Korean Morphological Richness Analyzer (KOMORA) Version 1.0

User Manual for KOMORA 1.0

This manual is written for users of KOMORA to analyze their data. It includes (a) a brief tutorial of how to install and use the application.

When using KOMORA 1.0 in your project, please cite this paper:

Hwang, H. (submitted). Development of morphological diversity in second language Korean: An NLP analysis using Korean Morphological Richness Analyzer.

• Installment

Download the version of KOMORA appropriate for your operating system (**Mac** or **Windows**) and open it. For Windows users, if the application does not work, please install JAVA following the steps illustrated from p. 3 of this document.

• Morphological indices in KOSCA 1.0

Category	Index	Measurement
Length of	Number of sentences	total number of sentences in text
production	Number of eojeols	total number of eojeols in text
	Token frequency of	total number of individual
	morphemes	morphemes (i.e., tokens) in text
	Type freuqnecy of	total number of unique morphemes
	morphemes	(i.e., types) in text
	Type-token ratio (Chotlos	total number of types ÷ total number
	1944)	of tokens
Lexical diversity	Root type-token ratio	total number of types ÷ sqrt (total
(or richness)	(RTTR; Guiraud, 1960)	number of tokens)
	Corrected type-token ratio	total number of types \div sqrt(2 × total
	(CTTR; Carrol, 1964)	number of tokens)
	Herdan (Herdan, 1960)	log(total number of types) / log(total
		number of tokens)
	Summer (Somers, 1966)	log{log(total number of types)} ÷
		log{log(total number of tokens)}
	Dugast (Dugast, 1978)	$\{\log(\text{total number of tokens})^2\} \div$
		{log(total number of tokens) –
		log(total number of types)}
	Maas (Maas, 1972)	{log(total number of tokens) -
		$log(total number of types)\} \div$
		$\{\log(\text{total number of tokens})^2\}$

Mean segmental type-	Please refer to the reference.
token ratio (MSTTR;	
Johnson, 1944)	
Moving-window type-	Please refer to the reference.
token ratio (MATTR;	
Covington & McFall,	
2010)	
Measure of textual lexical	Please refer to the reference.
diversity (MTLD;	
McCarthy & Jarvis,	
2010),	
HD-D (McCarthy &	Please refer to the reference.
Jarvis, 2007)	

• Input

- (1) Select the morpheme types for analysis.
- (2) Select the indices for analysis.
- (3) Click on the "Location" button (at the left bottom) to locate a folder in which text data for analysis are available. Note that all input files must be text files (.txt). All .txt files in the chosen input folder will be processed by KOMORA 1.0.
- (4) Click on the "Process" button (at the right bottom) to analyze inputted data.

	KOMOKA			
Korean Morphologio	cal Richness Analyzer Ver 1.0	About	Contact	
	Step 1: Select morphemes to be	e analyzed		
all morphemes	content morphemes	function me	orphemes	
	Step 2: Select indices to be a			
	select all			
token frequer	псу	type frequency		
ttr				
cttr		Herdan		
Summer		Dugast		
msttr		mattr		
mtld		hdd		
Step 3: Select the folder containing texts to be analyzed				
Location		f	Process	

• Output

An output of the inputted data analyzed in selected morphological indices will be saved as a comma-separated file named "results.csv", which is runnable in a software, like Number or Excel.

Important for Windows users only:				
Follow the steps below to make the application work.				
1. Download and install the	1. Download and install the version of Java that is appropriate for your operating system.			
(1) Go to <u>https://www.oracle</u>		· · · · · · · · · · · · · · · · · · ·		
	C	lows" and download the Java Development Kit		
download JAVA).	(Note: 1	You may be required to create an Oracle Account to		
Java SE Development Kit 18.0.2.1 downlo	ads			
Thank you for downloading this release of the Java™ P components using the Java programming language.	Thank you for downloading this release of the Java ¹⁴⁴ Platform, Standard Edition Development Kit (JDK ¹⁴). The JDK is a development environment for building applications and			
Components using the Java programming language. The JDK includes tools for developing and testing programs written in the Java programming language and running on the Java platform.				
Linux macOS Windows				
Product/file description	File size	Download		
x64 Compressed Archive	172.93 MB	https://download.oracle.com/java/18/latest/jdk-18_windows-x64_bin.zip (sha256 🖄)		
x64 Installer	153.45 MB	https://download.oracle.com/java/18/latest/jdk-18_windows-x64_bin.exe (<u>sha256 区</u>)		
x64 MSI Installer	152.33 MB	https://download.oracle.com/java/18/latest/jdk-18_windows-x64_bin.msi (sha256 🖄		
(3) Once the Java download	is comple	ete, run the exe and install Java.		
		a in the following manner.		
(1) Right click on the "My C	omputer'	on the desktop and select the "properties".		
This PO Pin to Quick access				
A TreeSize Free Manage				
Networ				
Map network drive Disconnect network drive				
Create shortcut				
Recycle I Rename				
2 Properties				
(2) Click on "advanced system	m setting	js".		

뇛 System		
$\leftarrow \rightarrow \checkmark \uparrow$ > Control Panel >	 System and Security > 	System
Control Panel Home	View besic informat	tion about your cc
Device Manager	Windows edition	
💎 Remote settings	Windows 10 Home	
System protection	© 2019 Microsoft Cor	poration. All rights reser
Advanced system settings		
	System	
	Manufacturer:	Microsoft Corpor
	Processor:	Intel(R) Core(TM)
(3) Click on "Environment Variable	s" to set a mintime	anvironment for Jovo
(3) CIICK ON ENVIRONMENT VARIABLE System Properties	\times ×	linningin ini java.
Computer Name Hardware Advanced System Protecti		
You must be logged on as an Administrator to make most of		
Performance		
Visual effects, processor scheduling, memory usage and	virtual memory	
	Settings	
User Profiles		
Desktop settings related to your sign-in		
	Settings	
Start-up and Recovery System start-up, system failure and debugging information	n	
	Settings	
Enviror	nment Variables	
OK Canc	el Apply	
(4) Click on "New" button.		
User variables for Guru99		
Variable Value OneDrive C:\Users\Guru99\OneDrive		
Path C:\Users\Guru99\AppData\Local PyCharm C:\Program Files\JetBrains\PyCh	\Programs\Python\Python37-32\S arm 2019.2.3\bin;	
PyCharm Community Edition C:\Program Files\JetBrains\PyCh TEMP C:\Users\Guru99\AppData\Local		
TMP C:\Users\Guru99\AppData\Local	\Temp	
New.	. <u>E</u> dit <u>D</u> elete]
(5) Type "PATH" in the "Variable n	ame".	

Edit User Variable	×		
Variable name: PATH			
Variable value:			
Browse Directory Browse File	OK Cancel		
(6) Copy the path of "bin" folder under t	the "JDK" folder.		
↑ 📙 → This PC → Local Disk (C:) → Program Files → Java	> jdk1.8.0_271 > bin Copy address		
Name ^	Date modified Copy address as text		
ccess	Edit address		
op 📌 💷 appletviewer.exe	31-12-2020 04 Delete history		
loads ★ ■ excrective	31-12-2020 04:51 PM Application 31-12-2020 04:51 PM Application		
ments 🖈 🔲 jabswitch.exe	31-12-2020 04:51 PM Application		
es 🖈 🔳 jar.exe	31-12-2020 04:51 PM Application		
le Drive 🖈 🔲 jarsigner.exe	31-12-2020 04:51 PM Application		
st 🖈 🍰 java.exe	31-12-2020 04:51 PM Application		
rah 🗾 iavac.exe	31-12-2020 04:51 PM Application		
(7) Paste the copied path in "Variable va	alue" and then click on "OK".		
New User Variable	×		
Variable name: PATH			
	.		
Variable value: C:\Program Files\Java\jdk1.8.0_271\bin	2		
Preuves Directory Preuves File			
Browse Directory Browse Eile	OK Cancel		
(8) Click on "New" button.			
(9) Type "CLASSPATH" in the "Variab	ble name". And, copy the path of "lib" folder under		
the "JDK" folder and past it in "Variable value" and then click on "OK".			
New User Variable	×		
Variable name: CLASSPATH			
Variable value: C:\Program Files\Java\jdk1.8.0_271\lib	2		
Provine Directory	OK Consel		
Browse Directory Browse File	OK Cancel		
Distance from 1440 a // marrie and 00 a and / material internal			
Pictur	res from https://www.guru99.com/install-java.html		