

Representing Polysemy in Trans Himalayan: theorizing semantic change and modeling annotation

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Motivation for this talk



What we should do

- Encouraging scholars to use text-based naturalistic examples to motivate analyzes.
- Create corpora for corpus-based queries rather than cherry-picked examples

How should we do it

- Determine clause, word, morpheme constituents
- Determine meaning
- Assign glosses

Complicating factors in analysis/annotation

Wordhood, clause breaks, morpheme structure

- **On the level of “word”:** Morphologically one word but written separately or variably
- **On the level of morpheme:** Historically separable morphemes written separately but in the synchronic grammar they form one semantic unit.



Unknown wordhood - Lamkang annotation (ISO 639-3:Imk)

neen=ni naan a-dei ma-an-ri -ng
 we=SR:AGT you.all 2-seeI neg-NonSg-INCEP-1A.neg
 ‘We do not see you (SG).’ (Chelliah et al 2019)

maan=ni maan ∅-dei-lam m-eh
 them=SR.AGT them 3P-seeI-3.PL neg-3A.neg
 ‘They do not see them’



Complicating factors in analysis

Morpheme semantics

- Different (historically unrelated) morphemes with same/similar meanings
- High degrees of polysemy for a single morpheme:
The same morpheme (historical lineage) with different semantics uses



How morpheme polysemy (semantic extensions) complicate annotation- examples from Manipuri (ISO 639-3: mni)

<i>usúba</i>	‘carpenter’
<i>čəphusaba</i>	‘potter’
<i>sənása</i>	‘goldsmith’
<i>wáruiba</i>	‘story teller’
<i>phisaba</i>	‘weaver’

<i>əčábə</i>		<i>pót</i>
ə	-čá	-pə
ATT	-eat	-NOM
for eating		thing
‘something edible’		thing

John	<i>čátpə</i>		<i>pammí</i>
John	čát	-pə	pam -í
John	go	-NOM	like -NHYP
John	to go		likes
‘John _i wants e _i to go.’			

<i>əykhoydə</i>		<i>lakpəda</i>			
əy	-khoy	-tə	lak	-pə	-tə
I	-hpl	-LOC	come	-NOM.	-LOC
to our place			upon coming home		
‘when coming to our place’					

IGT

- Semantic, morphological and phonological representation of text with phrase- and word- level translations

- Example from Hakha Lai (Van Bik 2010, p. 139)

<i>nihîn</i>	<i>tsüu</i>	<i>kàymaʔ</i>	<i>tivăa</i>	<i>ka-kâl</i>	<i>làay</i>
today	DEM	1SG.PRON	river	1SG.S-go.I	FUT

‘Today, I will go to the river.’

- Conventions — Leipzig Glossing Rules (LGR) (Max Planck Institute 2015)

Hierarchical Interlinear Glossed Text (HIGT)

HIGT is a method of creating interlinear glosses with two components:

Macro gloss and gloss

- A macrogloss denotes a hypernymic functional/semantic category
- A gloss denoting the hyponymic semantics of the morpheme
- E.g., ASP:PROG for a aspect morpheme that indicate progressive.



Roadmap

Examples	HIGT	HIGT Process	Impact
<p>SR markers, directionals, aspect, ideophones</p> <p>Manipuri, Dimasa, Lamkang, Hakha Lai</p>	<p>IGT with sample HIGT glossing</p> <p>macrogloss: gloss hypernymic:hyponymic</p>	<p>Existing morpheme lists</p> <p>Gather and split: Macro categories/semantic nuance</p>	<p>Corpus creation</p> <p>TB typology, Cross language comparison</p>



Acknowledgements

1. **US National Science Foundation, conference grant, Conference on Standards for Interlinear Glossed Texts in Related Languages (2020-2022.)**
2. **ICSTLL 2020 participants**
3. Chelliah, S., Burke, M. & Heaton, M. (2021). Using Interlinear-glossed texts to improve language description. *Indian Linguist* cs 82(1), 1–25.
4. Samson Lotven, Grayson Zeigler, Amanda Bohnert, and you will hear from the Differential Marking team working on Dimasa tomorrow.



One morpheme, varied functions

Semantic role markers

Semantic role marking in Manipuri

1. Semantic role marking of:
 - Core arguments (e.g. agent, patient)
 - Oblique arguments (eg., locative, associative)
2. Subordination of nominalized verbs with specific temporal semantics
 - E.g., after Ving, while Ving
3. Information structure and discourse marking
 - E.g., Contrastive focus, additive focus

Examples — Semantic role

Méháknə tebəlbə káwi.

mé-hák=nə tebəl=pu káw -i.

3- here=SR:AGT table=SR:PAT kick -SMOD:DECL

‘He kicked the table.’ (Chelliah 2009, p. 381)

Examples — Semantic role

Méhák Tombagə skul čətkhre.

mé- hák Tomba =kə skul
 3- here Tomba =SR:ASS school

čət -khi -lə -e.

go -ASP:IAM -ASP:PERF -SMOD:ASRT

‘He has gone to school with Tomba.’ (Chelliah 2009, p. 383)

Examples — Subordination

[...] *baĵi tolop phəŋbəgə, ləwčəttoybə.*

baĵi	tolop	phəŋ	-pə	=kə
father	salary	find	-NMZ	=CVB:SIM.ASS

ləw	čət	-toy	-pə
take	go	-VMOD:INTEND	-IS:NMZ.QUOT

“[...] My father will get his salary and (then) I will take it (there).”

Examples — Information structure

(4) *Tombadu yugə thékline*

tomba =tu	yu =kə	thék -li -ne.
Tomba =D.DIST	wine =IS:UNANT	drink -ASP:PROG
-SMOD:SI		

“Tomba was drinking rice wine!”

(The sentence implies this is not something Tomba ever does)

(Chelliah 2009, p. 383)

Analysis

1. Avoids assigning one gloss for multiple functions
2. Recognizes categories of semantic extension

	Semantic Role	Information Structure	Subordination
=nə	SR:AGT	IS:FOC	N/A
=pu	SR:PAT	IS:ADVR	
=tə	SR:LOC	IS:EXCL	CVB:SEQ.LOC
=kə	SR:ASS	IS:UNANT	CVB:SIM.ASS
=ki	SR:POSS	N/A	CVB:PURP.POSS
=təgi	SR:ABL		CVB:RSLT.ABL
=nə	SR:INST		CVB:CAUSE.INST

Example from Dimasa- subordination

<i>Bu-ha</i>	<i>Sambudhan</i>	<i>bu-ni</i>	<i>dol=khe</i>
dem-LOC	PN	3SG-GEN	group=ACC
that	Sambudhan	his	group

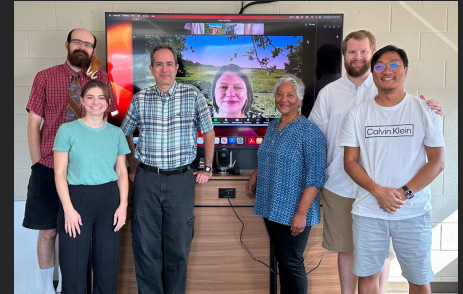
sling=ri-ma=ni
 learn=CAUS-NMLZ=GEN
 in order for them to learn

khlai=hi
 do=SUCC

<i>Maibang=khe</i>	<i>bono-bono</i>	<i>kha-lai-ba.</i>
PN=ACC	headquarters	form-COLL-NF:IPFV
Maibang	headquarters	formed

“At that time Sambudhan formed a headquarters at Maibang to train his group.”

(Veer Sambudhan Phonglo, 3.4, p110,
 Evans, Jonathan and Langthasa 2024



Abbreviations

ACC	accusative
CAUS	causative
COLL	collective
GEN	genitive
LOC	locative
NF:IPFV	nonfinite imperfective
NMLZ	nominalizer
PN	proper noun
PRSP	prospective
SUCC	successive

Existing annotation for Dimasa subordinators

sling =*ri* =*ma* =*ni*
learn =CAUS =NMLZ =GEN
in order for them to learn

Suggested HIGT for Dimasa subordinators

Solution 1: gloss reflects function and semantics

<i>sling</i>	= <i>ri</i>	= <i>ma</i>	= <i>ni</i>
learn	=CAUS	=NMLZ	=CVB:PURP.GEN

in order for them to learn

Solution 2: Radical solution: postulate a new lexeme

=*mani*
in order to



Example from Dimasa- subordination

hor bonwa deng=ba=ni jahon-ha kaykho-ma
 night five keep=NMLZ=GEN after-LOC take.out-PRSP
 “(Then), after keeping (it) for five nights, take it out.”

Judima 01, p 63, Evans, Jonathan and
Langthasa 2024 Dhrubajit 2023.)

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ACC	accusative
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PN	proper noun
PRSP	prospective
SUCC	successive

Existing annotation for Dimasa subordinators

deng =ba =ni jahon-ha
keep =NMLZ =GEN after-LOC
'after having kept'

Suggested HIGT for Dimasa subordinators

deng =ba =ni
 learn =NMLZ =CVB:SEQ.GEN
 in order for them to learn

=bani 'having Ved' CVB:SEQ.GEN
 =mani 'in order to V' CVB.PURP.GEN

Solution 1: gloss reflects
 function and semantics

Solution 2: Radical solution,
 postulate a new lexeme, avoids
 2 =ni's with different glosses



Case to IS in Dimasa?

<i>Bu-ha</i>	<i>Sambudhan</i>	<i>bu-ni</i>	<i>dol=khe</i>
dem-LOC	PN	3SG-GEN	group=ACC
that	Sambudhan	his	group

sling=ri-ma=ni
 learn=CAUS-NMLZ=GEN
 in order for them to learn

kh lai=hi
 do=SUCC

Maibang=khe
 PN=ACC
 Maibang

bono-bono
 headquarters
 headquarters

kha-lai-ba.
 form-COLL-NF:IPFV
 formed

“At that time Sambudhan formed a headquarters at Maibang to train his group.”

Abbreviations

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(Veer Sambudhan Phonglo, 3.4, p110,
 Evans, Jonathan and Langthasa 2024)



Similar semantics, different morpheme:

Direction marking

Directionality in Manipuri

1. Associated motion (with aspectual component)

V1-V2 combinations, where:

V2 is a directional (e.g., andative/venitive)

Indicates temporal order of motion event and verbal action

2. Quasi-compounding structures (with manner component)

V1-V2 combinations, where:

V2 originates from a positional verb (be up, be down)

Metaphorically extended to indicate manner/intensity of action



Examples — Associated motion

Mánə apəl čárəkkí

má -nə apəl čá -lək -í

he =IS:FOC apple eat -AM:VEN -SMOD:DECL

“When he came here he was eating an apple.”

(Chelliah 1997, p. 225)



Examples — Associated motion

Mígidə cəttúnə kərigi čak čáruri.

mí =gi =də	čət -túnə	kərigi
man =SR:POSS =SR:LOC go -CVB:PURP		why

čák	čá -lu -li
rice	eat -AM:AND -ASP:PROG

“Why do you go to his house to eat?”
(Chelliah 1997, p. 225)

Examples — Quasi-compounding structures

Məháknə layrik pusilli.

mə-hák=nə	layrik	pu	-sin	-lə	-i
3P-here=SR:AGN	book	bring	-DIR:VEN	-ASP:PERF	-SMOD:DECL

“He carried the book in.”

(Chelliah 1997, p. 211)

Examples — Quasi-compounding structures

Čáthokkhre.

čá	-thok	-khi	-lə	-e
eat	-DIR:AND	-ASP:IAM	-ASP:PERF	-SMOD:ASRT

“They ate them all up.”

(Chelliah 1997, p. 211)

Summary so far

1. Alerts the reader to closed class categories
2. Separates various morphosyntactic positions of directionality
3. Indicates categories where there is similar semantics
4. Helps build word morphology
 - Marking which categories can (and cannot) co-occur
 - E.g., DIR+DIR and AM+AM are barred but DIR+AM is permitted

Macro Glosses

- Closed categories
- Multiple members
- Paradigmatically related

Categories we use in Manipuri:

SR	semantic role
IS	information structure
IF	illocutionary force
DIR	direction
AM	associated motion
ASP	aspect
AFF	affectedness
VMOD	verbal mood
SMOD	sentential mood
CVB	converbalizer
NMZ	nominalizer

Gather and Split

How to HIGT

How to arrive at HIGT for your language - Manipuri example

N	CVB:ABL:RSLT	converb:ablative:result	=tagi	ABL
N	CVB:ASS:SIM	converb:associative:simultaneous	=kə	ASS
Y	CVB:RSLT	converb:result	-təné	BY
Y	CVB:D:DIST	converb:determiner:distal	-pədu	DCOMP
Y	CVB:D:PROX	converb:determiner:proximal	-pəsi	DCOMP
Y	CVB:INST:CAUSE	converb:instrumental:cause	=nə	INST
N	CVB:LOC:SEQ	converb:locative:sequential	=tə	LOC
Y	CVB:PURP	converb:purpose	-nəbə	IN ORDER TO
Y	CVB:PERF	converb:result	-ləbə	HAVING
Y	CVB:SEQ	converb:sequential	-ləgə	AFTER
Y	CVB:SIM	converb:simultaneous	-túne	ING
Y	CVB:PROG	converb:simultaneous	-ŋəy	DURING

Create a list of morphemes.

Gather and split.

How to arrive at HIGT for your language - Manipuri example

Y	SMOD:ASRT	sentential mood:assertive	-e	ASRT
Y	SMOD:COND	sentential mood:conditional	-ləbədi	IF
Y	SMOD:DECL	sentential mood:declarative	-í	NHYP
Y	SMOD:IMP	sentential mood:imperative	-u	IMP
Y	SMOD:INQ	sentential mood:inquisitive	=no	INQ
Y	SMOD:INT	sentential mood:interrogative	=lə	INT
Y	SMOD:OPT	sentential mood:optative	-ke	OPT
Y	SMOD:PERM	sentential mood:permissive	-sənu	PERMIT
Y	SMOD:PROHB	sentential mood:prohibitive	-nu	PROBH
Y	SMOD:SOLCT	sentential mood:solctcitive	-o	SOLCT
Y	SMOD:SUP	sentential mood:suplicative	-čhi	SUP

Create a list of morphemes.

Gather and split.

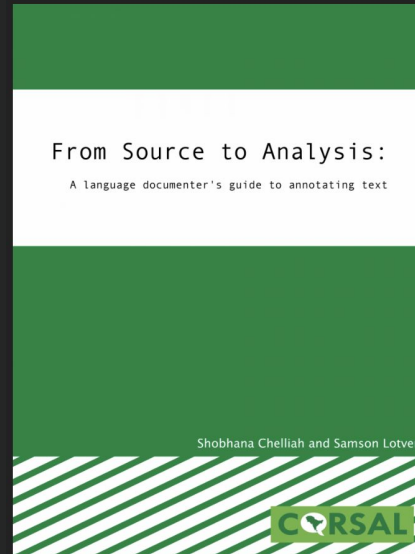
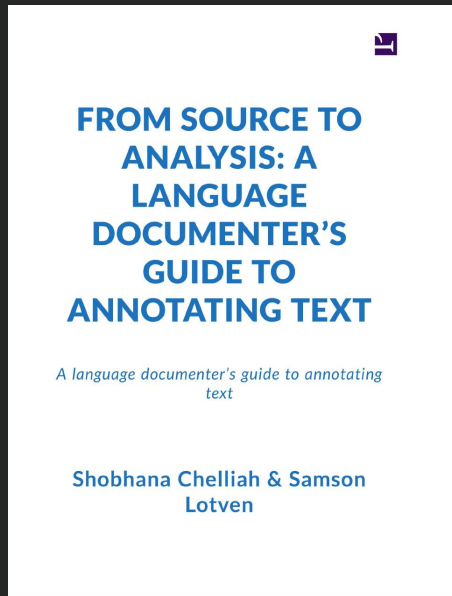
How to arrive at HIGT for your language - Manipuri example

Y	IS:ADD	information structure:additive		ALSO
Y	IS:ADVR	information structure:adversative	=pu	ADVR
N	IS:CNTR	information structure:contrastive	=nə	CNTR
Y	IS:EXCL	information structure:exclusive	=tə	EX
Y	IS:PRECISE	information structure:precise	-təmək	PRECISE
Y	IS:RSTR	information structure:restrictive	-mək	ONLY
Y	IS:SPEC	information structure:specific	=ti	DLMT

Create a list of morphemes.

Gather and split.

How to arrive at HIGT for your language - Hakha Lai example



<https://openbooks.library.unt.edu/sourcetoanalysis/>

How to arrive at HIGT for your language - Hakha Lai example

zuun	CLASS	noun classifier	CLOTH	item of clothing
kheng	CLASS	noun classifier	DISH	dish of food
dor	CLASS	noun classifier	DROP	drop of liquid
tlap	CLASS	noun classifier	FLAT	flat item
pa	CLASS	noun classifier	GEN	generic
mu	CLASS	noun classifier	GRAN	granular substance
bu	CLASS	noun classifier	GROUP	group of animals
fa	CLASS	noun classifier	HAIR	hair
thluan	CLASS	noun classifier	LONG	englongated item
fang	CLASS	noun classifier	MONEY	unit of money
tuah	CLASS	noun classifier	PAIR	pair
tar	CLASS	noun classifier	REDUP	reduplicant (autoclassifier)
pum	CLASS	noun classifier	ROUND	round item
dur	CLASS	noun classifier	SMCONT	small container
voi	CLASS	noun classifier	TIME	time

How to arrive at HIGT for your language - Hakha Lai example

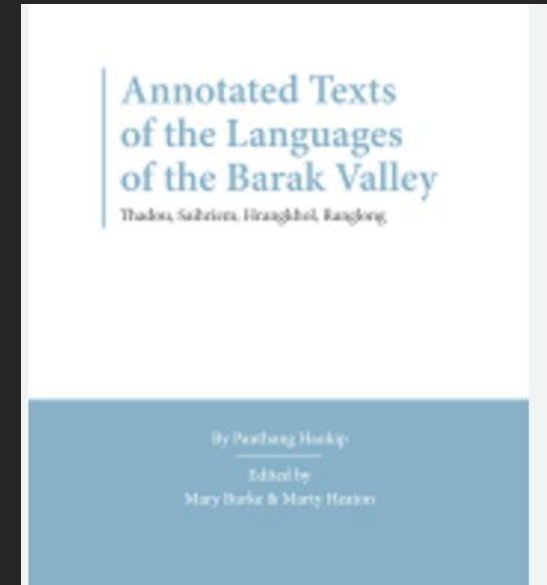
cemh	APPL	applicative	ADDBEN	additional benefactive
piak	APPL	applicative	AFFOBJ	affected object (malefactive/benefactive/substitutive)
hlei	APPL	applicative	APPLa	applicative a
ter	APPL	applicative	CAUSa	causative a
terchih	APPL	applicative	CAUSb	causative b
pi	APPL	applicative	COM	comitative
nak	APPL	applicative	INSTR	instrumental
hnoh	APPL	applicative	MAL	malefactive
seh	APPL	applicative	PERM	permissive
kanh	APPL	applicative	PRIOR	prioritive
taak	APPL	applicative	RELINQ	relinquitive

Macro Glosses: Allowing for step-wise grammar learning

Determine the macro gloss, then use additional examples to perfect the morpheme gloss. For example,

NEG:expected, NEG:unexpected,
NEG:unknown

IS:focus → IS:CNTR.FOC *or* IS:ADD.FOC



One lexeme, many functions, varied semantics

Ideophones

Chelliah, Shobhana, Evaline Blair, Melissa Robinson, Rex Rengpu Khullar, and Sumshot Khular. (2021). Reduplication

in **Lamkang**: Form, Function, Feeling. In Jeffrey Williams, (ed.), *Expressive Morphology in the Languages of South Asia*. 165-186. Abingdon: Routledge.

Ideophone features - Form

Duplicated syllables (two nonce syllables, one lexeme/one copy, lexeme/rhyme)

Display **unique phonetics** — variable pitch and length between first and second element (e.g., *si—si* surface as [sí:-sij])

prìit *naò* *si—si*
 sparrow small ideo—ideo
 ‘sparrow, this very small one’

A **synesthetic sound**, sometimes with ablaut

Evoke **sensory perception** in sound to mark vivid/visceral feeling

yíirìng *k-leng* *ding—dang* *paa=loh*
 gold NOM-shine ideo—ideo exemplary=EX
 ‘This gold is really ding-dang [dɪŋ dɑŋ] shiny.’



Ideophone features - Function, modify a verb

<p>Modify a verb: (often nominalized and stative) verbs - intensity, manner, size</p>	<p><i>dīī</i> <i>k-chààì</i> <i>tik—tik=a</i> water NOM-drip ideo—ideo=TOP ‘the water is dripping, tik-tik [tik ti:k^] (as from a faucet, water off a roof, or dripping from drying clothes)’</p>
<p>Modify a verb: classify the verb as taking an agent of a specific class</p>	<p><i>van</i> <i>k-chēn</i> <i>lum—lum=a</i> HORIZ NOM-run ideo—ideo=TOP ‘He (a fat person) is running.’</p>

Ideophone features - Function, modify a noun

Describe - **intensity** of attribute,
size of attribute

priìt naò si—si
sparrow small ideo—ideo
'sparrow, this very small one'



Why ideophone glossing is inconsistent

Focus on form - redup (big-redup; redup-redup)

Focus on effect - ideo (ideo)

Focus on semantics: varied (ideo:very)

Focus on function - verbal classifier



Mizo

tha-èèm-èèm-în a-lów-kúáy-ta-nhèèp-nhèèp â
 good-very-very-Adv 3s-come-sprout-PRPF-INT-INT FP

rua? hî a-sûûr a-sûûr â
 rain DEM 3s-pour 3s-pour FP
 'It rains every time.'

Daai Chin

Nghnaai-ktheih ta ang'aai jak-jak=a hmin=kti.
 Mango-fruit FOC yellowishly INTENSF:very=CF ripe=NON.FUT
 'As for the mango fruits they are very yellowishly ripe.'

Khumi

puykhawng
(name)

p-kung-phuphuu

CAUS-enter-AUGVCL

khaá
when

Hyow

yówyówâ

kón

hngát

hmú?-hô-ní

bókphóngphóngâ

glitteringly

pond

one

see.II-PM-TEMP

in.utterly.white

Anal Naga

va-sìŋ-kʰín! *sà:n* *í:-í:-má-kʰín!*

IMP.INTR-clever-IMP.PL night sleep-RDP-NEG-IMP.PL

‘Be clever! Do not sleep in the night!’ (anm_20151202_PO_Anthung_2_Folkstory 61)

How can HIGT be used?

- Treat the copied segments as one lexeme even if with a hyphen
- Create a macro gloss that indicates a general, overarching category (IDEO)
- Represent one of three broad semantic categories:
 - Size (SIZ) Intensity (INT) Manner (MNR)
- Specify one of two parameters
 - augment (AUG) or diminish (DIM) (punctual and repetitive are subtypes of these)
- Indicate which typical or exemplifying entities or actions are used

IDEO:SIZ.AUG.round

IDEO:INT.DIM.drip

IDEO:MNR.AUG.walk



HIGT examples in Lamkang

van *k-chēn* *lum—lum* =a

HORIZ NOM-run **ideo—ideo** =TOP

‘He (a fat person) is running.’

van *k-chēn* *lum—lum* =a

HORIZ NOM-run IDEO:MNR.AUG.fat =TOP

‘He (a fat person) is running.’

HIGT examples in Lamkang

k-trthling *peen—poon* =*a*

NOM-swell IDEO:SIZ.AUG.swell =TOP

‘(It) is swollen up a lot (as when bitten by a bug).’

yíiring *k-leng* *ding—dang* *paa=loh*

gold NOM-shine IDEO:INT.AUG.shine exemplary=EX

‘This gold is really ding-dang [diŋ daŋ] shiny.’

Reduplication for **distributive reading**

m -khùù—khùù m-tlaak dìl bih
 DEF -village—village 3A-settle behind then
 ‘after the groups settled each of their very own villages...’

m -khùù—khùù
 DEF -village—REDUP.DSTR
 ‘after the groups settled’



Reduplication for **intensity** reading

lou *thah* *buu k-txing* *t-chaak=a*
 field LOC:on rice NOM-left.over 1A.PL-eat=TOP

k-dii—k-dii

NOM-taste—NOM-taste

‘The rice you brought with you to the field, it is kdii-kdii [kdi:^ kdi:] tasty.’

NOM-taste—REDUP.INTS



Conclusion

Macro Glosses: Codifying our general knowledge of TB typology

1. Provide the novice documenter a curated list of expected categories for TB when glossing
2. Encourage IGT creation, improve description by using connected naturalistic text



HIGT for creating language-family level semantic ontologies

GOLD is an ontology for descriptive linguistics. It gives a formalized account of the most basic categories and relations (the 'atoms') used in the scientific description of human language. GOLD is intended to capture the knowledge of a well-trained linguist, and can thus be viewed as an attempt to codify the general knowledge of the field. It will facilitate automated reasoning over linguistic data and help establish the basic concepts through which intelligent search can be carried out. Furthermore, GOLD is meant to be compatible with the general goals of the Semantic Web.

A Common Ontology for Linguistic Concepts
Scott Farrar, William D. Lewis, and D. Terence Langendoen
{farrar, wlewis, langendt}@u.arizona.edu



Macro Glosses: Allowing for cross language comparison

Hakha Lai (Peterson 2003):	Laizo (Osburne 1975):	Mizo (Chhangte 1993, 2013):	Daai (So-Hartmann 2009):
<i>va-</i> ‘andative’ <i>hay-</i> ‘short range andative’ <i>hung-</i> ‘motion upwards to speaker/deictic center’ <i>rak-</i> ‘venitive’ <i>rung-</i> ‘motion downwards to speaker/deictic center’ <i>ving-</i> ‘motion downwards from speaker/deictic center’ <i>von-</i> ‘motion away, actor stationary’	<i>va-</i> ‘andative’ <i>heey-</i> ‘away’ <i>hung-</i> ‘up’ <i>ra-</i> ‘venitive’ <i>ving-</i> ‘down’ <i>rung-</i> ‘venitive down’	<i>vâ-</i> ‘thither’ <i>-hong</i> ‘come/go home’ <i>lów-</i> ‘hither’ <i>ron-</i> ‘hither’ <i>hán-</i> ‘up yonder’ <i>han-</i> ‘thither’ <i>zuk-</i> ‘down yonder’ (< <i>yuk</i>) <i>han-</i> ‘motion upwards and towards the speaker’	<i>va-</i> ‘forward with motion of agent’ <i>hei-</i> ‘forward with or without motion of agent’ <i>jəŋ-</i> ‘up’ <i>jəŋg-</i> ‘up with motion of agent’ <i>juk-</i> ‘down’ <i>ju-</i> ‘down with motion of agent’ <u>postverbal elements</u> <i>lo</i> ‘venitive’, <i>vaai</i> ‘andative’, <i>hɯ</i> ‘undirected’, <i>hwt</i> ‘back’ (stationary action)

HIGT and CoRSAL Goals

1. Improve language description through expanding data sets
2. Provide training in software for corpus creation
3. Provide training for the processing of texts
4. CoRSAL ontology for description of languages of South Asia (specifically, TransHimalayan)

References

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Thank you!

Questions and comments appreciated

I welcome discussion with you about the language or languages you are working on. How can HIGT help simplify the annotation task and clarify constituent structure and word grammar?

