

ᐅᑦᑲᐅᓯᐅᑦ ᐃᑕᑦᓯᑦᑲᑦ ᑲᑦᑲᑦᑲᑦ



uqausiup ilanginnik nanisijjut



## Recognition of the root, suffixes and ending of words

### Applications

- dictionary
- search engine
- spelling checker and corrector
- grammatical analysis (parser)
- language instruction
- language training
- statistics over corpora

## Dictionaries

- Multi-dialectal outline dictionary (*A. Spalding*) – *Aivilik*
- Ulinnaisigutiit (*L. Schneider*) – *Nunavik*
- Uqausiit tukingit – *Tununiq, North Baffin*
- Inuit uqausillaringit (*Taamusi Qumaq*) - *Nunavik*

## Suffixes

& endings –

Morphology –

Phonology

- Suffixes of the eskimo dialects of Cumberland Peninsula and North Baffin Island (*K. Harper*)
- Some aspects of the grammar of the eskimo dialects of Cumberland Peninsula and North Baffin Island (*K. Harper*)
- Dictionnaire des infixes de la langue esquimaude (*L. Schneider*)
- Inuktituorutît – Grammaire purement esquimaude (*L. Schneider*)
- Inuktitut – A grammar of North Baffin Dialects (*A. Spalding*)
- Introductory Inuktitut, and all other works by *M. Mallon*
- Inuit uqausiqatigiit (*L.-J. Dorais*)

Nunavut *inuktitut*

Nunavik (Northern Quebec) *inuttitut*

Nunatsiavut (Labrador) *inuttut*

Kalaallit Nunaat (Groënland) *kalaallisut*



umiaq-

boat

umiarjuaq

ship (big boat)

umiarjualiug-

to build ships

umiarjualiurvik

shipyard

umiaqpit

of your boat

umialik

one with a boat (boat owner)

sinik-

sleep

siniktunga

I sleep

sinigvik

bed

siniliqtitaugattaqput\*

they are usually put to sleep

\* *from the Hansard, speaking of polar bears*

Composite lexicalized stems  
(*root + suffix(es)*)  
commonly and regularly used as roots

aanniaqsuqti

aanni<sup>(q)</sup>aqsuqti

aanniaqsuqti-

nurse

aanniasuqtiqarmata

they have a nurse

aanniasuqtiqaqtitsinirmik

the recruitment of nurses

umiarjuaq

*n n*ship (*boat - big*)

siniliqtitauqattaqput

*v v v v v*

they are usually put to sleep

(*sleep - to be doing <progressive action>* -  
*to cause, to make someone* -  
*to be one who is <passivization>* -  
*usually, habitually - they*)

umialiug-

*n v*to build boats (*boat - to build*)

maligaliurvik

*v n v n*

legislative assembly

(*follow - something that is <passivization>* -  
*to build - a place to, where one...*)

*n: noun**v: verb*

case/function

possessed:  
number

possessor:  
person & number

iglu

a/the house

igluuk

two/ the two houses

igluit

(the) houses (many)

igluup

of the house

igluga

my house

iglumi

in the house

iglunni

in my house

mode

subject:  
person & number

object:  
person & number

takuvunga

I see

takuvutit

you see

takuvisi

do you see?

takuvara

I see her

takuvaatigut

he sees us

takugama

because I see

takugavinga

because you see me

Special conditions on what must:

- follow
- precede
- directly
- remotely

direct pre-condition:

*-ngau-* must be attached to  
a nominal stem in the dative case  
(*"mut"* ending)

mine  
ujaraqsiurvingmunngauvut  
(they are going toward the mine)

immediacy  
type  
function  
position  
morpheme  
mode  
specificity  
number  
case  
possessivity  
transitivity

Root + [Suffix]\* + Grammatical ending

1 inuktitut word



a word

a phrase

a complex sentence

umiaq

*boat*

umiaraapingmi

*in a small boat*

umialiurumanasuginngippara

*I don't think that he wants to build  
a boat*

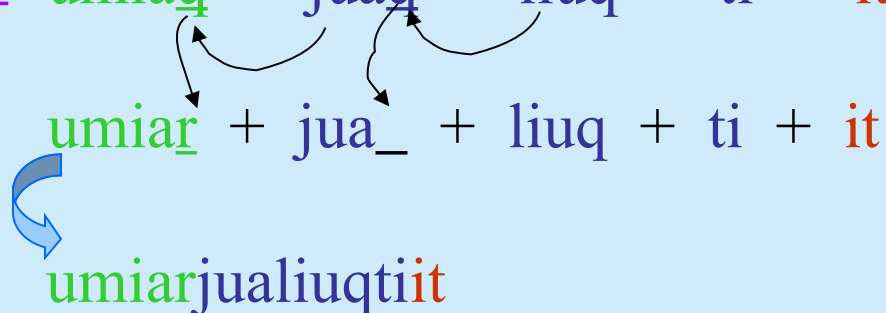
Root + [Suffix]\* + Grammatical ending

the morphemes to put together are: umiaq + juaq + liuq + ti + it

but you say and pronounce  
this:

umiar + jua\_ + liuq + ti + it

umiarjualiutuqtiit



## Contexts

i u a

t

k

q

- neutral (no change at all)
- deletion of the preceding consonant
- voicing of the preceding consonant
- nasalization of the preceding consonant
- assimilation of the preceding consonant
- insertion
- consonant alternating
- fusion
- self-decapitation

*pilirivviktigut*  
(through the department)

*pilirivvisi*  
(your department)

*pilirivvigjuarmi*  
(in a big department)

*pilirivvingnut*  
(to departments)

*pilirivvimmmut*  
(with the department)

*pilirivvisi*  
(your department)

*tusaqpallaiqqaujutit*  
(you have probably heard)

*uumajurasungniq*  
(hunting)

*umiat*  
(boats)

- contextual morphemic forms & morpho-phonological behaviours
- meanings (*English, French [, Inuktitut]*)
- syntactical [& semantic] information

## Microsoft Access Tables

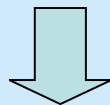
- Roots
- Words (commonly lexicalized; place names; undecomposable, etc.)
- Demonstratives
- Suffixes
- Noun endings
- Verb endings
- Demonstrative endings
- Constraints

<i>Table</i>	<i>Size*</i> <i>(to this date)</i>
<b>Roots</b>	<b>2087</b>
<b>Words</b>	<b>1192</b>
<b>Demonstratives</b>	<b>50</b>
<b>Suffixes</b>	<b>352</b>
<b>Noun endings</b>	<b>311</b>
<b>Verb endings</b>	<b>1234</b>
<b>Demonstrative endings</b>	<b>16</b>
<b>Constraints</b>	<b>43</b>
<b>Morphemic forms</b>	<b>2228</b>

*\* current sizes – growing*

## Dialectal phonological differences in consonant clusters

phonological



spelling

ilipsi

ilissi

ilitsi

*(you)*

iglu

illu

*(house)*

tiki&&uni

tikittuni

tikitsuni

*(arriving, he ...)*

# Example of dialectal differences

Inuktitut - Word Decompositi...

**aglaktiup**

Root&suffixes		Meaning
aglak	allak	to write
ti	ji	one whose job is; agent
up	up	genitive: of a; the (one)

**aglaktiup** (noun)

**agl**ak = **all**ak

Inuktitut - Word Decompositi...

**allattiup**

Root&suffixes		Meaning
allat	allak	to write
ti	ji	one whose job is; agent
up	up	genitive: of a; the (one)

**allattiup** (noun)

**t** - **ti** = **k** - **ti**

**NRC-CNRC**

*Institute for  
Information  
Technology*



# Possible applications for the Inuktitut Morphological Analyser



# Dictionary Application (French)

2. click

1. select

3. get a French description of the syllabic word in the Internet page

Racine&suffixes	Signification
ᐃᓄᓂᓄᓄ	savoir quelque chose; être conscient de quelque chose
ᓄᓄᓄᓄ	commencement de l'action: 'commencer à'
ᓄᓄᓄᓄ	capacité: 'pouvoir', 'être capable de'
ᓄᓄᓄᓄ	déclaration: tu ...

ᐃᓄᓂᓄᓄ ᓄᓄᓄᓄᓄ (verbe)

1. click

2. get a list of the  
suffixes  
in the database

3. click

4. get a  
description of  
the suffix

The screenshot shows two browser windows. The background window, titled 'Main Page - Microsoft Internet Explorer', displays a list of Inuktitut suffixes under the heading 'Inuktitut - Liste des suffixes'. The list includes entries like 'llaaluk', 'llaq', 'llarik', 'lu', 'luaq', 'luktaat', 'luunniit', 'ma', 'mi', 'miutaq', 'mmarik', 'najaq', 'naga', 'nasaag', 'nasuaq', 'ngaga', 'nga', 'ngaaq', 'ngau', 'ngu', 'niaq', 'niaqqau', 'niaqtaksari', 'niqsag', 'nirai', 'niraq', 'niujaq', 'nnajuk', 'ngai', 'nngag', 'nngait', 'nngit', 'nnguaq', 'nnguk', 'nnguit', 'paaq', 'paluk', 'pasaag', 'pats', 'qajaa', 'qajaanngit', 'qalauq', 'gaminngit', 'gammag', 'gag', 'gatauti', 'gati', 'gattaq', 'gauq', 'qqau', 'qqautau', and 'qquqtu'. A green box labeled '2. get a list of the suffixes in the database' points to this list. A green box labeled '3. click' points to the 'niaq' entry.

The foreground window, titled 'Inuktitut - Suffix definition - Microsoft Internet Explorer', provides a detailed definition for the suffix 'niaq':

**niaq**

**Type**  
verbal suffix, verb-to-verb, producing a verb

**Position**  
This suffix must be followed by another suffix, i.e. it cannot occur in word-final position.

**Variants and actions**

- After vowel  
**niaq** It does not affect the final of the stem.
- After t  
**niaq** It nasalizes the t of the stem into n.
- After k  
**niaq** It nasalizes the k of the stem into ng.
- After q  
**niaq** It nasalizes the q of the stem into r.

**Meaning**  
future, today

**Examples**

(qai)	(%bΔ)	qainiaqtuq	%bΔσ<Δ%>%	He will come
(tikit)	(ΠP%)	tikinniaqtunga	ΠP%σ<Δ%>%%	I will arrive
(kaak)	(b%)	kaangniaqtut	b%σ<Δ%>%	They will be hungry
(ilinniaq)	(ΔC%σ<Δ%>)	ilinniarniaqpugut	ΔC%σ<Δ%>σ<Δ%>%>J%	We will learn

“It often seems like it is just getting progressively really more difficult to do.”

Inuktitut - Word Decomposition - Microsoft Internet Explorer

Root&suffixes		Meaning
ajur	<u>ajuq</u>	1) to be unable to or incapable of doing s.t. 2) to not work; to be out of order
na	<u>nak</u>	causation: 'to cause'; 'to make ...'; 'to create the conditions for ...'
si	<u>si</u>	the action is being done now, where it was not the case before
vallia	<u>vallia</u>	progression; 'gradually'
ju	<u>juq</u>	one/he who does the action
alu	<u>aluk</u>	largeness; impressiveness; 'large'; exaggeration, aggrandizement of action (with gerundive): 'a lot', 'a great deal'
tuinna	<u>tuinnaq</u>	ordinaryness, lack of special qualities; 'only', 'just', 'merely'
u	<u>u</u>	existence; is
quuji	<u>quuji</u>	resemblance; 'look like'; 'appear'
qatta	<u>qattaq</u>	regular or habitual action; 'often'
lir	<u>liq</u>	on-going action; present progressive tense
mat	<u>mat</u>	because: because he/she/it ...

ajurnasivalliajualutuinnauquujiqattalirmat (verb)

\* Words may also be in Roman alphabet

Search:

uqausilirinirmut kamisina

(Languages Commissioner)

Hits:

[http://action.attavik.ca/home/langcom/iu\\_whatnew.shtml](http://action.attavik.ca/home/langcom/iu_whatnew.shtml)

*uqausilinirmut kamisina*mik

[http://langcom/rights/iu\\_role.html](http://langcom/rights/iu_role.html)

*uqausilinirmut kamisina*up

<http://www.assembly.nu.ca/old/inuktitut/news/>

*uqausilinirmut kamisina*up, *uqausilirinirmut kamisina*

Other appellations:

uqausilirijikkut kamisinangat  
uqausilirinirmut kiggaqtuti  
uqausilirinirmut kiggaqtuqti  
uqausilirinirmut kiggaqtuiji











In a corpus (e.g. the Nunavut Hansard), find:

- How many times is a given suffix used?
- How many times is it used with another given suffix?
- In what proportion is a given suffix used as opposed to a dialectal equivalent?
- What percentage of all the words are based on a given root?
- etc.

## Current status

Current success rate

82.75%

(February 15, 2005)

95.41%

(April 3, 2006)

Test bench: 1000 most frequent words from  
Nunavut Hansard (>100 times each word)

Failures:

- vocative case
- missing finals
- database (missing morpheme; unknown behaviour; pronouns)
- typos (short/long vowels; single/double consonants; missing/one-too-many character)
- missing functionalities in IMA