Detailed Analysis of Complex Sentences in Punjabi Language

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ABSTRACT

Complex sentences constitute major parts of the Punjabi language. All the large sentences are either of compound or of complex type. Detail analysis of complex sentences is helpful in processing the Punjabi language through computer. This study will be helpful in identifying and separating the complex sentences from Punjabi corpus. Also this study will be helpful in developing other NLP applications like simplification of sentences, grammar checking of complex sentences, summarization and machine translation etc.

Keywords
Complex sentence processing, NLP, Punjabi language

1. INTRODUCTION
A sentence is a group of words expressing a complete thought. All sentences mainly lie in three categories i.e. simple sentence, compound sentence and complex sentence. Simple sentences are composed of single clause whereas compound and complex sentences are composed of more than one clause. A complex sentencecontains at least one independent clause and one or more than one dependent clauses. These dependent and independent clauses are joined by subordinate conjunctions such as ਜੋ, ਜਿਵੇਂ, ਜਦੋਂ, ਜੇ, ਕਿ etc.

Example:

> Punjabi: ਜਦੋਂਮੁੰਡਾਰੇਲਵੇਸਟੇਸ਼ਨਪਹੁੰਚਿਆਤਾਂਗੱਡੀਜਾਚੁੱਕੀਸੀ
>
> English Translation: When boy reached at station then the train had left.

In above sentence ਜਦੋਂ-ਤਾਂis sub-ordinate conjunction. It occurs in pair i.e. one part lies at the beginning of dependent clause and the other part lies at the end of the dependent clause. In above sentence ਜਦੋਂਮੁੰਡਾਰੇਲਵੇਸਟੇਸ਼ਨਪਹੁੰਚਿਆਤਾਂis the dependent clause starting with subordinate conjunction ਜਦੋਂ and ending with other part of subordinate conjunction ਤਾਂ and the second part i.e. ਗੱਡੀਜਾਚੁੱਕੀਸੀis the independent clause.

2. OVERVIEW OF PUNJABI LANGUAGE
Punjabi language is a member of the Indo-Aryan family of languages, also known as Indic languages. Other members of this family are Hindi, Bengali, Gujarati, and Marathi etc. Indo-Aryan languages form a subgroup of the Indo-Iranian group of languages, which in turn belongs to Indo-European family of languages. Punjabi is spoken in India, Pakistan, USA, Canada, England, and other countries with Punjabi immigrants. It is the official language of the state of Punjab in India. Punjabi is written in "Gurmukhi" script in eastern Punjab (India), and in "Shahmukhi" script in western Punjab (Pakistan).

3. INTRODUCTION TO CLAUSES
If sentence is the largest unit then clause is second largest unit in a sentence. A clause is composed of different phrases. The clauses basically fall in two main categories i.e. Dependent clause and Independent clause. The basic difference between these two types of clauses is that an independent clause can constitute an independent sentence where as a dependent clause cannot create a sentence, they need an independent clause for it.

3.1 Independent Clause
An independent clause can constitute a simple sentence on its own. Every sentence contains independent clause as a basic element. The independent clause contains a finite verb phrase as an essential element.

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3.2 Dependent Clause

Dependent clause cannot constitute a sentence on its own. It always occurs with an independent clause in a complex sentence. It typically consists of subordinate verb phrases or start with a subordinate conjunction or words of relative pronoun word class. Dependent clause typically conveys an incomplete thought and for its completion an independent clause is required. In some cases it can have the structure similar to an independent clause. Dependent clauses in complex sentences can be realized by the following means:

- The complex sentence containing three or more than three clause can have more than one independent clause.
- The dependent clauses of complex sentences contain noun phrase, adverb phrase and adjective phrase.

4. STRUCTURE OF PUNJABI SENTENCE

Punjabi sentence follow SOV (Subject-Object-Verb) order. In Punjabi sentences, the subject occurs first followed by the object and then the verb. Punjabi sentences can be categorized in to three types. These are simple sentence, compound sentence and complex sentences. A sentence is further composed of clauses which can be further classified as independent clause and dependent clause. An independent clause can constitute a simple sentence on its own. Every sentence contains independent clause as a basic element. The independent clause contains a finite verb phrase as an essential element

5. STRUCTURE OF COMPLEX SENTENCES

On the basis of method of joining independent clauses and dependent clauses using subordinate conjunctions following patterns have been designed:-

Table 1: Various Patterns of Complex sentences

Pattern No.	Pattern	Example
1.	Independent Clause + Sub-ordinate Conjunction + Dependent Clause	ਵਾਕਰਚਨਾਤਾਂਹਰਕੋਈਕਰਸਕਦਾਹੈ *Independent clause* ਜੇ *Sub−ordinate Conjunction* ਉਸਨੂੰਅਕਲੀਹੁਨਰਹੋਵੇ *dependent clause*
2.	Sub-ordinate Conjunction + Dependent Clause + Independent Clause	ਜਿਉਂਜਿਉਂ *sub−ordinate conjunction* ਨਵੀਂਤਹਜ਼ੀਬਵੱਧਰਹੀਹੈ *dependent clause* ਖੁਸ਼ੀਦੇਪੁਰਾਣੇਢੰਗਬਦਲਰਹੇਹਨ *independent clause*
3.	Sub-ordinate Conjunction + Dependent Clause + Sub-ordinate Conjunction + Independent Clause	ਜੇ *sub−ordinate conjunction* ਕਿਤੇਨਿਉਕਲੀਹੁੱਧਹੋਗਿਆ *dependent clause* ਤਾਂ *Sub−ordinate Conjunction* ਮਾੜੇਯੁੱਧਨਾਲਹੀ੨੫੦ਸ਼ਹਿਰਜੰਗੀਕਹਿਰਦਾਨਿਸ਼ਾਨਾਬਣੇਨਾਲਾਜ਼ਮੀਹਨ *independent clause*
4.	Dependent Clause with non-finite verb clause + , + Independent Clause	ਦਿੱਲੀਜਾਂਦਿਆਂ *Dependent clause* , *comma* ਮੇਰਾਹਵਿੱਚਜਾਖਲਉਤਰਗਿਆ *independent clause*

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5.	Subject + Independent Clause + Predicate + Dependent Clause	ਇਹਪਾਰਟੀ ਜੋ ਮੁਕਾਬਲੇਦੀਸਰਕਾਰਦੀਆਂਫੜ੍ਹਾਂਮਾਰਦੀਸੀ Subject Independent Clause Predicate ਸਾਰੀਆਂਸੀਟਾਂ'ਤੇਹਾਰਗਈ Dependent Clause
6.	Independent Clause + Sub-ordinate Conjunction + Dependent Clause + Sub-ordinate Conjunction or (,) + Dependent Clause	ਹੁਣਸਾਡੀਗੱਲਬਾਤਵਿੱਚੋਂਵੀਦਰਿਆਲੋਪਹੋਗਏ ਅਤੇ Independent Clause Sub−ordinate Conjunction ਪਾਣੀਦਾਜ਼ਿਕਰਆਉਂਦਾਹੈ ਤਾਂ *dependent clause* *sub−ordinate conjunction* ਘਾਟਜਾਂਬੁਝੂਦੇਅਰਥਾਂਵਿੱਚਹੀਆਉਂਦਾਹੈ Dependent Clause
7.	Sub-ordinate Conjunction + Dependent Clause + Sub-ordinate Conjunction + Independent Clause + Sub-ordinate Conjunction + Dependent Clause	ਜੋ ਕਿਸੇਦੇਘਰਪੁੱਤਰਜੰਮਿਆ Sub−ordinate Conjunction Dependent Clause ਤਾਂ Sub−ordinate Conjunction ਉਹਜਰੂਰਕਿਸੇਗੁਰੂ, ਪੀਰ, ਅਵਤਾਰ, ਸੰਤ, ਮਹੰਤਦੀਬਖਸ਼ਸ਼ਹੈ *independent clause* ਜਾਂ ਕਿਸੇਮੜ੍ਹੀ, ਮਸਾਣੀ, ਕਬਰ, ਮੱਠਜਾਂਮੂਰਤੀਦਾਫਲਹੈ Sub−ordinate Conjunction Dependent Clause
8.	Independent Clause + Sub-ordinate Conjunction + Independent Clause + Sub-ordinate Conjunction + Dependent Clause	ਬਹੁਤਲੋਕਰੱਬਤੋਂਡਰਕੇਅਰਦਾਸਕਰਦੇਹਨ ਅਤੇ *Independent clause* Sub−ordinate Conjunction ਰੱਬਤੋਂਉਹਚੀਜ਼ਾਂਮੰਗਦੇਹਨ *independent Clause* ਜਿਹੜੀਆਂ ਉਹਨਾਂਦੇਘਰਦੇਨੇੜਲੇਡਿਪੂਤੋਂਵੀਮਿਲਸਕਦੀਆਂਹਨ Sub−ordinate Conjunction Dependent Clause

6. CLASSIFICATION OF COMPLEX SENTENCES

Complex sentences are classified on the basis of position of dependent clause and types of conjunctions used to join dependent and independent clauses [Cheema, B.S., 2005]. On this basis complex sentences are divided in to following four categories:-
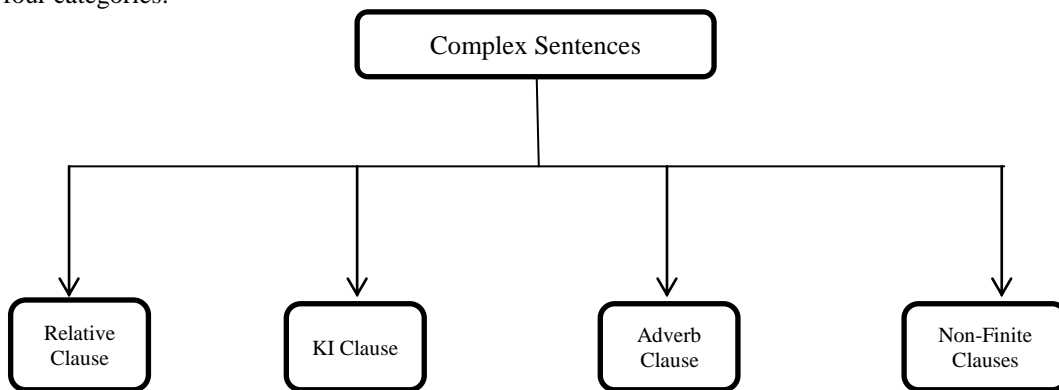

Fig 1: Classification of Complex sentences

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6.1 Complex Sentences (Relative Clauses)

These types of complex sentences are identified by presence of ਜੋ and ਜਿਹੜਾconjunctions. These conjunctions are positioned either at the beginning or left of the clause. These conjunctions have fixed position in the sentence. Relative clause acts as an adjective to the noun phrase. On the basis of position of the relative clause in the complex sentence, the complex sentences are divided in to three types as shown in table 2 [Cheema, B.S.,2005]:

Table 2: Possible Patterns of Complex sentences having Relative Clause

Sr. No.	Type	Example
1.	Noun phrase of dependent clause comes before the Relative Clause.	ਉਹਮੁੰਡਾਜਿਹੜਾਮੇਰੇਨਾਲ਼ਪੜਦਾਸੀਅੱਜਬਹੁਤਸੋਹਣਾਗਾਉਂਦਾਹੈ। (uh muṇ ḍ ā jihṛ ā mērē nāla○paṛ dā sī ajj bahut sōhṇ ā gāundā hai .)
2.	In the construction of relative clause the main noun phrase comes after the Relative clause.	ਜਿਹੜਾਕੰਮਜਲਦੀਹੋਜਾਏਉਹੀਚੰਗਾਹੈ। (jihṛ ā kamm jaldī hō jāē uhī caṅ gā hai .)
3.	Relative clause comes after the independent clause.	ਉਸਕੁੜੀਨੇਸ਼ਹਿਰਜਾਣਾਹੈਜਿਹੜੀਕੱਲ੍ਹਪਿੰਡ'ਤੋਆਈਸੀ। (us kuṛ ī nē shahir jāṇ ā hai jihṛ ī kallh piṇ ḍ 'tō āī sī.)

6.2 Complex sentences (KI Clause)

These types of sentences are identified by the presence of KI clause in the sentence. There are five possible patterns of such type of sentences [Cheema, B.S.,2005]:-

Table 3 : Possible Patterns of Complex sentences having KI clause

Sr. No	Pattern	Example
1.	Independent Clause +KI Clause	ਉਹਚਿੱਠੀਸੁਣਰਿਹਾਸੀਕਿਉਸਦਾਮਿੱਤਰਆਗਿਆਹੈ। (uh ciṭ ṭ hī suṇ ā rihā sī ki usdā mittar ā giā hai .)
2.	Independent Clause +KI Clause +Independent clause	ਉਹਚਾਹੁੰਦਾਸੀਕਿਕੋਈਆਪਣੀਆਂਅੱਖਾਂਨਾਲਉਸਦੀਆਂਨਾੜ੍ਹਾਂਨੂੰਢਿੱਲਿਆਂਕਰਕੇਉਸਦੇਅੰਦਰਨੂੰਪੱਧਰਕਰਦਏ।(uh cāhundā sī ki kōīāpṇ īāṃ akkhāṃ nāl us dīāṃ nāṛ hāṃ nūṃḍ hilliāṃ karkē us dē andar nūṃ paddhar kar daē .)
3.	Independent Clause + PAR Clause + KI Clause	ਤੁਸੀਂਲੋਕਾਂਨੂੰਵੇਖਰਹੇਹੋਪਰਉਨ੍ਹਾਂਨੂੰਪਤਾਨਹੀਂਕਿਤੁਸੀਂਉਹਨਾਂਨੂੰਵੇਖਰਹੇਹੋ। (tusīṃ lōkāṃ nūṃ vēkh rahē hō par unhāṃ nūṃ patā nahīṃ ki tusīṃ uhnāṃ nūṃ vēkh rahē hō .)

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4.	Dependent Clause +KI Clause +Independent clause	ਸ਼ਾਇਦਮਦਨਸਿੰਘਨੂੰਇਹਸਮਝਕੇਕਿਕਿਲ੍ਹਾਉਸਦੇਰਹਿਮਉਤੇਹੀਹੈਇਸਤੋਂਉਹਲਾਪਰਵਾਹਸੀ। (shāid madan siṅgh nūṃ ih samajh kē ki kilhā us dē rahim utē hī hai is tōṃ uh lā parvāh sī.)
5.	Independent Clause +KI Clause +TAN clause	ਬਲਕਾਰਸਿੰਘਇਹਜਾਣਦਾਸੀਕਿਜੇਉਹਚਾਹੁਣਤਾਂਉਸਨੂੰਉਸਦੇਪਿੰਡਲਿਜਾਸਕਦੇਹਨ। (balkār siṅgh ih jāṇ dā sī ki jē uh cāhuṇ tāṃ us nūṃ us dē piṇḍ lijā sakadē han .)

6.3 Complex sentences (Adverb Clause)

In these types of complex sentences, the dependent clause is named as an adverb clause as these clauses starts with adverb. There are two types of adverbs as mention in table 4 [Cheema, B.S., 2005].

Table 4: Types of adverbs

Sr. No	Type	Example
1.	**J-Adverb**:-These types of adverbs creates adverb clause (dependent clause) in the complex sentences and these adverb clauses acts as adverb for independent clause. In simple sentence such task is done by the single adverb. e.g. ਜੋ, ਜਦੋਂ, ਜਿਥੇ, ਜਿਵੇਂ, ਜਿੱਧਰ, ਜਦ, ਜਿਸਤਰ੍ਹਾਂetc.	ਜਦੋਂ ਉਸ ਦੀ ਜਾਗ ਖੁੱਲ੍ਹੀ ਚੋਰੀ ਹੋ ਚੁੱਕੀ ਸੀ। (jadōṃ us dī jāg khullhī cōrī hō cukkī sī.)
2.	**F-Adverb**:-These types of adverbs can't exist in simple sentences they can only create the adverb clauses. e.g. ਕਿਉਕਿ, ਭਾਵੇਂ, ਸਗੋਂ, ਜੇetc.	ਜੇ ਮੁੰਡਾ ਸਕੂਲ ਜਾਏਗਾ ਤਾਂ ਪਾਸ ਹੋ ਜਾਏਗਾ । (jē muṇḍā sakūl jāēgā tāṃ pās hō jāēgā .) ਭਾਵੇਂ ਤੁਸੀਂ ਕਿੰਨਾ ਸਮਝਾਓ , ਮੁੰਡਾ ਸਿੱਧੇ ਰਾਹ ਨਹੀਂ ਪਏਗਾ । (bhāvēṃ tusīṃ kinnā samjhāō , muṇḍā siddhē rāh nahīṃ paēgā .)

6.4 Complex sentences (Non-finite clauses)

These types of complex sentences contain a dependent clause having non-finite verb phrase which bound the dependent clause (predicate) with independent clause. For example:

ਰੱਸੀਟੱਪਦਿਆਂਮੇਰੇਪੈਰਨੂੰਮੋਚਆਗਈ। (rassīṭ appdiāṃ mērē pair nūṃ mōc ā gaī)

I sprained my foot while skipping the rope.

In above example, ਰੱਸੀਟੱਪਦਿਆਂ (rassīṭ appdiāṃ) is the dependent clause (predicate) and the word ਟੱਪਦਿਆਂ (ṭ appdiāṃ)is non-finite verbal phrase and this non-finite verbal phrase bound this clause with in-dependent clause i.e. ਮੇਰੇਪੈਰਨੂੰਮੋਚਆਗਈ (mērē pair nūṃ mōc ā gaī).On the basis of the form of non-finite verb, these can be further divided in to three forms [Brar, B.S.,1995]:-

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Table 5 : Types of complex sentences on the basis of non-finite verb

Sr. No	Non-finite verb type	Example
1.	**Participial**: - Contains non-finite verb like ਟੱਪਦਿਆਂ, ਵੇਖਿਆ, ਕੀਤਿਆਂ i.e. contains ਇਆਦੀਆਂ and ਈ as postfix with verb.	ਪੁਲਸ ਨੂੰ ਵੇਖਦਿਆਂ ਹੀ ਚੋਰ ਖਿਸਕ ਗਿਆ । (pulas nūṃ vēkhdiāṃ hī cōr khisak giā .)
2.	**Infinitival**: - Contains ਨੇ, ਨ, ਏ etc. as postfix with root verb. E.g. ਕਰਨੋ, ਜਾਏ	ਦੇਸ਼ ਭਗਤ ਦੇਸ਼ ਖ਼ਾਤਰ ਮਰਨੋ ਨਹੀਂ ਡਰਦੇ । (dēsh bhagat dēsh ḵ ẖ ātar marnō nahīṃḍ ardē .)
3.	**Conjunctival**: - ਕੇ with root verb. E.g.ਖਾਕੇ , ਵੇਖਕੇ	ਛਾਲ ਮਾਰ ਕੇ ਉਹ ਕੰਧ ਟੱਪ ਗਿਆ । (chāl mār kē uh kandh ṭ app giā .)

7. CONCLUSIONS AND FUTURE WORK

In this study, author made a detailed analysis of complex sentences and observed that complex sentences have fixed pattern that is composed of independent and dependent clauses separated by conjunctions. This study could be helpful in computational linguistic for identification of complex sentences in Punjabi language. Further this could be helpful for the grammar checking of complex sentences. Another utilization of such study can be used to differentiate the compound sentences from complex sentences.

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