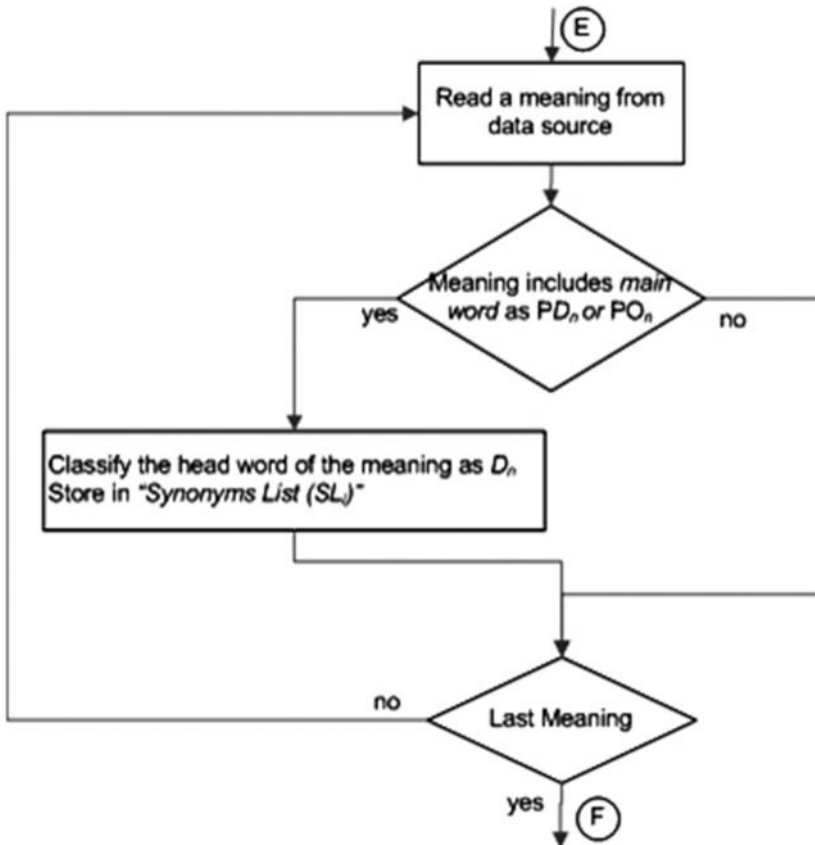
Figure 5. Workflow diagram of Chain Cross Check Process.



The *chain cross check process* continues until no more words are found to be classified as  $D_n$ . In some cases, the entire dictionary is required to be checked to find the synonyms of the main word.

In the last step, the *reverse check process* is carried out by checking all meanings in the dictionary as if they include main word as a synonym (Figure 6).

**Figure 6.** Workflow diagram of *Reverse Check Process*.



When the main word is found, then the head word of that meaning is classified as  $D_n$ . The notations, which are used in *Synonym Parser (SP)* module, are simply given in the following.

The processes given above can be explained on a sample word. The selected main word for this process is “adım (step)” which has six different

meanings in Turkish. The meanings of the main word and the words obtained during the processes are given in Table 2.

**Table 2.** *The Meanings of Main Words, Pre-definite and Possible Synonyms*

Head Word	Meaning
Adım ( <i>Step</i> )	
İki diş arasındaki aralık	<i>The interval between two threads.</i>
Yürümek için yapılan ayak atışlarının her biri	<i>An advance or movement made by raising the foot and bringing it down elsewhere for walking</i>
Bir ayak atışıyla alınan ve uzunluğu yaklaşık 75 cm olan mesafe	<i>The space passed over in one step, approximately 75 cm</i>
Girişim, hamle	<i>Attempt, move</i>
Bir gösterge ucunun eş olarak ayrılmış yaylardan biri boyunca aldığı yol	<i>The distance covered by a probe over one of the springs separated evenly</i>
Bir yarışın belirli uzaklığı kapsayan bölümlerinden her biri, etap	<i>Each of the parts of a race that covers a particular distance, lap</i>
Girişim ( <i>Attempt</i> )	
Bir işe girişme, teşebbüs	<i>Set to work, undertaking</i>
İki veya daha çok dalga hareketinin, aynı noktaya aynı anda gelmesiyle birbirini yok edebilmesi veya kuvvetlendirebilmesi olayı	<i>The event where two or more wave movements arrive at the same point in the same time causing an increase or decrease in the amplitude</i>
Hamle ( <i>Move</i> )	
Atak	<i>Attack</i>
İleri atılma, atılım, saldırı	<i>Rush ahead, exploit, assault</i>
Saldırı, savlet	<i>Assault, onslaught</i>
Satrançta ve damada taş sürme işi	<i>Moving pieces in chess or checkers</i>
Etap ( <i>Lap</i> )	

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Aşama

*Stage*

Adım

*Step*

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Teşebbüs (*Undertaking*)

Girişim, girişme

*Attempt, attempting*

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Atak (*Attack*)

Geveze

*Talkative*

Düşüncesizce her işe atılan, cüretkâr

*One who bursts in upon without thinking, courageous*

Çevik, hareketli

*Agile, dynamic*

Atılım

*Exploit*

Saldırı, saldırış, hücum, hamle, akın

*Offence, assault, assail, move, raid*

Gol atmak veya sayı kazanmak amacıyla yapılan akın, ofans

*Moves performed in order to score, offence*

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Atılım (*Exploit*)

Atılma işi

*The act of exploiting*

İleri atılma

*Rush ahead*

Hızla ilerleme, hamle, savlet

*Forge ahead, move, onslaught*

Sayı kazanmak amacıyla yapılan atılış, hücum

*Moves performed in order to score, attack*

Herhangi bir konuda ilerleme çabası, hamle

*Any attempt to progress in any issue, move*

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Saldırış (*Assault*)

Saldırma işi

*The act of attacking*

---

Savlet (*Onslaught*)

Şiddetli saldırı

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*Fierce attack**Aşama (Stage)*

Bir yarışın belirli uzaklığı kapsayan bölümlerinden her biri, etap

*Each of the parts of a race that covers a particular distance, lap*

Önem veya değer bakımından gitgide yükselen bir sıra basamakların her biri, rütbe, mertebe, paye

*Each of the steps that increase in terms of importance or value, rank, degree, position*

Varılması istenen bir amaca doğru geçilmesi gerekli dönemlerden her biri, evre, basamak, adım, merhale

*Each of the periods to pass in order to achieve a desired goal, phase, echelon, step, gradation*

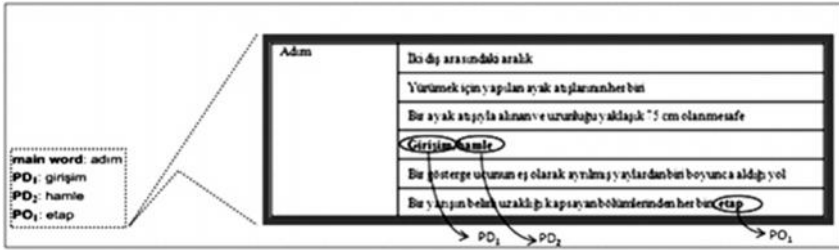
*Kadem (Foot)*

Ayak, adım

*Foot, step*

In the first step of the general process, which is called as *Synonym Parsing Process*, the words “girişim” and “hamle” and “etap” were found as synonyms. The first two of them are defined as *Pre-Definite (PD<sub>n</sub>)* and the last is defined as *Possible (PO<sub>n</sub>)* synonym (Figure 7).

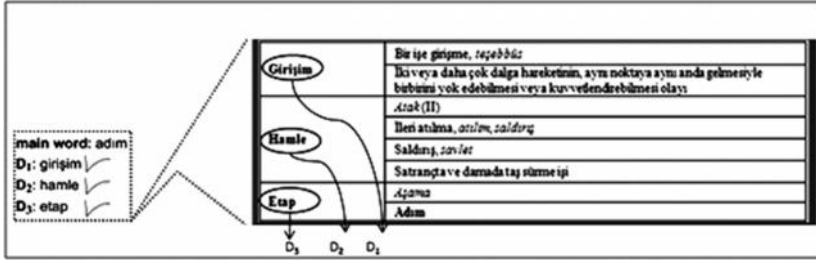
**Figure 7.** Synonym parsing process for “adım” main word.



After the *Synonym Parsing Process*, the words “girişim (attempt)”, “hamle (move)” and “etap (lap)” were checked if they exist in the dictionary as head words. All of these words were found in the dictionary, classified as D<sub>1</sub>, D<sub>2</sub>, and D<sub>3</sub> synonyms respectively, and put into the SL<sub>1</sub>.

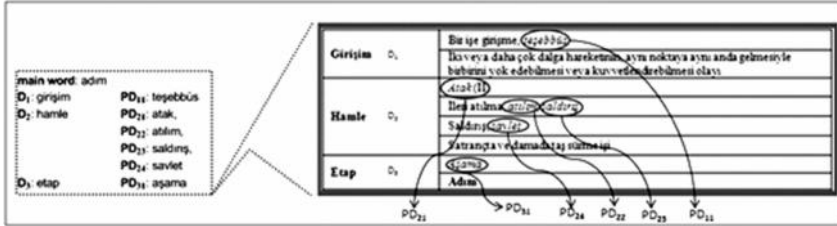
In the *Synonym Cross Checking Process*, the meanings of D<sub>n</sub>s did not include other D<sub>n</sub>s, and the main word “adım (step)” was found only in the meaning of the word “etap (lap)” (Figure 8).

Figure 8. Synonym cross checking process for “adım” main word.



In the *Chain Cross Checking Process* step, firstly, the  $PD_{nk}$  and  $PO_{nk}$  synonyms of the  $D_n$  are found as; “teşebbüs (undertaking)” for “girişim (attempt)”; “atak (attack)”, “atılım (exploit)”, “saldırı (assault)”, “savlet (onslaught)” for “hamle (move)”; “aşama (stage)” for “etap (lap)”. After applying the cross checking process onto these words, they are put into the list  $SL_{ij}$  as *Probable* ( $PR_{nk}$ ) synonyms (Figure 9).

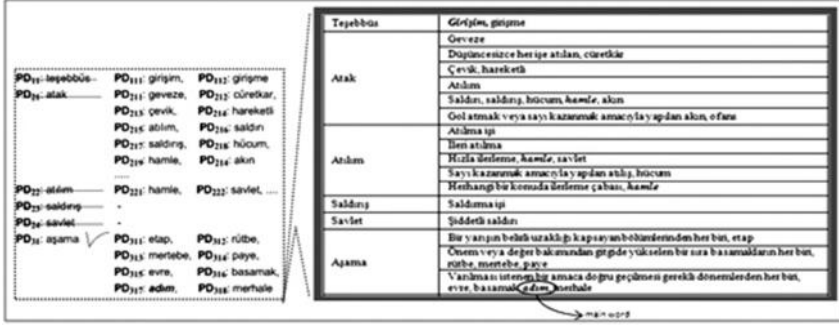
Figure 9. First step of chain cross checking process for “adım” main word.



Since only the word “aşama (stage)” includes the main word “adım (step)” as  $PD_{317}$  synonym in its meaning part, it was selected as  $D_4$  for the main word “adım (step)”. This step is repeated recursively until no new PR is found in all sub steps.

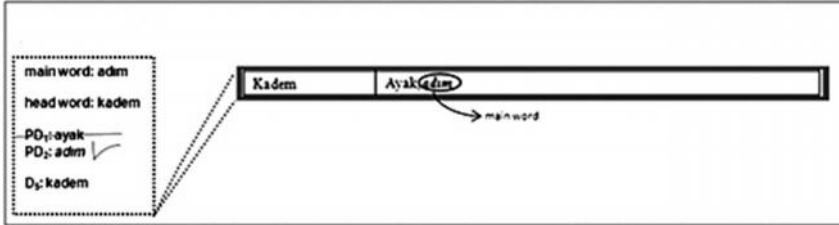
For this sample, next sub step will be carried out for the words “girişim (attempt)”, “girişme (attempting)”, “geveze (talkative)”, “cüretkâr (courageous)”, “çevik (agile)”, “hareketli (dynamic)”, “atılım (exploit)”, “saldırı (offense)”, “saldırı (assault)”, “hücum (assail)”, “hamle (move)”, “akın (raid)”, “ofans (offence)”, “savlet (onslaught)”, “etap (lap)”, “rütbe (rank)”, “mertebe (degree)”, “paye (position)”, “ever (phase)”, “basamak (echelon)”, “merhale (gradation)” (Figure 10).

Figure 10. Second step of chain cross checking process for main word, “adım”.



As the last step, the *Reverse Check Process* is carried out on the dictionary and only the word “kadem (foot)” was detected which has the main word “adım (step)” in its meaning part. Therefore, this word was also selected as a synonym of the main word, and added to the  $SL_1$  as  $D_5$  (Figure 11).

Figure 11. Reverse check process for main word, “adım”.



The definite synonyms of “adım (step)” main word, which are stored in *Definite Synonyms Database (DSDB)*, are “girişim (attempt)”, “hamle (move)”, “etap (lap)”, “aşama (stage)” and “kadem (foot)”.

Both the definite synonyms found by ASDICT, and the definite synonyms determined by supervised techniques are stored into the *Definite Synonym Database (DSDB)* in the form as shown in Table 3.

Table 3. Sample Data in DSDB

Head Word	Synonyms
çözümleme	tahlil / analiz
çözülme	parçalanmak / dağılmak / çökmek
bayrak	sembol / simge / sancak / öncü / alem



**2.4. Ambiguities and solving methods:** Like synonyms, the antonyms of the head word are written in the full meaning between commas. Therefore, during synonym search process, some ambiguities are appeared such as in the “beyaz (white)” headword which has five different meanings as given in Table 1.

In the first meaning of the headword “beyaz”, the definition is given as “Ak, kara, siyah karşıtı”. The words between commas, “ak” and “kara” are accepted as PDs. Also, after applying the method mentioned above onto these words, both of them are determined as *Definite Synonyms (D<sub>n</sub>)* of the word “beyaz”.

However, even “ak” is synonym of “beyaz”, “kara” is antonym. Since the word “ak” is located in the meaning part of “kara” and is determined as its definite synonym, this problem cannot be solved during cross check process. Meanings, which include such problems (ambiguities), has also an additional phrase as “..... karşıtı (opposite of ...)” at the end. In most cases, this problem should be taken into consideration by taking the preceding word just before that phrase. The PDs or POs, which has such ambiguities, are stored in a file named as *Ambiguity File (AF)* for further supervised resolving processes.

In Turkish, the idioms may include auxiliary verbs such as “olmak, etmek, eylemek”, which turn the status of the preceding word to “verb” when considered together. Therefore, this kind of idioms may be accepted as synonyms of the head words and can be determined by SP. For example, the idiom “analiz etmek (to analyze)” is determined as synonym of head word “çözümlemek (to examine)”.

In the dictionary, there are some head words written as phrases, such as “açıktan tayin (direct appointing)”. In such cases, the synonym can be found in two steps. In the first step, all words in the phrase are taken one by one and synonyms of each word are searched in the dictionary by using the method described above. When the synonym of a word cannot be found, then the word is taken as is. In the second step, the synonyms are combined together forming word phrases. For example, the synonym of “açıktan tayin” is found as “açıktan atama”, since synonym of “tayin” is “atama” in Turkish. Since the structure of Turkish is suitable, this method gives adequate results.

The synonym phrases, which are found as PDs or POs of any main words and cannot be resolved either definite synonyms or not, are stored in the AF to be resolved in the *Ambiguity Solver (AS)* module.

In the AS module, at first, the data in the ambiguity file, some samples of which are given in Table 4, is verified as if they are *Definite Synonyms (D)* or not.

**Table 4.** *Sample Data in AF*

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**Bayrak** çözümlene tahlil / analiz sembol / simge / sancak / öncü / alem.

**Çözölmek** parçalanmak / dağılmak / çökmek.

**Çözümlene** tahlil / analiz.

**Çözümlenek** analiz etmek / tahlil etmek.

**Darmadağın** tarumar / darmadağınık **darmadağın etmek** karıştırmak / dağıtmak.

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The supervised process is carried out by the experts in Turkish Linguistic Association (TDK) and Linguistic Department of Literature Faculty in Dokuz Eylül University. After the verification process, the synonyms, which are denoted as definite synonym (D) of any head word, are stored into the DSDB.

## 2. Conclusion

The synonyms dictionaries are required and commonly used especially in the field of linguistics. The studies on the computerized analysis of Turkish were begun in the 1990s and till now a synonym dictionary has not been created. Therefore, with the collaboration of Turkish Linguistic Association (TDK:Türk Dil Kurumu), an Automated Synonym Dictionary Generation Tool for Turkish (ASDICT) was developed.

In this study, ASDICT was described in general. The data used throughout this study was taken from Contemporary Turkish Dictionary, which is published by TDK. By using this dictionary data, a synonym database for Turkish was developed and has currently been published by TDK in the official web site at [www.tdk.org.tr](http://www.tdk.org.tr) (Figure 12).

Figure 12. Synonyms of “bayrak” in the “Online Synonyms Dictionary of TDK”.



Since the dictionary database was not suitable and included unnecessary data, a simplification and filtering process was carried out on it by removing unnecessary fields and tables. Although the synonyms in the dictionary were correctly determined by ASDICT, in some cases, depending on both the nature of Turkish and structure of the dictionary, some words were mis-determined. For example, some words have more than one meaning, and some meanings include both synonyms and antonyms in the data source, resulting ambiguities in synonyms extraction process. In general, synonyms are located as separate words in the meaning part such as “bayrak: öncü”, but in some cases, they are located at the end of the descriptive sentence after the “,” (comma) mark such as “bayrak: Bir milletin, belli bir topluluğun veya bir kuruluşun simgesi olarak kullanılan, renk ve biçimle özelleştirilmiş, genellikle dikdörtgen biçiminde kumaş, sancak”. However, the antonyms are located in the same way, which also causes ambiguity, such as “beyaz: Ak, kara, siyah karşıtı”. In

order to generate a reliable synonym dictionary and overcome these kinds of ambiguities, supervised methods are required. For the synonym dictionary, all ambiguities were overhauled and finalized by the experts in Turkish Linguistic Association (TDK) and Dokuz Eylül University, College of Social Science and Literature Linguistic Department. The ambiguities, which arised from the non-standardized syntax of the Contemporary Turkish Dictionary, can be resolved by replacing the punctuation mark “,” (comma) with “;” (semicolon) such as “beyaz : Ak; kara, siyah karşıtı”. After this process, more synonyms can be correctly extracted from the dictionary; therefore the usage of supervised methods can be minimized.

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# Türkçe için Otomatik Eşanlamlılar Sözlüğü Oluşturma Aracı (ASDICT)

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## Öz

Bu makalede, gerçekleştirimi yapılan Türkçe için Otomatik Eşanlamlılar Sözlüğü Oluşturma Aracı (ASDICT) ve algoritmaların geliştirme süreçleri detaylı bir şekilde anlatılmıştır. ASDICT, Türk Dil Kurumu (TDK) tarafından yayımlanan Güncel Türkçe Sözlük veritabanı üzerinde uygulanarak bir eşanlamlılar veritabanı elde edilmiştir. Eşanlamlılar sözlüğü oluşturma süreci, dört ayrı işlem uygulanarak gerçekleştirilmiştir. Bu işlemlerin sonucunda kesin olarak belirlenmiş olan eşanlamlı kelimeler *Kesin Eşanlamlı (Definite Synonym (Dn))* olarak sınıflandırılmış ve *Eşanlamlılar Listesi'ne (Synonym List (SLi))* kaydedilmiştir. Kesin Eşanlamlı olarak sınıflandırılmayan bazı kelimeler, *Belirsiz (Ambiguity)* olarak sınıflandırılarak, daha güvenilir bir eşanlamlılar veritabanı oluşturabilmek amacıyla, denetimli yöntemlerle kontrol edilip belirlenmek üzere *Belirsizlik Listesine (Ambiguity File (AF))* kaydedilmiştir. İşlemlerin sonucunda, Kesin Eşanlamlılar Veritabanı (Definite Synonyms Database (DSDB)) olarak adlandırılan eşanlamlı kelimeleri içeren veritabanı oluşturulmuş ve Türk Dil Kurumu'nun resmi web sitesinde kullanıma açılmıştır (TDK 2009).

## Anahtar Kelimeler

Eşanlamlı, otomatik, sözlük, Türkçe, doğal dil işleme

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## (ASDICT)

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### Аннотация

(ASDICT) ASDICT  
(TDK: Türk Dil Kurumu),  
(Dn)  
(SLi).  
(AF),  
«  
» (Definite Synonyms Database (DSDB)),  
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### Ключевые слова

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