

Present Status of GRASS Internationalization Project

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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 [1]. GRASS can handle not only information on the surface of the earth but also underground three-dimensional geologic information [2].

However, in general GIS, multi-languages is required for the purpose of enabling widespread use of GRASS in operational environment. Furthermore, English GUI and help function are hard to use for the more general end user who do not use English as a means of communication. GRASS has Russian version as an example of language localization [3]. Localization (L10n; "L" + 10 letters + "n"; upper case L is used to distinguish it from the numeral 1 (one)).) can be carried out for individual languages, however in order to support multi-language locales it is important that internationalization (i18n; "i" + 18 letters + "n"; lower case i is used to distinguish it from the numeral 1) 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 GRASS5.7 as it supports multi-language locales and UTF-8 encoding.

2 Internationalization of GRASS

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 (eg. [4]).

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 "mload" 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;

```
#####
# Name:          gui.tcl
:
package require msgcat
proc _ {s} {return [::msgcat::mc $s]}
::msgcat::mload "$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.

```
:
::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 example of message catalogue file.

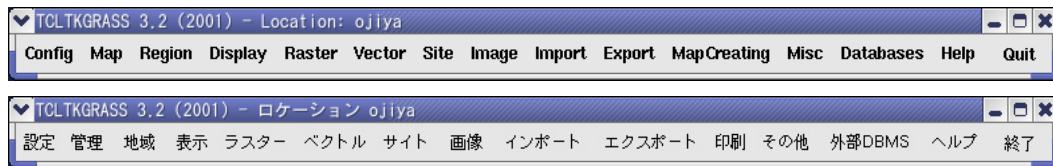


Figure 3: Tcltkgrass-i18n menu (upper; original English, lower; Japanese version).

- (1) Three lines of macro definition was added in the beginning of the gui.tcl (Fig. 1(a)),
- (2) All text strings and string variables to translation were surrounded by "[_]" (eg. [_ "English Text"] or [_ \$label]) (Fig. 1(b)(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; eg. ja for Japanese, de for German, th for Thai etc.) needs to be created based on en.msg file as following rule.

```
Original >> ::msgcat::mset en "File(F)" "File(F)"          (en.msg)
Changed << ::msgcat::mset yy "File(F)" "zz(F)"            (xx.msg)
  Where yy is the locale code and zz is the message in desired language.
  Only roman character (e.g. (F)) can be used for shortcuts.
```

In case of Japanese multi-byte character-sets EUC-JP and Shift-JIS is also supported (eg. Fig. 2). Depending on the locale (LANG) environment, tcltkgrass-i18n can be displayed in locale language.

According to the above rule, example of language localization of GRASS has been completed in Japanese. The original English menu and Japanese menu of tcltkgrass are shown in Fig. 3. The example of the module is shown in Fig. 4.

Nviz of the i18n version consists of "nviz-i18n" new command and modules include message catalogue file as same as tcltkgrass-i18n. The the control main panel with surface panel of Japanese version of nviz-i18n is shown in Fig. 5.

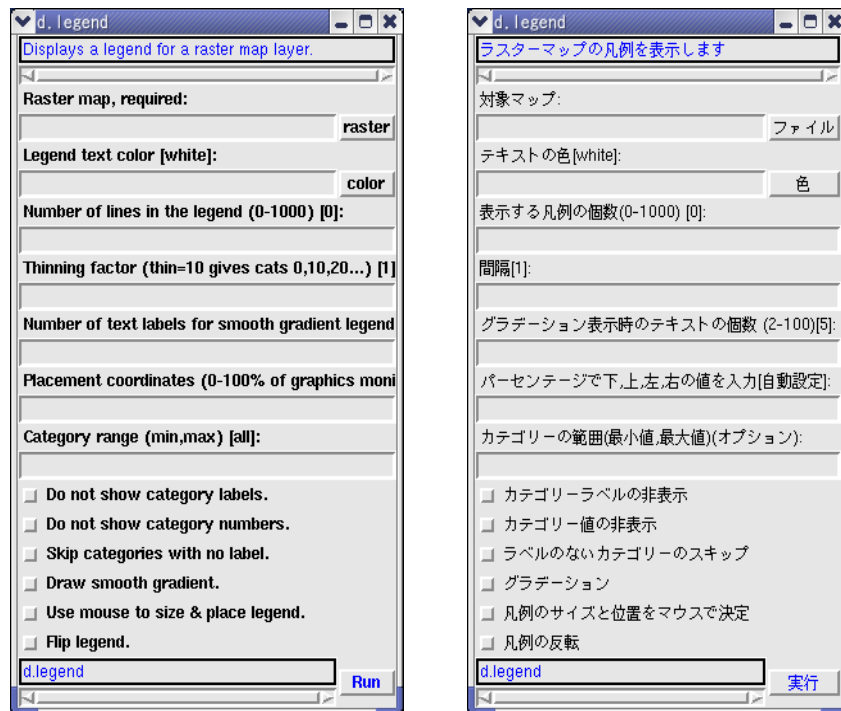


Figure 4: Example of d.legend module (left; original English, right; Japanese version).

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 program, and (b) help information is described in the echo command of shell script.

In the case of (a), "include locale.h" was added to the each program which include the help information, all strings of help information were surrounded by `_()` macro (eg. Fig. 6). In the case of (b), four new definition lines for the TEXTDOMAIN was added to the beginning of each shell script, and all strings of help message was surrounded by `gettext "strings "` (eg. Fig. 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 (Fig. 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           (eg. d.rast help).
```

The Japanese example of command help is shown in Fig. 9.



Figure 5: Example of nviz-i18n Japanese version.

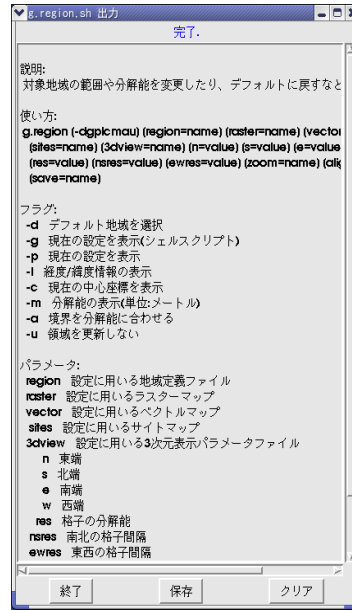


Figure 9: Example of Japanese command help (g.region.sh).

```

*****
* MODULE:          d.text
*
*
*
* #include "raster.h"
* #include "glocale.h"
*
* module = G_define_module();
* module->description =
*     _("Draws text in the active display frame on the graphics monitor.");
*
*
    
```

Figure 6: Example of i18n version command (d.text).

```

TEXTDOMAIN=cell.out.tiff
export TEXTDOMAIN
TEXTDOMAINDIR=$GISBASE/locale
export TEXTDOMAINDIR
*
* echo `gettext "This program collects several display functions to create a map"`
* echo `gettext "that can be exported using the cell driver. It first creates a preview"`
*
    
```

Figure 7: Example of i18n version shell command (cell.out.tiff).

```

"Project-Id-Version: d.text 5.0.3\n n"
*
* "Content-Type: text/plain; charset=UTF-8\n n"
* "Content-Transfer-Encoding: 8bit\n n"
*
* #: src/display/d.text/cmd/main.c:63
* msgid "Draws text in the active display frame on the graphics monitor."
* msgstr "モニターにテキストを表示します"
*
    
```

Figure 8: Example of the translated message (.po) file (d.text).



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



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



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

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 display. 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 Fig. 10 and Fig. 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 Fig. 12.



Figure 13: Main menu of GRASS 5.3 (upper; original, lower; Japanese).

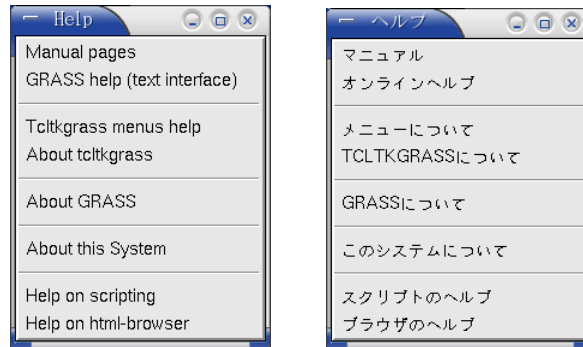


Figure 14: Sub-menu of GRASS 5.3 (left; English, right; Japanese).

2.5 Internationalization of GRASS5.3

At present, only tcltkgrass of GRASS5.3 version has been internationalization. The main menu and the command module example of internationalised GRASS5.3 are shown in Fig.13 and Fig. 14, respectively.

3 Japanese sample data sets of GRASS

Language localization of GRASS has been completed for Japanese. To realize completely localization, Japanese GRASS sample datasets 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 Fig. 15, examples of this sample data set are shown. And, another four data sets that aimed at natural science, social science, and perspective 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.

4 Conclusions

The present status of the development of internationalization version of GRASS was summarized. And, The examples of Japanese version were expressed using Japanese 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 to 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 internationalized version of GRASS and Japanese sample data sets can be downloaded [5].

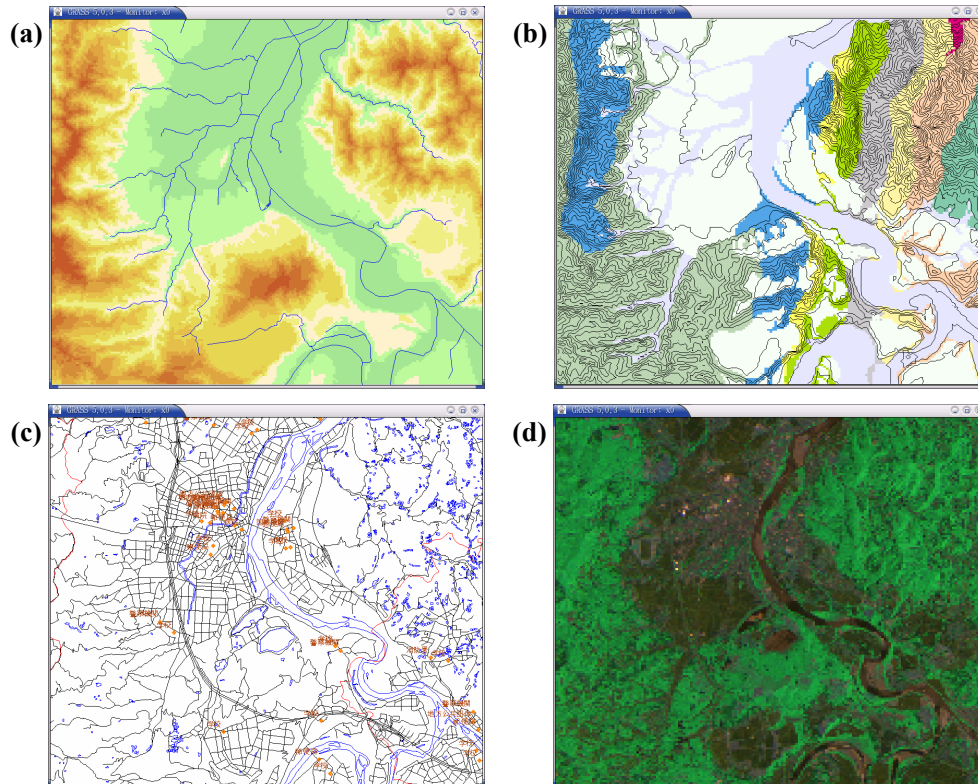


Figure 15: Examples of Japanese data set. (a) Elevation with river line, (b) geology with contours, (c) road, river and public sites, (d) ASTER image.

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