



Multi-Language Support and Localization of GRASS GIS

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Abstract

In this paper we described the efforts towards Internationalization (i18n) of GRASS GIS and discuss present status. Development of GRASS-i18n has been carried out in the following four broadways.

- a) *Tcltkgrass-i18n and Nviz-i18n Graphical User Interface (GUI)*
- b) *i18n of GRASS command help system*
- c) *i18n of GRASS text drawing command such as d.text and d.label*
- d) *i18n of GRASS PostScript print command (ps.map)*

As a result of the above developments, it is now easily possible to localize GRASS GUI to other languages by creating appropriate message files in other languages. Further, display and printing for other languages are supported using Unicode (UTF-8) encoding scheme. The i18n of GRASS and localization to Japanese and Vietnamese were completed for version 5.0.3. The i18n functionality and localization to other are being incorporated into the GRASS version 6.0.0 release.

1. Introduction

GRASS GIS is Free/Libre Open Source Software (FOSS) for Geoinformatics designed for accumulation, management, analysis and visualization of spatial information. GRASS is useful in the various fields such as resource management, hazard mapping, environmental monitoring, marketing and medical informatics (Neteler and Mitasova, 2002). GRASS can handle not only information on the surface of

the earth but also underground three-dimensional geologic information (Masumoto et al., 2004).

Multi-languages is required for the purpose of enabling wide-spread use of GRASS GIS in operational environment. Furthermore, English GUI and help function are hard to use for end user who do not use English as a means of communication. GRASS has Russian version as an example of language localization (Shevlakov, 2002). Localization (L10n; "L" + 10 letters +

"n") can be carried for individual languages, however in order to support multi-language locales, it is important that internationalization (i18n; "i" + 18 letters + "n") of GRASS is carried out in a systematic and phased manner.

For these purpose, the i18n version of GRASS 5.0.3 is being developed. At present, Tcltkgrass GUI, Nviz, command help, text display on monitor, and PostScript print command have been developed as an i18n version. Efforts are also being made to incorporate the i18n features in GRASS6.0.0 as it supports multi-language locales and UTF-8 encoding.

2. Internationalization of GRASS

5.0.3

Development of GRASS-i18n has been carried out in the four broadways. As a result of the developments, it is now easily possible to localize GRASS GUI to other languages by creating appropriate message catalogue files in other languages (e.g. Nonogaki et al., 2004).

2.1 Tcltkgrass-i18n and Nviz-i18n Graphical User Interface

The menu of tcltkgrass and Nviz which are the main GUI of GRASS have been internationalized. Tcltkgrass of the i18n version consists of "tcltkgrass-i18n" new command and modules include message catalogue file (en.msg). The "msgcat", "mc" and "mcload" function of Tcl/Tk were used to perform the internationalization of tcltkgrass. These are a set of function that can be used to manage multi-language user interface with message

catalogue file.

The principal modified points of tcltkgrass program are as following;

- (1) Three lines of macro definition was added in the beginning of the gui.tcl (Figure 1(a)),
- (2) all text strings and string variables to translation were surrounded by "[_]" (eg. [_ "Family:"] or [_ \$label]) (Figure 1(b) and (c)),
- (3) message catalogue file (en.msg) was created.

For desired languages, the Unicode-8 version of the new message catalogue file xx.msg (xx is the locale code; e.g. ja for Japanese, de for German, th for Thai etc.) needs to be created based on en.msg file as following rule.

```
Original >> ::msgcat::mcset en
             "File(F)" "File(F)"
                                                     (en.msg)

Changed <<  ::msgcat::mcset yy
             "File(F)" "zz(F)"
                                                     (xx.msg)
```

Where yy is the locale code and zz is the message in desired language. And only roman character (e.g. (F)) can be used for shortcuts.

In case of Japanese, multi-byte EUC-JP and Shift-JIS charactersets are also supported (e.g. Figure 2). Depending on the locale (LANG) environment, tcltkgrass-i18n can be used in Japanese language.

According to the above rule, examples of language localization of GRASS have been completed in Japanese and Vietnamese. The

```
#####
# Name:          gui.tcl
#
package require msgcat
proc _ {s} {return [::msgcat::mc $s]}
::msgcat::mcload "$env(TCLTKGRASSBASE)/main" .....(a)
#
button $path.b$j -text [_ $label] -relief flat -command $cmd .....(b)
#
label $path.lab1 -text [_ "Family:"] .....(c)
#
```

Figure 1: Internationalization (i18n) version of gui.tcl.(GRASS5.0.3)

original English, Japanese and Vietnamese menu of tcltkgrass are shown in Figure 3. The examples of the module are shown in Figure 4.

Nviz of the i18n version consists of new command “nviz-i18n” and modules include message catalogue file that are as same as tcltkgrass-i18n. The control main panels with surface panel of Japanese and Vietnamese version of nviz-i18n are shown in Figure 5.

2.2 Command Help System

The command help for the command included in tcltkgrass-i18n was internationalized. The “_()” macro and a “gettext” command were used for internationalization of command help. The next two main improvements had been done.

- (1) The improvements that affect to all GRASS help command.

These are the change for the fixed expression strings such as the kind of the message and help information related to all help commands. All strings of the translation object were changed to the call by _() macro in the src/libes/gis/parser.c program.

- (2) The improvements to the help message of each command.

These are two cases of help command such as (a) help information is described in the C language program, and (b) help information is described in the echo command of shell script.

In the case of (a), “include glocale.h” was added to the each program which

```

::msgcat::mset ja "Copy" "コピー"
::msgcat::mset ja "Create a grid" "グリッドの作成"
::msgcat::mset ja "Create/edit label" "ラベルの作成/編集"
::msgcat::mset ja "Display text labels" "テキストラベルの表示"
    
```

Figure 2: Japanese version example of message catalogue file



Figure 3: Tcltkgrass-i18n menu (upper; original English, middle; Japanese, lower; Vietnamese version)

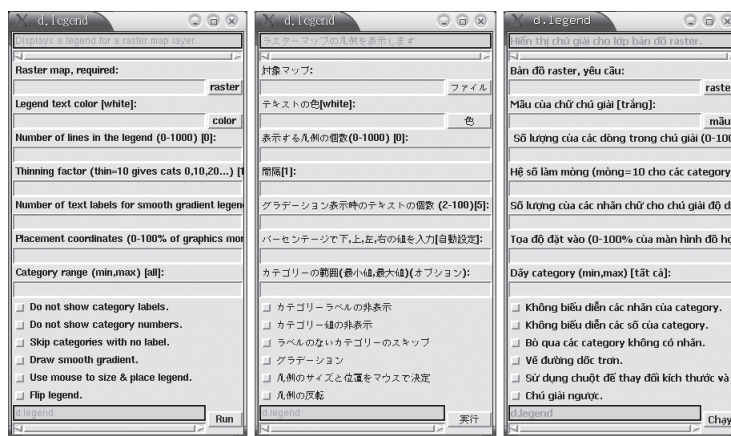


Figure 4: Example of d.legend module (left; original English, middle; Japanese, right; Vietnamese version)

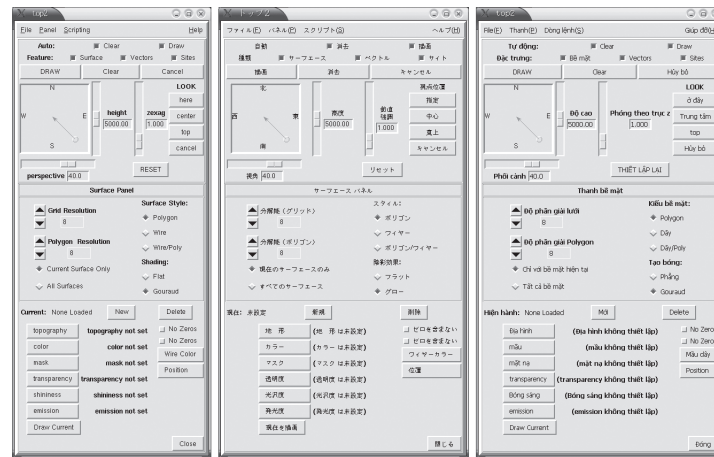


Figure 5: Examples of nviz-i18n panel (left; original English, middle; Japanese, right; Vietnamese version)

include the help information, all strings of help information were surrounded by `_()` macro (e.g. Figure 6). In the case of (b), four new definition lines for the `TEXTDOMAIN` were added to the beginning of each shell script, and all strings of help message were surrounded by `gettext "strings"` (e.g. Figure 7).

For desired languages, the new binary message (.mo) files needs to be created as following four steps;

- step 1. Create the gettext source message (.pot) files using `xgettext` command.
- step 2. Copy these files to the proper directory.
- step 3. Translate these source files and save as the translated message (.po) files (Figure 8).
- step 4. Compile the translated message files to the binary message (.mo) files using the `msgfmt` command.

The command help dialog box can be displayed in `tcltkgrass-i18n` by clicking the right button of the mouse over a menu item or on a "RUN" (execute) button of a command dialog. And, the command help can be invoked also in a shell by typing the following:

```
GRASS:> grass_command help
                (e.g. d.rast help).
```

The examples of command help are shown in Figure 9.

2.3 Text Draw Command

The text display on the graphic monitor of GRASS was internationalized. It was changed to use TrueType fonts instead of the vector fonts of the original version of GRASS. By using TrueType fonts, Double Byte characters such as Japanese character set can be displayed. To set up TrueType fonts, a new command "d.font.freetype" has been added to perform font and character encoding. As a result of this internationalization, various languages can be used for the site label, legend and so on. In Figure 10 and Figure 11, site labels and legend are shown as the examples of Japanese font display on the graphics monitor.

2.4 PostScript Print Command

To produce high quality hardcopy map products, PostScript print command (`ps.map`) was internationalized. PostScript output can be included the text in various language. The example of PostScript print is shown in Figure 12.

2.5 Computer Environment

For localized version of GRASS, it is necessary to prepare the computer environment that local language can be used. And, the Tcl/Tk of 8.4 and later version is required to implement

3. Present Status of GRASS6.0.0 (beta)

Based on the efforts of internationalizing GRASS 5.0.3, the major part of the required software changes has been introduced to GRASS 6.0.0. This new version provides a rewritten vector engine with integration of RDBMS support, support of the multi-byte TrueType/FreeType fonts in the display system, a new Tcl/Tk based graphical user interface and improved interoperability to OGC standards and common GIS data formats.

Messages have not yet been completely indicated in the source code with “_()” macro, but the mechanism which searches for indicated messages in the source code in order to generate a template file was completely automated. Also automated was the merge of new messages into existing message catalogues. While in GRASS 5.0.3 all modules keep their own message catalogue file, the messages storage was simplified to use only two catalogues in the ‘locale/’ sub-directory: one catalogue for library messages and one for module messages. The message handling is fully integrated into the new Makefile system which helps non-programmers to start new translation projects.

Japanese messages have been partially migrated to the new system. In general, tran-



Figure 10: Example of Japanese language legend using d.legend command

slations already existing for GRASS 5.0.3 can be automatically transferred to the new GRASS using the “fuzzy translation tool” within the “kbabel” software of the KDE project.

The new Tcl/Tk based graphical user interface is generated upon runtime from the standard help texts. Due to this improvement developers do not have to separately maintain the graphical user interface any more. Also translations of the standard help texts will appear immediately in the new Tcl/Tk based graphical user interface. However, the integration of “msgcat”, “mc” and “mclod” functions to fulfil this task is still missing in GRASS 6.0.0.

The parameters/flags part of the online HTML documentation is also rendered from the standard help texts within a virtual session during compile-time of the software. Compiling GRASS 6.0.0 in an environment of a GRASS supported language will render the upper part of the HTML documentation in the selected language.

Currently translations are ongoing for Japanese, German, French, Slovenian and Italian languages. The efforts are coordinated in a mailing list at <http://grass.itc.it/devel/i18n.php>.

4. Sample Data Sets Development for i18n

Language localization of GRASS 5.0.3 has been completed for Japanese and Vietnamese. To realize completely localization, GRASS sample datasets for each language version have been prepared.

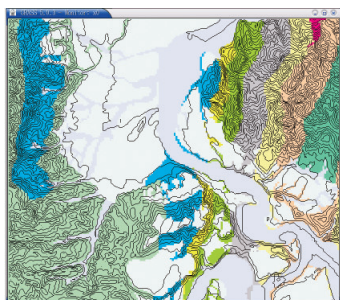
The sample data set of the Japanese version was developed for multi-purpose use similar to the Spearfish data set of GRASS. In this data set, natural science data (elevation, vegetation, geology, landslide, and ASTER images) and social science data (land use, population density, commerce establishment, road, railroad, and public facilities) were included. In Figure 13, examples of this sample data set are shown. And, another four data sets that aimed at natural science, social science, and perspec-



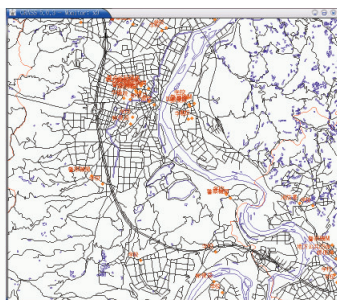
Figure 11: Example of Japanese site labels using `.site.labels` command



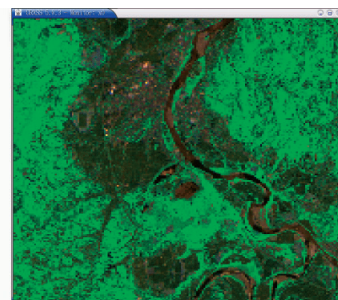
Figure 12: Example of PostScript print in Japanese using `ps.map` command



(a) Geological map with elevation contours

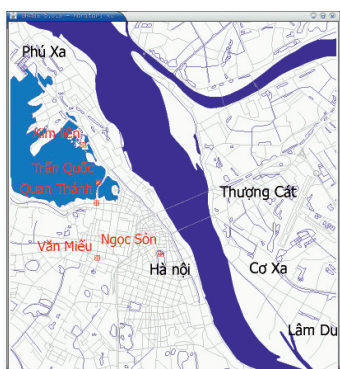


(b) road, river and public sites



(c) ASTER image

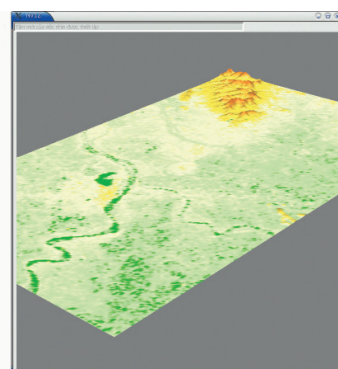
Figure 13: Examples of Japanese data set



(a) Topographical map



(b) ASTER image



(c) SRTM data

Figure 14: Examples of Vietnamese data set

tive view were prepared. These GRASS sample data sets are available freely, and can be downloaded from the Internet (<http://www.foss4g.org/FOSS4G/>). The sample datasets can help Japanese users to learn about GRASS functionality using datasets that they are familiar with.

The sample data set of the Hanoi City for Vietnamese version was developed. Examples of this data set (Topographical map, ASTER image, and SRTM DEM) are shown in Figure 14.

5. Conclusions

The present status of the development of internationalization version of GRASS was summarized. And, the examples of Japanese and Vietnamese version were expressed using each sample data set. At present, internationalization of two main function of GRASS could not complete as following;

- (1) The message and notice of GRASS command,
- (2) GRASS online manual.

Further development and investigation are necessary for these functions.

The portal site to open these result and other information related GRASS and FOSS4G is <http://www.grass-japan.org/FOSS4G>. From this portal site, the binary code, source code of internationalised version of GRASS and Japanese sample data sets can be downloaded (Raghavan et al., 2004).

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