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Chapter 1

Introducing Sanyog

Welcome to Sanyog, a speech enabled Augmentative and Alternative Communication system. The system has enabled people suffering from Speech and Motor Impairments to communicate with others in an easy and natural way.

Using Sanyog, a user can communicate using icons, text and speech. Sanyog makes this possible by allowing the user to form single sentences or compose messages of arbitrary length or use pre-stored messages. All these the user can do using user-friendly interfaces that can be operated with mouse, keyboard or special access switches.

1.1 Features

The Sanyog System provides the following features.

- **Iconic Communication:** The user can form natural language sentence from icons selected from an interface. Icons can be selected with either mouse, keyboard or special access switches. The sentences can be modified with respect to tense and mood. Also, the generated sentence can be spoken out using text to speech systems that are incorporated with Sanyog.

- **Soft Keyboard:** The soft keyboard interface allows the user to compose texts, save the text in a file for later use and print it. Mouse, keyboard or special access switches can be used to compose text in the keyboard interface. The composed text can be spoken out using the inbuilt text to speech synthesis facility. The keyboard supports word and character level prediction to reduce text composition time.

- **Communication with Pre-stored Messages:** The system allows faster communication using a set of pre-stored messages. The messages are displayed to the user in the form of text and icons. Moreover, selection of a message by the user (using either mouse or keyboard or special access switches) automatically speaks out the message, making it speech enabled.

- **Support for Special Access Mechanism:** For making the system accessible to motor-impaired users, all the above interfaces have been integrated with special access mechanism comprising scanning and special access switches. With this feature, the user does not need to use mouse or keyboard to operate the system. Instead, they can use specially designed access switches that require little motor control.

- **Personalization:** The icons used in the iconic communication or the stored messages (both icons and texts) used in the pre-stored message based communication can be

personalized according to the user's likes and dislikes. A personalization interface is provided with the system for the purpose.

- **Language Support:** At present, the Sanyog system supports communication in three languages, namely (i) Bengali (ii) Hindi and (iii) English. The system interfaces for all these languages are the same with minor variations in soft keyboard interfaces (like the presence of the **Yuktakshar** key).

- **Feature Customization:** Sanyog is a complete hardware-software package containing all the interfaces for all three languages. Also, with special access mechanism, the system can be operated with either a single or two special access switches. You can customize all these features of the system according to your need. An interface is provided with the system for this feature customization which comes up during the system start up. From this interface, you can specify the language, the number switches etc.

Chapter 2

Software Setup and Installation Guidelines

2.1 System Requirements

- To run at minimum performance levels, Sanyog requires: Pentium III 700 MHz Processor
- For improved speed and better performance: Pentium IV 2 GHz Processor is recommended.

2.1.1 Memory (RAM) Requirement

- Sanyog is to be run on a system having a minimum of 128 MB RAM.
- To use the **personalization interface**, at least 256 MB of RAM is required.
- It is recommended to have at least 256 MB of RAM. Additional memory will improve speed and performance.

2.1.2 Hard Disk Storage Requirement

Sanyog requires this minimum hard disk space.

- Approximately 200 MB of free hard disk space to install Sanyog, including the help files.
- An additional 100 MB of free hard disk space is required after installation to run Sanyog

2.1.3 Additional Hardware Requirements

The Sanyog system comes with a range of specially designed access switches. These switches are required to make the system accessible to motor-impaired persons who can not use mouse or keyboard. The access switches are connected to an interface “box” that also comes with the system. This interface box connects to the “ports” of your computer. So, to make the Sanyog system work with switches, you need to have either of the following ports of your computer in a working condition.

- Serial Port: with most desktop PCs, there are two serial ports available. These are known as COM1 and COM2. Among them, COM1 is required to connect the serial port switch interfaces.

Note: Some Desktop PCs may have only a single serial port. Connect the serial port switch interface to the single serial port in that case.

- Hardware lock is supplied with the system for authentication.

2.1.4 Software Requirements

Operating System: Windows 98, 2000, ME, XP

2.2 Before You Install

The following steps are to be completed before installing Sanyog:

- Exit all the applications before installing Sanyog.
- Check whether Sanyog System is previously installed. If it exists, uninstall it.

2.3 Installing Sanyog

To install Sanyog:

- Start Windows.
- Put the Disc in the CD-ROM drive. The windows Auto Run program starts the Installation automatically, and the setup wizard guides you through the installation steps.

If the windows auto play feature is not enabled on your computer, follow these steps to install Sanyog:

- Start Windows.
- Put the Disc in the CD-ROM drive.
- On the Start menu, click **Run.**
- Type **D:\SETUP**, or the appropriate letter for your CD-ROM drive, then press **Enter**. The Setup wizard guides you through the installation steps.

The Setup wizard creates a directory named Sanyog and installs all Sanyog files in the folder “Sanyog 1.0”, which is created within the Sanyog Directory.

2.4 During Installation

Welcome Screen

During installation of Sanyog, first a welcome screen will appear. Click **next** to continue.

License Agreement

Read the License agreement carefully if you accept all terms click **Yes** to continue otherwise click **No** to exit Setup.

Installation Type

Select **Common Profile** to install the software for all users of the computer or **Personal Profile** for the current user only.

Destination Folder

To install Sanyog 1.0 components to the given default folder path click **Next** or to install to a different folder, click **Browse** and choose another folder.

Program Folder

Installer will add program icons to the program folder named "Sanyog\Sanyog 1.0" (By Default). You may type a new folder name of select one from existing folder list.

Fonts and **Device Driver Installation**

After Installation of fonts and Device Driver for Hardware lock a message box will appear as shown in Fig 2.1.

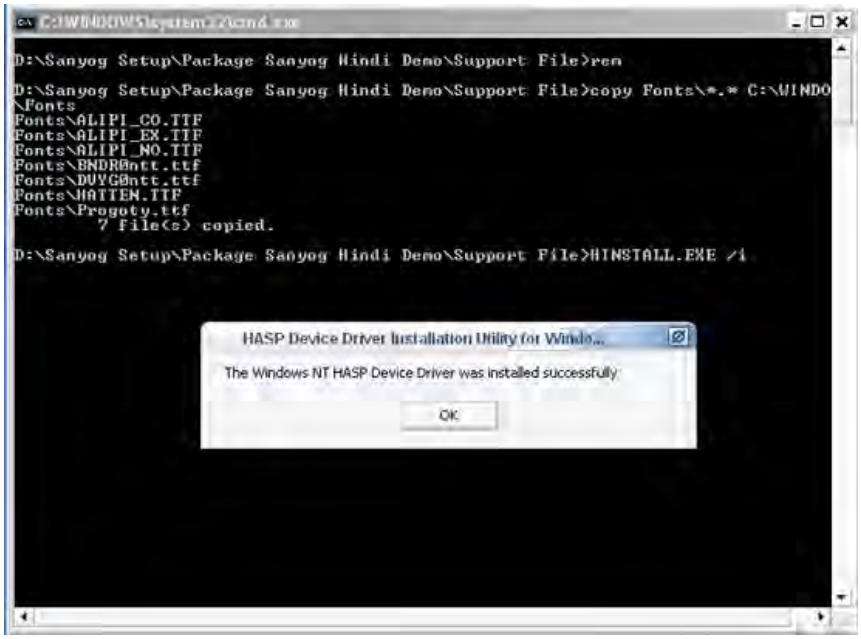


Fig 2.1

Press **ok** to complete the Setup Process.

2.5 Uninstalling Sanyog

To Uninstall Sanyog from your system follow the given steps:

1. In the start menu point to **Settings** and then click **Control Panel**

2. The control panel window will appear. Double click the **Add/Remove Program** icon. The Add/Remove dialog box will open

3. From the Add/Remove dialog box select Sanyog and click the **remove** button present in the bottom right corner.

4. From the Uninstall confirmation dialog box click **Yes** to completely remove the Sanyog software from your computer.

Chapter 3

Before You Start Using the System

- Make sure that the hardware lock (shown in Figure 3.1) that has been supplied is properly connected to the parallel port.

Fig 3.1

- To operate the system with access switches, make sure that the Switch Interface (shown in Figure 3.2) is connected to the proper port (COM1 for serial port interface and any of the USB ports for USB interface)

Fig 3.2

- Switch on the speaker to get the audio output.

3.1 Getting Started

You can Start Sanyog using either of the following ways.

- On the Start menu, point to programs and then click Sanyog

  Or

- On the desktop, you will see a shortcut icon for Sanyog. Double click over the icon to start the system.

Chapter 4

The Initial Configuration Screen

After you start the Sanyog system, the following screen (Figure 4.1) will appear. You can customize the features provided in Sanyog by selecting options present in the screen. Thus, this initial configuration screen acts as the feature customization interface mentioned in chapter 1. The different customization options in the screen are presented in the form of icons to make them intuitive.

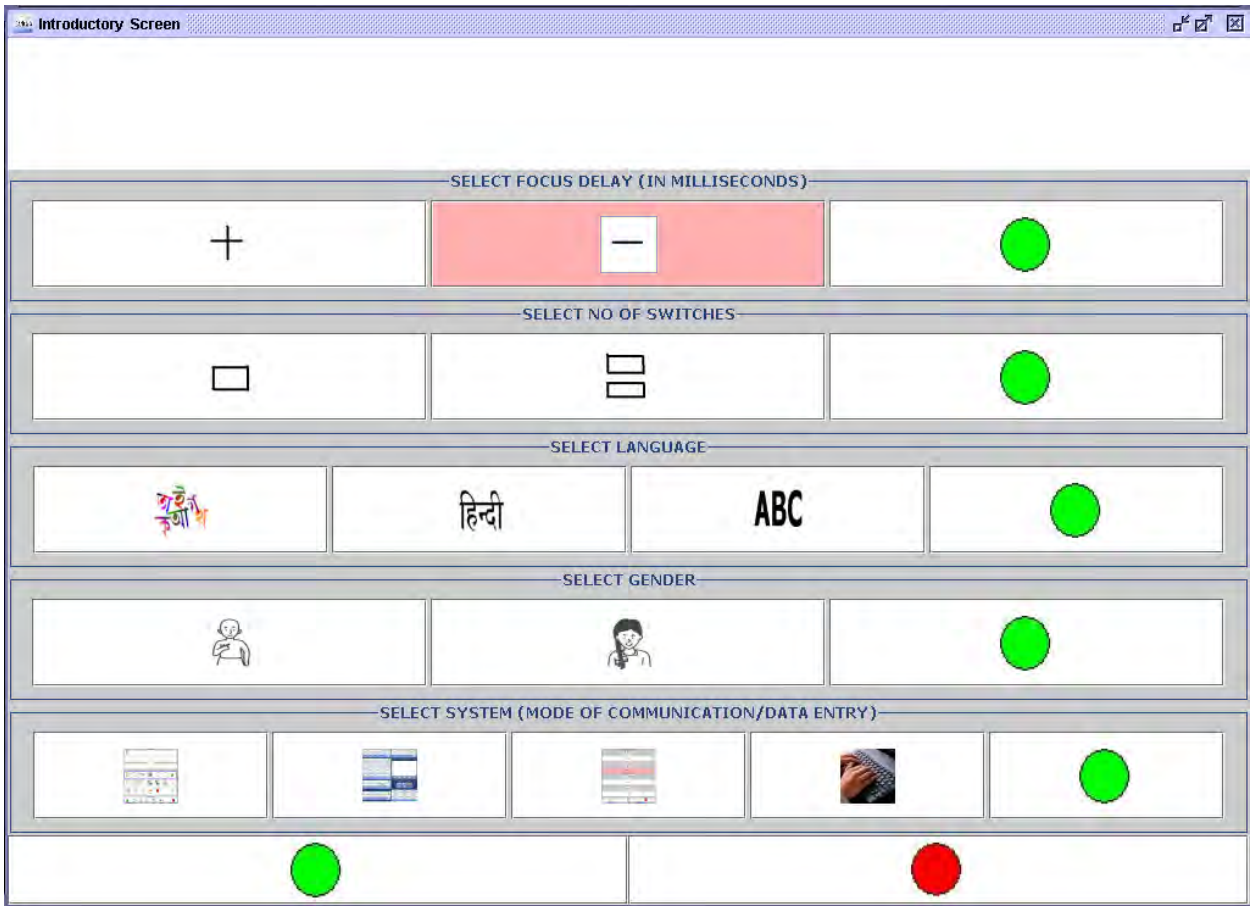


Fig. 4.1. The Initial Configuration Screen

4.1 Setting the Scan Step

To operate the different interfaces of Sanyog with access switches, the Sanyog system uses the so-called method of *Scanning*. The term scanning implies periodic highlighting of on-screen elements. Now, this highlighter can be shifted from one on-screen element to the next either automatically (which is known as *auto-scanning*) or using access switches.

In case of auto-scanning, the highlighter stays on an element for sometime and then moves to the next element. The time the highlighter stays on an element is called *scan step*. The duration of a scan step varies widely among user to user based on their physical ability and expertise with a particular system.

In Sanyog, you can set your own scan step duration using the options present in the first row of the initial configuration screen. This is shown in Figure 4.2 within the red boundary. The default scan step of the system is 1500 Millisecond (a millisecond is one thousandth of a second). If you click on the "+" icon, the scan step will increase by 500 milliseconds. Clicking on the "-" icon will reduce it by 500 milliseconds.

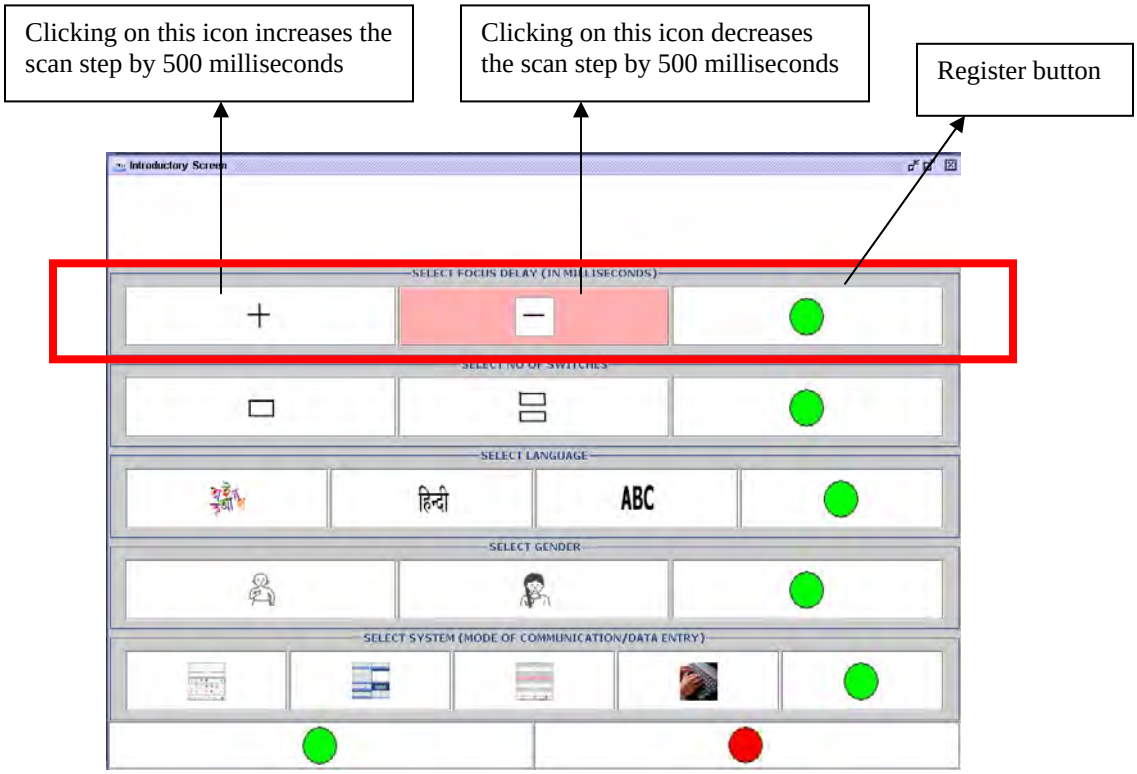


Fig. 4.2. The options to set the scan step

Once you set a particular scan step, you **must register this setting** with the system by clicking on the green button present in the row.

Please remember while setting your scan step,

- The scan step duration can not be reduced to lower than 500 milliseconds. This is the lowest value set by the system.

- If you do not set your scan step duration, the system will operate with the default scan step duration of 1500 milliseconds (1.5 second).

- If you do not register the scan step you have set, the system will work with the default scan step only. Your settings in that case will not have any effect on the system.

4.2 Selecting Number of Switches

This option allows you to decide with how many access switches you want to operate the system. With the current version of Sanyog, you can select to operate the system with either a single switch or two switches.

The options present in the second row in the initial configuration screen allow you to select the number of access switches you want to use to operate the system (Figure 4.3). By clicking on the single square option, you can operate the system with single switch and by clicking on the double square option, you can operate the system with two switches.

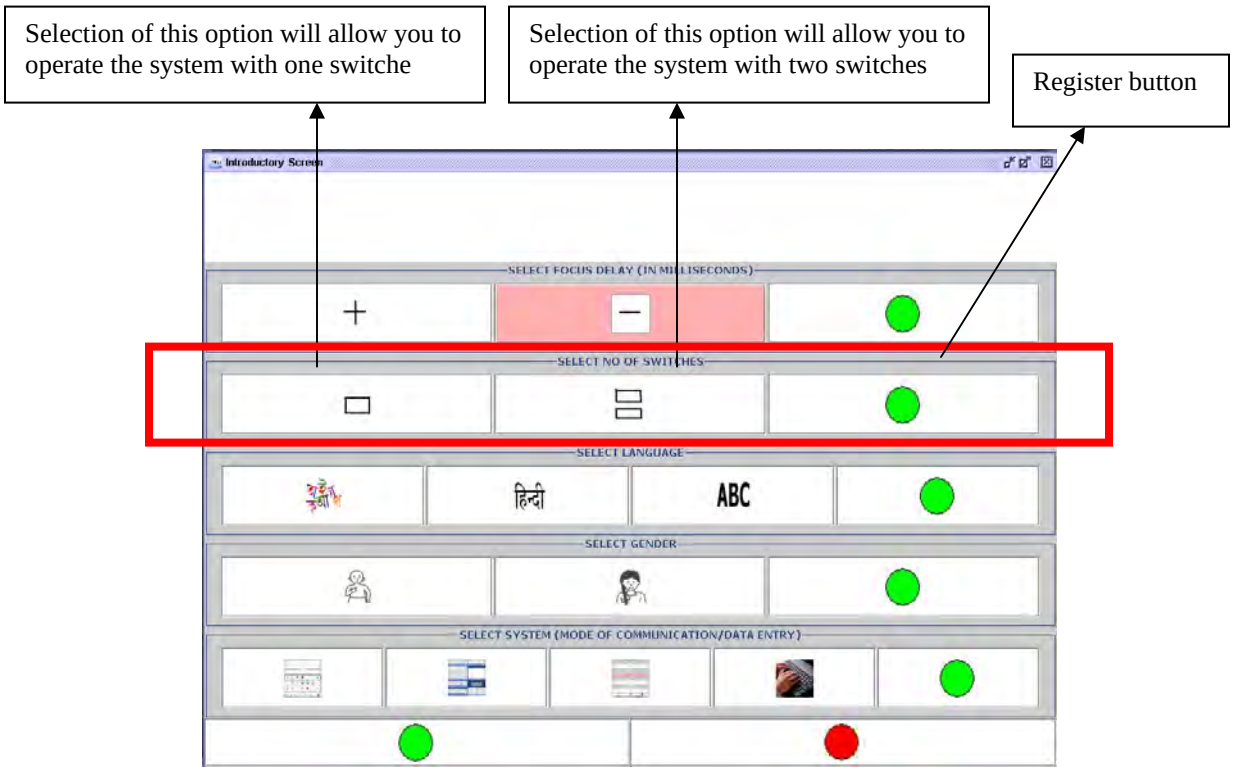


Fig. 4.3. The options to select number of access switches

Once you select a particular option, you **must register this selection** with the system by clicking on the green button present in the row.

Please remember while selecting number of switches,

- If you do not select number of switches from this row, the system can not be operated with switches. In that case, you have to use Sanyog with mouse only.

- If you do not register the number of switches you have selected, the system will not work with the switches and can be operated with mouse only. Your settings in that case will not have any effect on the system.

4.3 Selecting Language

The Sanyog System currently supports three languages, namely Bengali, Hindi, and English. You can select your language for communication using the options present in the third row of the initial screen, as shown in Figure 4.4.

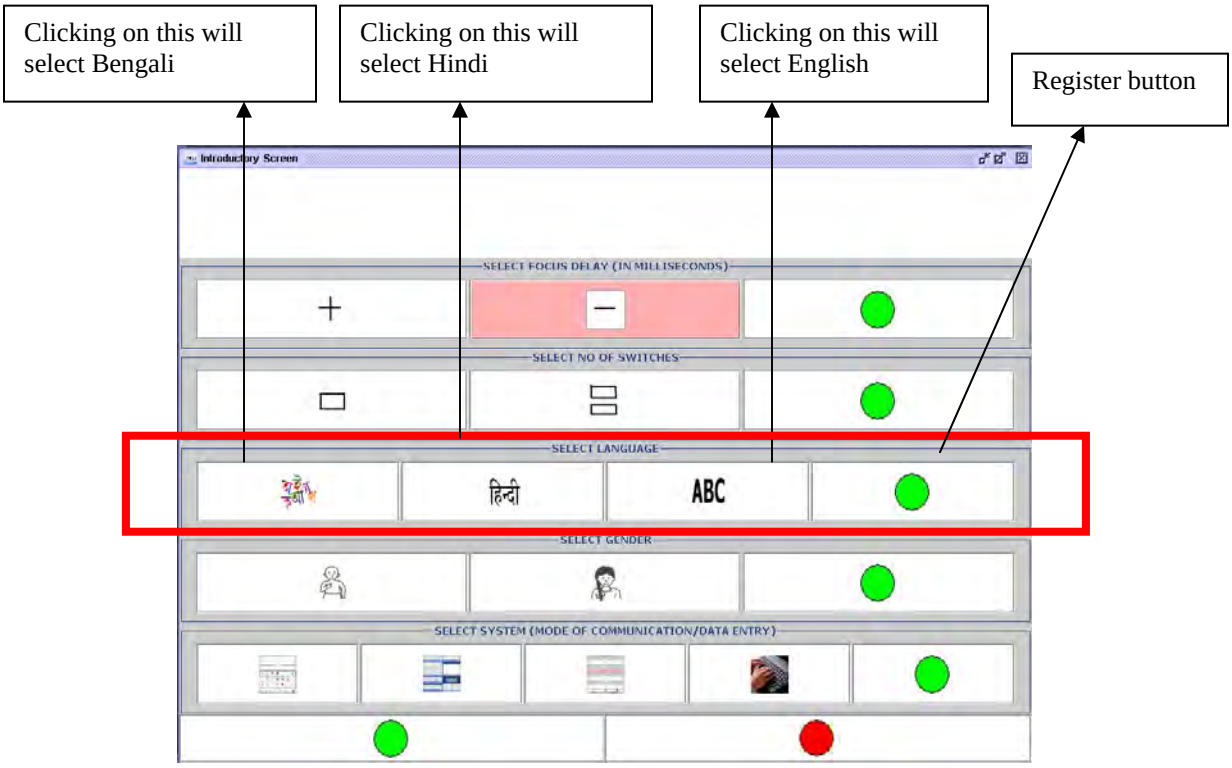


Fig 4.4. The language selection options

Once you select a particular language, you **must register this selection** with the system by clicking on the green button present in the row.

Please remember while selecting language,

- If you do not select language from this row, the system will work in Bengali only which is the default language.

- If you do not register the language you have selected, the system will not work in that language and you have to use the system in Bengali. Your selection in that case will not have any effect on the system.

4.4 Indicating Gender of the User

This option you need to select only if case have selected Hindi as your language of communication. Figure 4.5 shows the gender represented by the icons present in the fourth row of the initial screen.

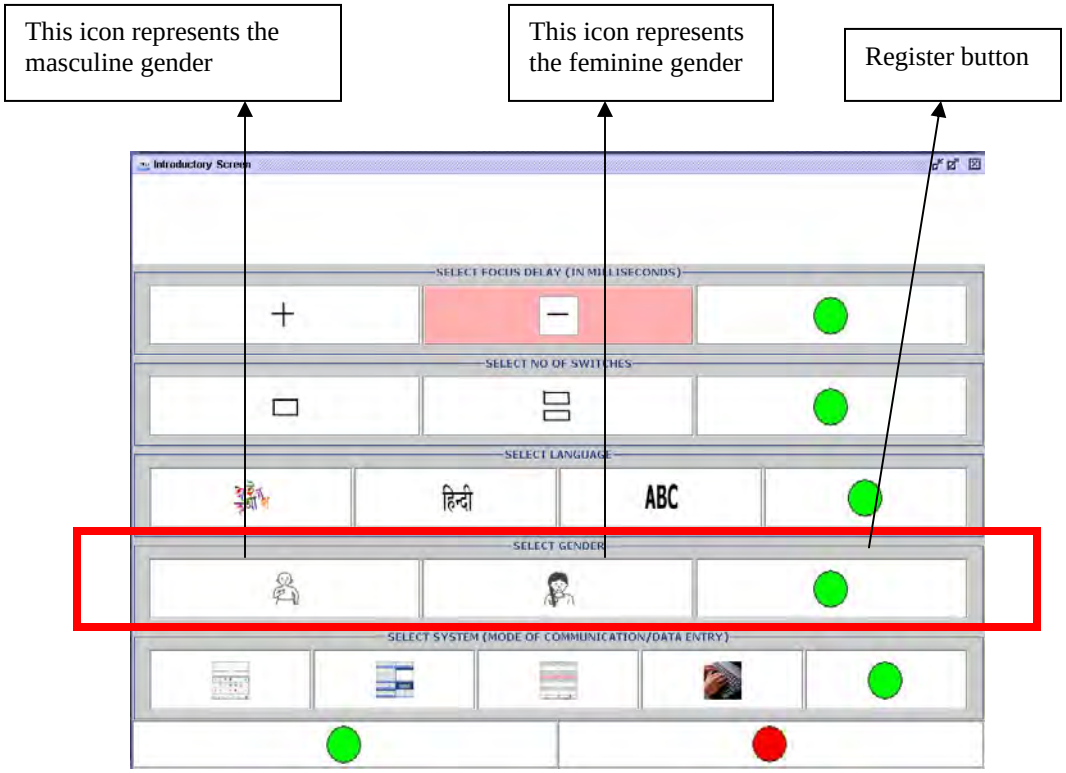


Fig. 4.5. The gender options

Once you select a particular gender option, you **must register this selection** with the system by clicking on the green button present in the row.

Please remember while selecting gender,

- You must select appropriate gender option from this row if your language of communication is Hindi. Otherwise, some of the sentences generated in the iconic communication system will not be grammatically correct since in Hindi, the gender of the subject determines the form the sentence unlike in Bengali or English.

- If you do not select gender from this row, the system will work with masculine gender which is the default gender.

- If you do not register the gender option you have selected, your selection in that case will not have any effect on the system.

4.5 Selecting the System Mode

The Sanyog system contains three sub systems for communication and one sub system for personalization. The three communication sub systems are (i) iconic communication system (ii) Soft keyboard and (iii) pre-stored message based communication system. You can select the particular sub system you want to use by selecting from the options present in the fifth row of the initial screen, as shown in Figure 4.6.

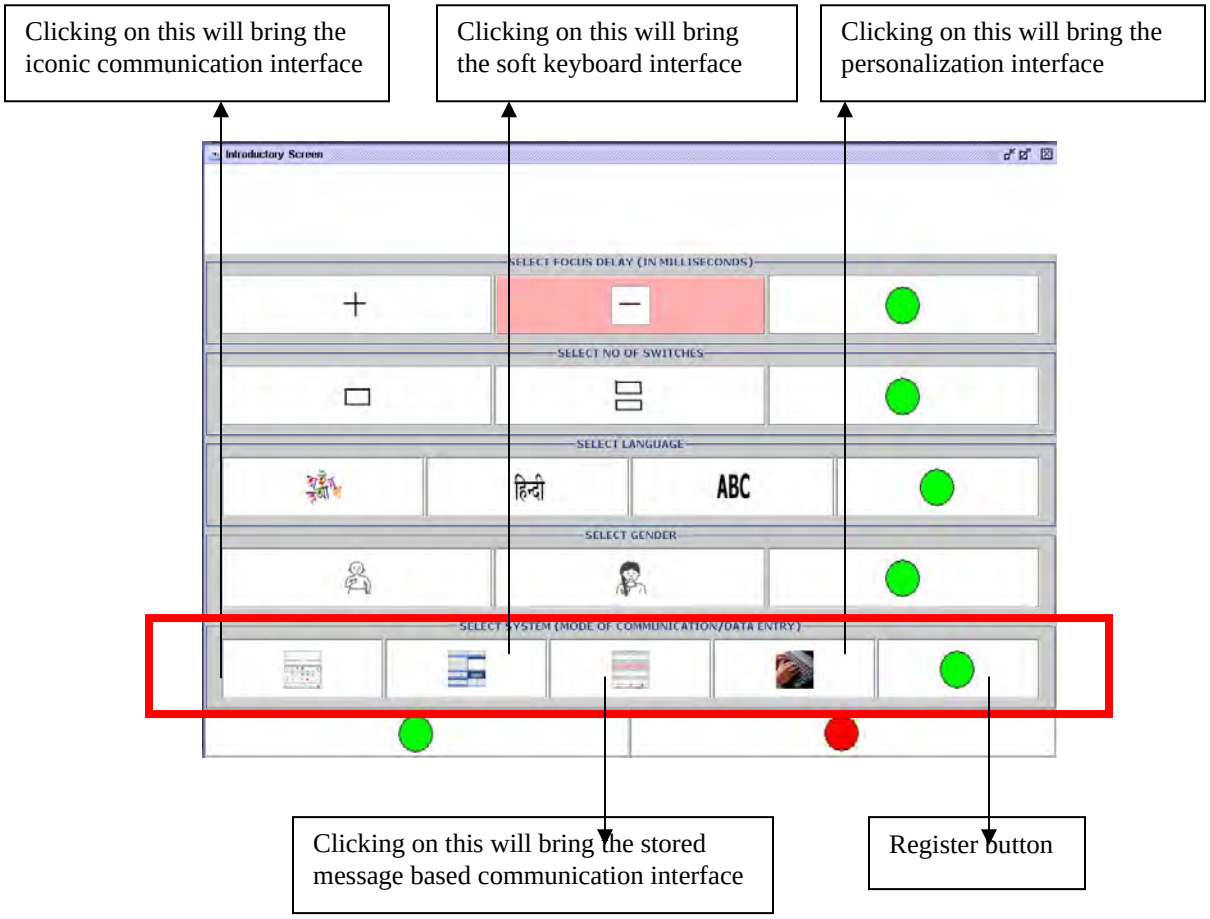


Fig. 4. 6. The sub system selection options

Once you select a particular sub system, you **must register this selection** with the system by clicking on the green button present in the row.

Please remember while selecting sub system,

- If you do not select a sub system from this row, on exiting the initial screen, the default sub system interface will appear, which is the iconic communication interface.

- If you do not register the sub system you have selected, your selection in that case will not have any effect on the system and the default sub system interface (iconic communication interface) will appear.

4.6 Ensuring that You Have Registered Your Selections Properly

It is mandatory that you register with the system the selection you made from any row in the initial screen (except the last one) by clicking on the green button present in each row. If this is not done, then your selections will not have any effect and the system will work with the default settings. To verify that you have properly registered your selection with the system, a text display is provided in the initial screen. The text display has two parts, upper and lower.

When you click on a particular option, the corresponding value is displayed on the upper part of the text display. For example, if you click on the "+" icon in the first row, the current scan step duration is shown in the upper part of the text display area like "current scan speed is: 2000" (Figure 4.7).

When you register the selection by clicking on the green button of a row, the upper part of the text display is cleared and the text comes to the lower part (Figure 4.8).

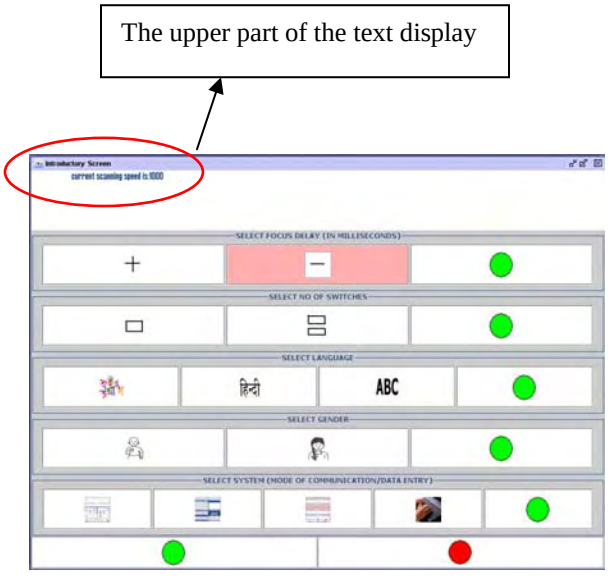


Fig. 4.7

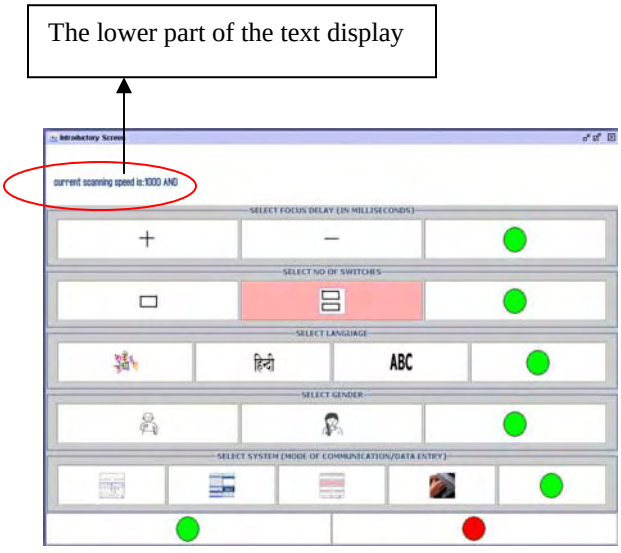


Fig. 4.8

Please remember that,

- To select a particular option in a row, click on it and check if the text appears in the upper part of the text display area. If not, then the selection is not proper. Click again unless it appears in the display.
- To register a particular selection, click on the green button in the corresponding row and check if the upper part of the text display is cleared and the text comes to the lower part. If not, then it is not properly registered. So, click the green button again.

4.7 Exiting the Initial Configuration Screen

- To exit the initial screen and bring in the particular sub system you have selected with selected scan step duration, number of switches, language and gender, click on the green button present in the last row of the initial screen (Figure 4.7).

- Clicking on the red button in the last row (Figure 4.9) will exit the Sanyog system. In that case, to use Sanyog, you have to restart it again using the procedure mentioned in chapter 3, section 3.1.

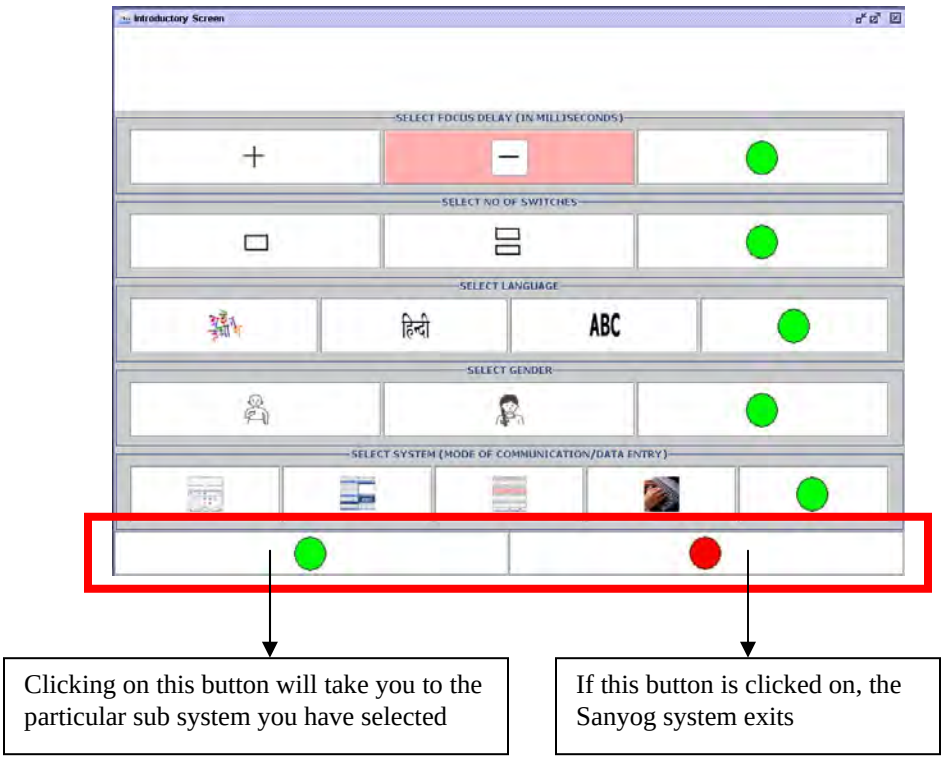


Fig. 4.9. Exiting from the initial screen

4.8 Operating the Initial Configuration Screen with Access Switches

The initial configuration screen can be operated with mouse, keyboard or special access switches. To operate the initial screen with keyboard or special access switch, do the following.

- The columns in each row of the screen are auto-scan enabled. That means a highlighter moves from one column to the next in a row in a circular and periodic way. So you can operate it with single switch. For single switch operation, press the switch designated “Register” when the particular item you want to select in a particular row is highlighted. To go to the next row with or without any selection, press the “Register” switch when the green button (register button) of the current row is highlighted.
  You can use the “Enter” key of the keyboard as a replacement of switch to do the same.

- With two switches, you can use one switch to select elements in a row and another switch to jump from one roe to the next. Use the switch designated “Register” to select elements in a row and the switch designated “Shift” to jump between rows.
  Alternatively, you can use the “Enter” key and the “Shift” key of the keyboard as replacement of the “Register” and “Shift” switches, respectively.

Chapter 5

The Iconic Communication Interface

The iconic communication interface (Figure 5.1) comes up if you select the iconic communication sub system from the initial configuration screen. With iconic communication sub system, you can construct Single and simple sentences at a time by selecting icons from the interface for different tense (past, present and future), aspect (simple, continuous and perfect), type (assertive, negative and interrogative) and mood (wish, desire etc).

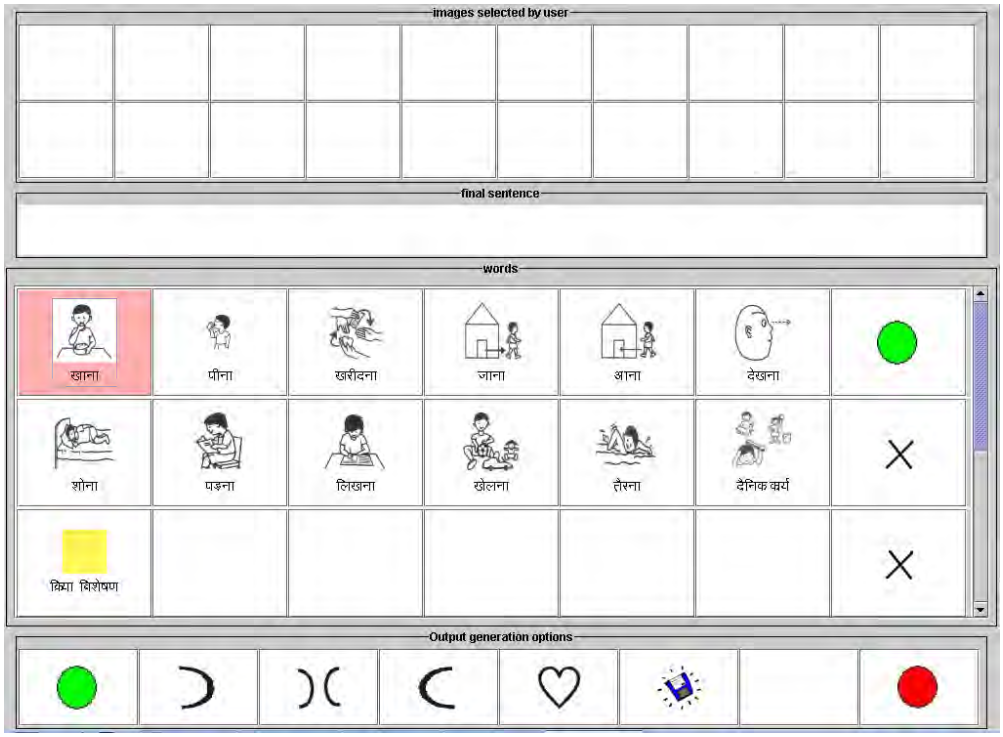


Fig. 5.1. The iconic communication interface

The icons that you can select from the interface are of different types. The icon types include,

- **Icons Denoting Verb:** This type of icon represents a verb. For example, the icon for “eat”.
- **Icons Denoting Noun:** This type of icon represents a noun or pronoun. For example, the icon for “apple”.
- **Icons Denoting Adjectives:** This type of icon represents an adjective. For example, the icon for “tall”.
- **Icons Denoting Adverbs:** This type of icon represents an adverb. For example, the icon for “fast”.

- **Special Purpose Icons:** There are some icons present in the interface that do not have any linguistic concepts attached with them. Rather these are used to perform some specialized tasks. The icons are discussed in detail later in this chapter (Section 5.4).

You need to perform the following steps to select icons from the interface.

1. To construct a sentence, you need to first select the verb in the sentence.
2. At the beginning of the selection, the interface contains a set of verb icons. Select the verb icon from the interface.
3. Once the verb icon is selected, a question window will pop up in front of you and a new set of icons will be displayed in the interface. This new set contains noun icons. To answer the question, Select one or more noun icons by clicking on the desired icons.
4. A verb may have more than one questions associated with it. You can either,

    - Answer a question by selecting nouns from the interface
      Or
    - Can skip the current question and go to the next question using a special icon present in the interface.

5. Once you feel you have selected all the icons necessary to construct the appropriate sentence, you can exit the selection process using a special icon present in interface.
6. There are different icons representing different tenses, aspects, types and moods. Select the appropriate icons to construct the sentence you need.
7. After forming the sentence, you can speak it out using the “speak” button present in the interface.

Please remember that,

- You can qualify the verb you select with adverbs using a special icon present in the interface.

- You can qualify each of the nouns you select to answer a question with adjectives using a special icon present in the interface.

5.1 The Image Output Display Component

The topmost component of the iconic interface displays the icons selected by the user and the selected icons arranged in sequence according to the syntax of the sentence formed (Figure 5.2).

Please remember that,

- If the icon you select from the interface does not appear in the top row of the image output display component, it is not properly selected. Click it on again to select it properly.

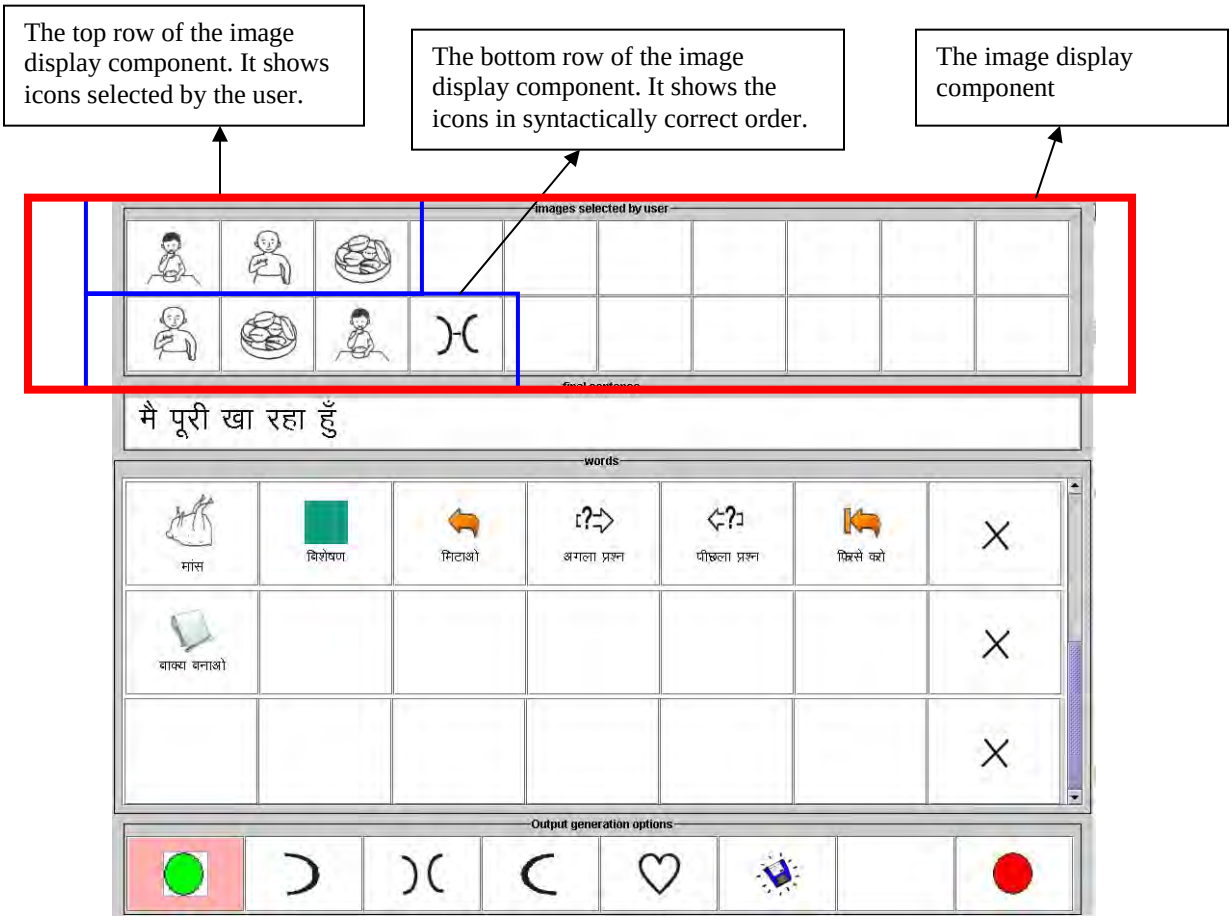


Fig. 5.2. The image output display component

5.2 The Text Output Display Component

The sentence that you form appears in the text output display component, which lies below the image output display component (Figure 5.3).

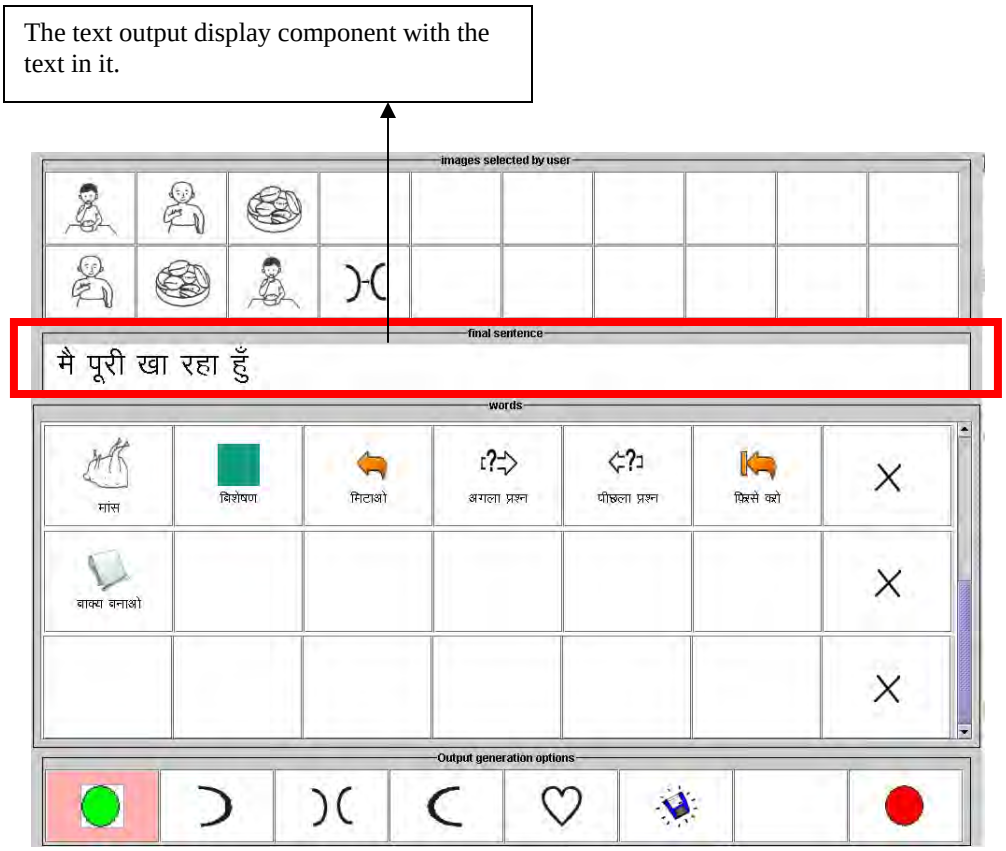


Fig. 5.3. The text output display component

5.3 The Vocabulary Component

All the icons representing verbs, verb groups, nouns, noun groups, adjectives and adverbs are displayed in the vocabulary component of the interface (Figure 5.4).

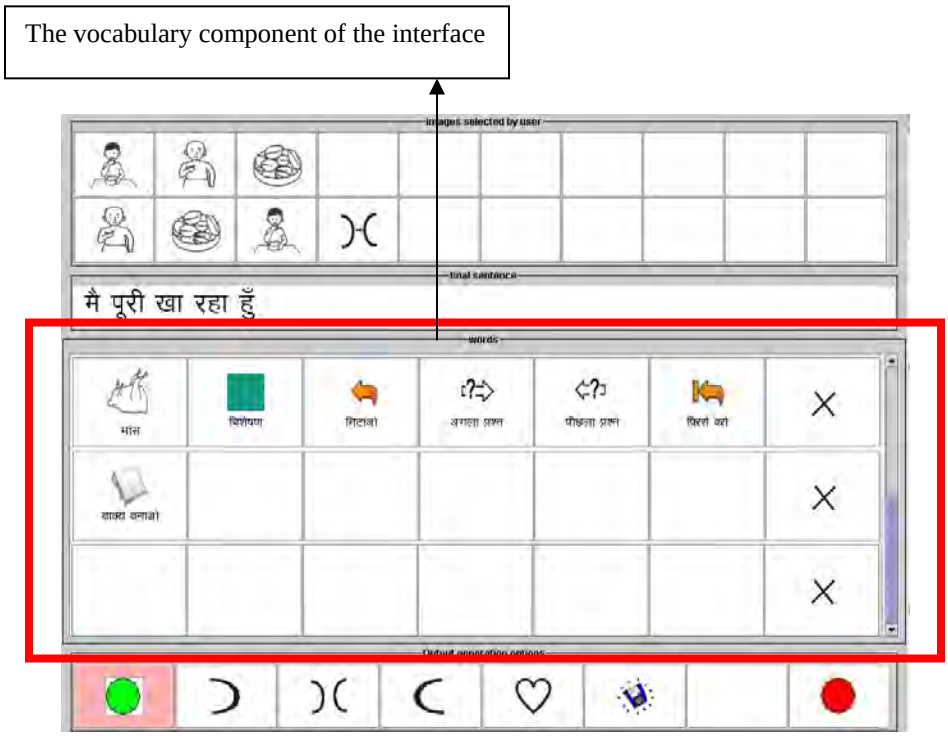


Fig. 5.4. The vocabulary component of the interface

5.4 Special Icons In The Vocabulary Component

Apart from the icons representing nouns, verbs, adjectives and adverbs, the iconic communication interface contains some special purpose icons used to perform special operations.

5.4.1 The Name Icon

The Name icon is shown in Figure 5.5. If you click on this icon, the soft keyboard interface will appear in front of you (for details about the soft keyboard interface, please refer to chapter 7). With this keyboard, you can enter proper nouns or anything for which you do not have an icon in the interface.

Fig. 5.5

5.4.2 The Time Icon and the Time Interface

The Time icon is shown in Figure 5.6. When you click on this icon, an interface shown in Figure 5.7 appears. You can enter absolute time like “10.50 PM” using this interface.

Fig. 5.6

To enter absolute time using the Time interface, you need to do the following.

- To enter time like “10 AM”, select the digits 1 followed by 0 from the interface and then select the AM option.
- To enter time like “10.30 AM”, select the digits 1 followed by 0, then select the “:” symbol, and then select the digits 3 followed by 0 and finally select the AM option.

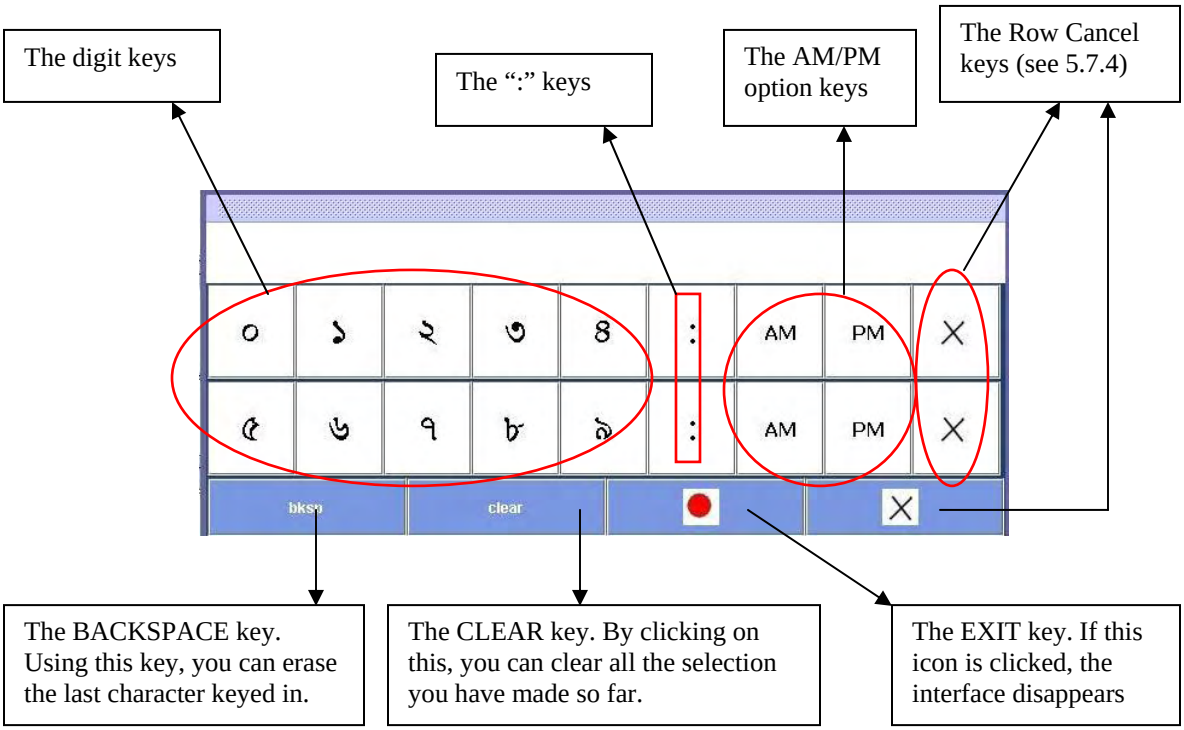


Fig. 5.7. The Time interface

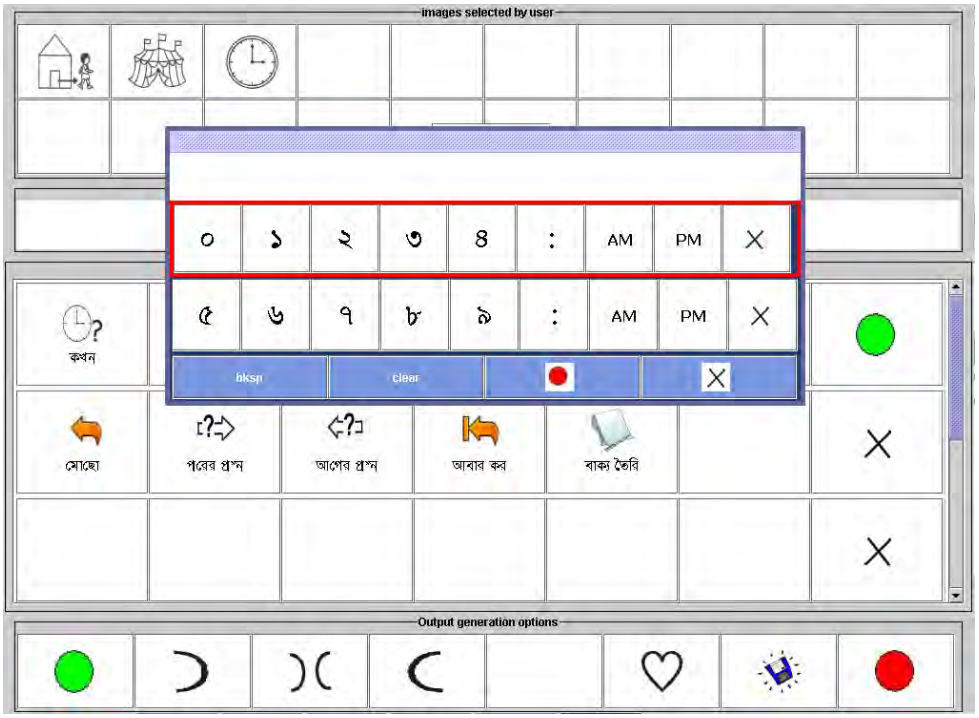


Fig. 5.8. The Time interface will appear on the iconic interface as seen in the Figure.

5.4.3 The Previous Question Icon

The icon is shown in Figure 5.9. If you click on this icon, the previous question along with the associated icon set will be displayed in the interface.

Fig. 5.9

5.4.4 The Next Question Icon

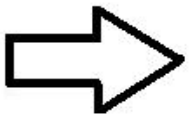
The icon is shown in Figure 5.10. If you click on this icon, the next question along with the associated icon set will be displayed in the interface.

Fig. 5.10

5.4.5 The Back Icon and the Next Icon

In the present version of Sanyog, the iconic communication interface at a time can hold up to thirty icons (excluding special icons). If there are more than thirty non-special icons, the the Back icon (Figure 5.11a) and the Next icon (5.11b) appears in the interface. With these special icons, you can access the previous set of words and the next set of words, respectively.

(a)



(b)

Fig. 5.11

5.4.6 The Undo Icon

The icon is shown in Figure 5.12. When you click on this icon, the last icon selected from the interface is removed. You can use this icon to make correction in case you have selected a wrong icon.

Fig. 5.12

Please remember that,

- Clicking on this icon repeatedly will remove all the icons you have selected to answer the current question only.

5.4.7 The Undo All Icon

The icon is shown in Figure 5.13. Using this icon, you can remove all the icons you have selected from the interface and then start the selection process afresh.

Fig. 5.13

5.4.8 The Finish Icon

The icon is shown in Figure 5.14. If you select this icon, that will indicate that you have finished selecting icons from the vocabulary component and is now ready to form sentence with the selections.

Fig. 5.14

Please remember that,

- You need to select this icon to indicate end of selection process when you are using access switches. If you are operating the system with mouse, you do not need to select it and can form the sentence directly.

5.4.9 The Adjectives Icon

If you want to qualify a noun with adjectives, you need to select the adjective icon (Figure 5.15). When you select this icon, a set of adjective icons is displayed in the interface from where you can select one or more adjectives.

Fig. 5.15

Please remember that,

- To qualify a noun, you need to select the noun icon first and then select the adjectives.

5.4.10 The Adverbs Icon

If you want to qualify a verb with adverbs, you need to select the adverb icon (Figure 5.16). When you select this icon, a set of adverb icons is displayed in the interface from where you can select one or more adverbs.

Fig 5.16

Please remember that,

- To qualify a verb, you need to select the adverbs first and then select the verb icon.

5.4.11 The Exit Icon

With the Exit icon (Figure 5.17), you can come back to the original set of icons from the set of adverb or adjective icons.

Fig. 5.17

5.5 The Output Options Component

The output options component in the iconic communication interface is shown in Figure 5.18. Using the options present in this component, you can generate natural language sentences in different tense, aspect and modality from the icons you have selected from the vocabulary component.

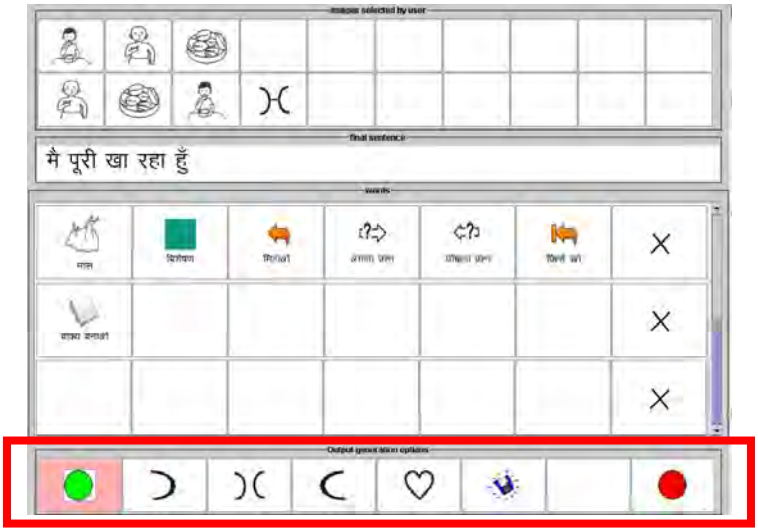


Fig. 5.18. The output options component (inside red rectangle)

Some of the options in this component are arranged hierarchically. When you click on one of them, the next level is displayed and so on. Such hierarchical arrangements are made for tense, aspect, type and mood options.

5.5.1 The Restart Option

If you click on this option (Figure 5.19), everything you have done so far (that is the icons you have selected and the sentence you have formed) will be undone and you can restart the icon selection afresh.

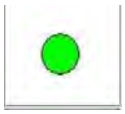


Fig. 5.19

5.5.2 The Exit Option

If you click on this option (Figure 5.20), the iconic communication system exits and the initial configuration screen will reappear in front of you.

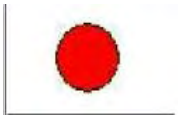


Fig. 5.20

5.5.3 The Save Option

If you have formed a sentence from icons and want to save that for later use, you can use the save option (Figure 5.21). When you click on this option, the sentence that is present in the interface is saved. You can retrieve the sentence later in stored message based communication sub system (chapter 6).

Fig. 5.21

5.5.4 The Tense Options

There are three tense markers present in the output options component, shown in Figures 5.22 to 5.24. You need to select the appropriate one to form sentence in that particular tense. When you click on any one of these tense markers, three aspect markers for that tense appears in the interface.

Fig. 5.22. Past tense marker

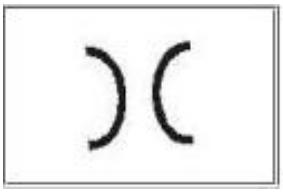


Fig. 5.23. Present tense marker

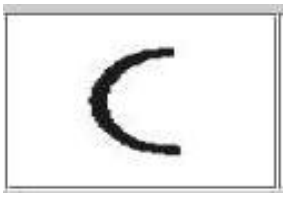


Fig. 5.24. Future tense marker

5.5.5 The Aspect Options

When any of the tense option is selected, the aspect options are displayed in the output option component. For each tense, there are three aspect options present. These are shown in Figures 5.25 to 5.27.

Fig. A. Past simple marker

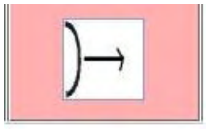


Fig. B. Past continuous marker

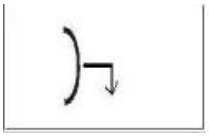


Fig. C. Past perfect marker

Fig. 5.25. The aspect markers for past tense

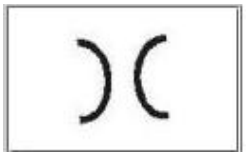


Fig. A. Present simple marker

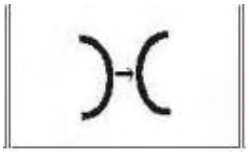


Fig. B. Present continuous marker

Fig. C. Present perfect marker

Fig. 5.26. The aspect markers for present tense

Fig. A. Future simple marker

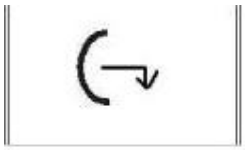
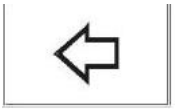


Fig. B. Future continuous marker

Fig. C. Future perfect marker

Fig. 5.26. The aspect markers for future tense

Please remember that,

- The aspect markers of a tense will appear when you click on the particular tense
- The aspect markers for future tense are present in English only. In Bengali and Hindi version, these are not present.
- You can use the **Back** option  displayed along with the aspect markers to return to the previously displayed output options.

5.5.6 The Type Options

If you click on any of the aspect markers, the type options appear in the output options component. These options represent the type of sentences you can form. There are three type options present (Figure 5.27). These are,

(i) **Assertive** to form assertive sentences
(ii) **Negative** to form negative sentences
(iii) **Interrogative** to form interrogative sentences

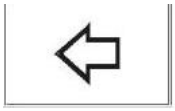
Fig. A. Assertive type marker

Fig. B. Interrogative type marker

Fig. C. Negative type marker

Fig. 5.27. The type markers

Please remember that,

- When you click on the future tense marker in Bengali and Hindi version, the type markers appears. In all other cases, the type markers appear only after selecting an aspect marker.
- You can use the **Back** option  displayed along with the type markers to return to the previously displayed output options.

5.5.7 The Mood Options

The iconic communication system of Sanyog allows the user to modify an already formed sentence or generate a new sentence based on modalities like wish, desire etc. You need to perform the following steps to form modal sentences.

(i) Click on the Mood marker from the output options component. It will result in appearance of different modal markers in the output options component shown in Figure 5.28.

Fig. A. Advice mood

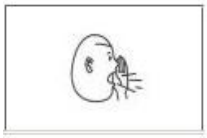


Fig. B. Command mood

Fig. C. Request mood

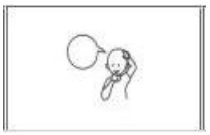


Fig. C. Request mood

Fig. 5.28. Different mood markers

(ii) Click on the appropriate mood marker. The type markers (see section 5.5.6 above) will appear.
(iii) Select an appropriate type to form a sentence of the selected mood and type.

Please remember that,

- Bengali language version has only **command** and **wish** mood markers.
- English language version has only **wish** mood marker.
- Hindi language version has only **command**, **advice** and **request** mood markers.

5.5.8 The Speak Option

Once you form a sentence using the options present in the output options component, you can "speak out" that sentence with the speak option shown in Figure 5.29. When you click on this option, the sentence is spoken out by the system.

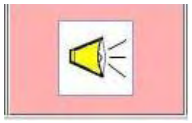


Fig. 5.29

5.6 The Save-Alert Dialogue

After forming a sentence, if you select the **Restart** option (see 5.5.1), a dialogue box will appear on the current interface (Figure 5.30). Using options present in the dialogue box, you can either (i) save the current sentence (ii) proceed without saving the current sentence or (iii) do not refresh. If you choose the save option, you can view the saved sentence in the stored message communication interface.

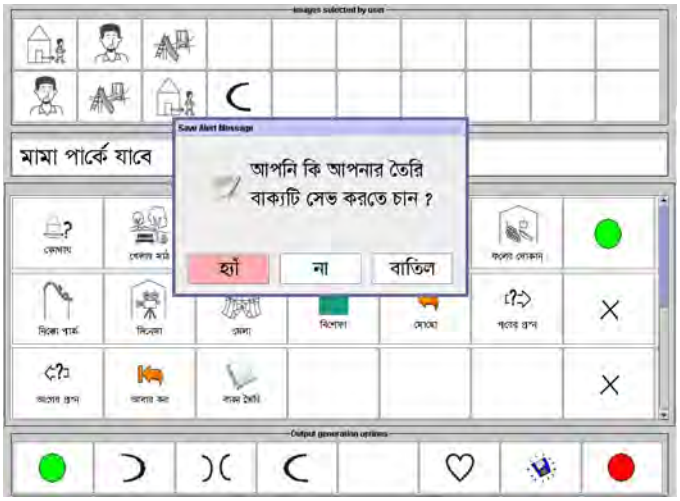


Fig. 5.30

5.7 Operating the Interface with Special Access Switches

The iconic communication interface can be accessed with mouse, keyboard or special access switches. To operate the interface with special access switches or keyboard, do the following.

5.7.1 Operating with Single Switch

You can operate the interface with single access switch if you have selected the single switch option from the initial configuration screen (see chapter 4, section 4.2). In that case, when the interface appears, the vocabulary component and the output options component are alternatively highlighted. If you want to select icons and then form sentence, you have to select the vocabulary component. Otherwise, you can select the output options component (to access the **Exit** option) if you want to exit. To select either of these components, press the access switch designated "Register" when that component is in focus.

If you select the vocabulary component, the rows in the vocabulary component are auto-scanned. To select a particular row, press the access switch designated "Register" when the row highlighter is on that row.

Once a particular row is selected, the columns (the individual icons) in that row are auto-scanned. To select a particular icon, press the access switch designated "Register" when the highlighter is on that particular icon.

When you select the **Finish** special icon (see section 5.5.9) in the vocabulary component, the scanning shifts to the output options component. Otherwise, if you select this component at the beginning, then also the scanning shifts to this component. The options present in this component are scanned automatically. To select a particular option, press the access switch designated "Register" when that particular option is highlighted.

If you select the **Restart** option (see section 5.5.1) from the output options component, the scan shifts to the **Save-Alert Dialogue** (see section 5.6) box. The options (Yes, No, Cancel) in the dialogue are auto-scanned. To select a particular option, press the access switch designated "Register" when that option is highlighted.

If you select "Yes" or "No" in the save-Alert Dialogue box, the scanning returns to the vocabulary component. If you select "Cancel", the scanning remains in the output options component.

In stead of the access switch, you can use the "Enter" key in the keyboard to operate the system.

5.7.2 Operating with Two Switches

You can operate the interface with two access switches if you have selected two switch option from the initial configuration screen (see chapter 4, section 4.2). In that case, when the interface appears, the vocabulary component is highlighted. If you want to select icons and then form sentence, you have to select the vocabulary component. If you press the access switch designated "Shift", the highlighter moves to the output options component. You need to select the output options component (to access the **Exit** option) if you want to exit. To select either of these components, press the access switch designated "Register" when that component is in focus.

If you select the vocabulary component, the row highlighter appears on the first row (from top) of the vocabulary component. To select a particular row, press the access switch designated “Register” when the row highlighter is on that row. To move the highlighter from one row to another, use the access switch designated “Shift”.

Once a particular row is selected, the columns (the individual icons) in that row are auto-scanned. To select a particular icon, press the access switch designated “Register” when the highlighter is on that particular icon.

When you select the **Finish** special icon (see section 5.5.9) in the vocabulary component, the scanning shifts to the output options component. Otherwise, if you select this component at the beginning, then also the scanning shifts to this component. The options present in this component are scanned automatically. To select a particular option, press the access switch designated “Register” when that particular option is highlighted.

If you select the **Restart** option (see section 5.5.1) from the output options component, the scan shifts to the **Save-Alert Dialogue** (see section 5.6) box. The options (Yes, No, Cancel) in the dialogue are auto-scanned. To select a particular option, press the access switch when that option is highlighted.

If you select “Yes” or “No” in the Save-Alert Dialogue box, the scanning returns to the vocabulary component. If you select “Cancel”, the scanning remains in the output options component.

You can use the “Enter” and the “Shift” keys in the keyboard in stead of the “Register” and “Shift” switches, respectively.

5.7.3 The Block Cancel Icon

If you have selected the vocabulary component, the scanning will start in that component. The **Block Cancel Icon** (Figure 5.31) present in this component is provided to exit quickly from the vocabulary component.

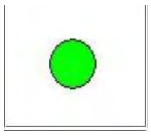


Fig. 5.31

The other way to come out from the vocabulary component is the **Finish** option which appears only when you have selected some icons.

5.7.4 The Row Cancel Icon

If you have selected a particular row, then the scanning will start on the icons present in that row. If your selection is wrong, then you can undo the wrong row selection using the **Row Cancel Icon** (Figure 5.32) present in each row.

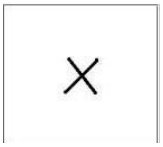


Fig. 5.32

Chapter 6

Pre-Stored Message Based Communication Interface

The pre-stored message based communication interface (Figure 6.1) comes up if you select the pre-stored message based communication sub system from the initial configuration screen. With pre-stored message based communication sub system, you can communicate by simply selecting messages from a list. The selected message is also “spoken out” automatically by the system, making your communication speech enabled.

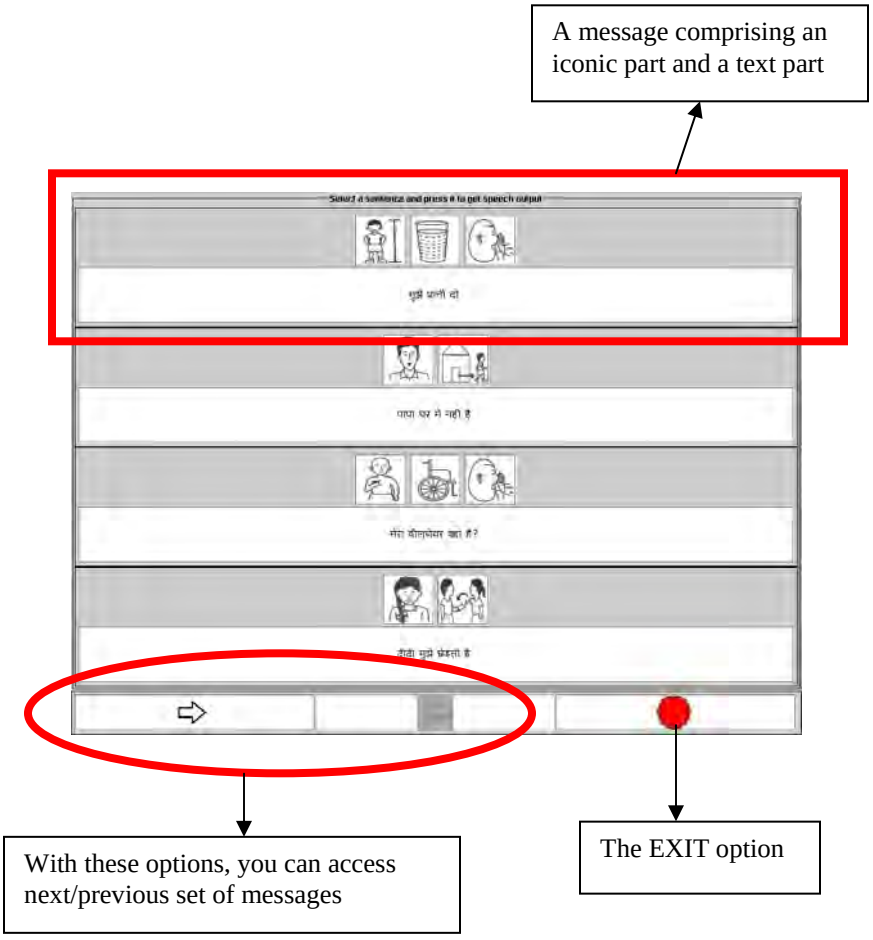
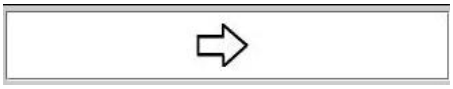


Fig. 6.1. The pre-stored message based communication interface

Please remember that,

- Each message has a text part and an optional iconic part. The iconic part may comprise one or more icons.
- At a time, four messages are displayed in the interface.

- Use the **NEXT** option  present in the interface to access the next set of messages. If this option is disabled, there are no more messages available.
- Use the **PREVIOUS** option present in the interface to access the previous set of messages. If this option is disabled, there are no previous set of messages.
- You can return to the initial configuration screen using the EXIT option.

6.1 Operating the Interface with Special Access Switches

The pre-stored message based communication interface can be operated with mouse, keyboard or special access switches. To operate the initial screen with keyboard or special access switch, do the following.

6.1.1 Operating with Single Switch

You can operate the interface with single switch if you have selected the single switch option from the initial configuration screen (see chapter 4, section 4.2). In that case, when the interface appears, the messages in the interface are auto-scanned. That means a highlighter moves from one message to the next. After the messages, the highlighter scans the options (**Next**, **Previous**, and **Exit**) in a similar way.

To select a message or an option, press the switch designated “Register” when the particular item you want to select is highlighted.

You can use the “Enter” key of the keyboard as a replacement of the “Register” switch to do the same.

6.1.2 Operating with Two Switches

You can operate the interface with two switches if you have selected the two switch option from the initial configuration screen (see chapter 4, section 4.2). In that case, when the interface appears, the first message in the interface is highlighted.

To move the highlighter from one message to the next, press the switch designated “Shift”. After the fourth message, the highlighter goes to the options (**Next**, **Previous**, and **Exit**). After covering the options, it goes back to the first message again. To select a message or an option, press the switch designated “Register” when the particular item you want to select is highlighted.

You can use the “Enter” key and “Shift” key of the keyboard as a replacement of the “Register” switch and “Shift” switches, respectively.

Chapter 7

The Soft Keyboard Interface for Message Composition

If you select the soft keyboard option from the initial configuration screen (see chapter 4, section 4.5), the soft keyboard interface (Figure 7.1 and 7.2) appears. With this interface you can compose any text, save the text in a file, take printout of the text and do a lot more things.

To compose a text or perform various file operations, you need to select the keys from the interface. You can perform the selection using either mouse, keyboard or special access switches.

Fig. 7.1. The Soft keyboard interface (in Bengali)

Fig. 7.2. The Soft keyboard interface (in English)

As you can see, the interface contains individual blocks that are shown in with red rectangle along with a numeric label. Please remember that,

- In both Bengali and Hindi soft keyboard interface, all the eight blocks shown in Figure 7.1 are present.
- The English soft keyboard interface contains the seven blocks shown in Figure 7.2.

These blocks and their functions are described below.

7.1 The Alphabet Components

The blocks that contain alphabetic characters comprise the alphabet component of the interface. Please remember that,

- In the Bengali and Hindi interfaces (Figure 7.1), blocks 1-4 comprise the alphabet component. Among these blocks, block 3 is the **Matra** block and block 4 contains some **Yuktakshars** (Conjugate symbols).
- In the English interface (Figure 7.2), blocks 2 and 3 comprise the alphabet component. Block 2 contains the alphabet in small letters and block 3 contains the alphabet in capital letters.

7.2 The Numeric Character and Punctuation Component

This component holds the numeric and punctuation characters. Please remember that,

- In the Bengali and Hindi interface (Figure 7.1), block 5 contains both the numeric characters and punctuation marks.
- In the English interface (Figure 7.2), block 1 contains the punctuation marks and block 4 contains the numeric characters.

7.3 The Text Display Component

The text you compose is displayed in this component. Block 6 in the Bengali and Hindi interface (Figure 7.1) and block 5 in the English interface (Figure 7.2) are the text display of components of the respective interfaces.

7.4 The Prediction Component

To reduce text composition time, the soft keyboard interface is equipped with prediction mechanisms. The keyboard supports two types of prediction.

- **Character Level Prediction**: When you select one or more characters of a word, the system predicts the word.

- **Word Level Prediction**: If you compose a word and then selects the “Space” special key (see section 7.5.6) from the interface, the system predicts the next word.

The predicted words are displayed to you in block 8 of the Bengali and Hindi interface (Figure 7.1) or block 7 in the English interface (Figure 7.2). Please remember that,

- If the predicted word is the one you want, you can select it from the designated block. Otherwise, ignore the predicted words and proceed with your composition.

7.5 Special Purpose Keys

To facilitate various editing tasks for text composition and for performing other specialized tasks, the soft keyboard interface contains a number of special purpose keys. For easy access, these keys are distributed throughout the interface.

7.5.1 Special Purpose Keys for Editing

The alphabetic, numeric and punctuation and prediction components in the soft keyboard interface contain a set of keys (Figure 7.3) to facilitate text composition and editing.

The “Space”, “Back Space” and “Enter” keys have the same functionality as the corresponding keys in any keyboard.

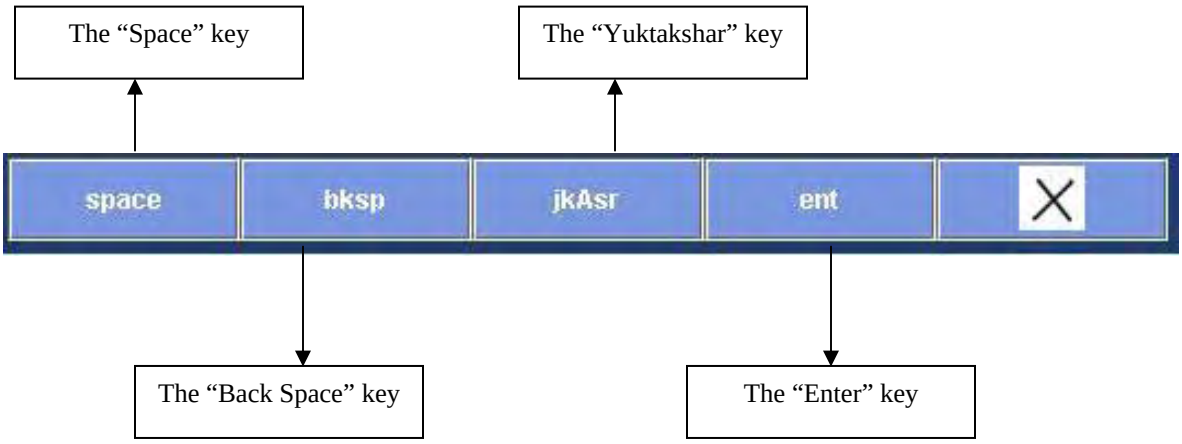


Fig. 7.3

In Bengali and Hindi interface (Figure 7.1), one extra key in this set is present, the “Yuktakshar” key. You can use this key to compose conjugate symbols. The steps you need to perform to construct a conjugate symbol with this key are,

1. Select the first symbol
2. Select the “Yuktakshar” key
3. Select the second symbol
4. Repeat steps 2 and 3 for more symbols

Please remember that,

- The “Yuktakshar” key is not present in English interface.

7.5.2 Special Purpose Keys in the Text Display Component

The text display component of the soft keyboard interface (block 6 of Figure 7.1 and block 5 of Figure 7.2) also contains some special purpose keys in a row at the bottom, shown in Figure 7.4.

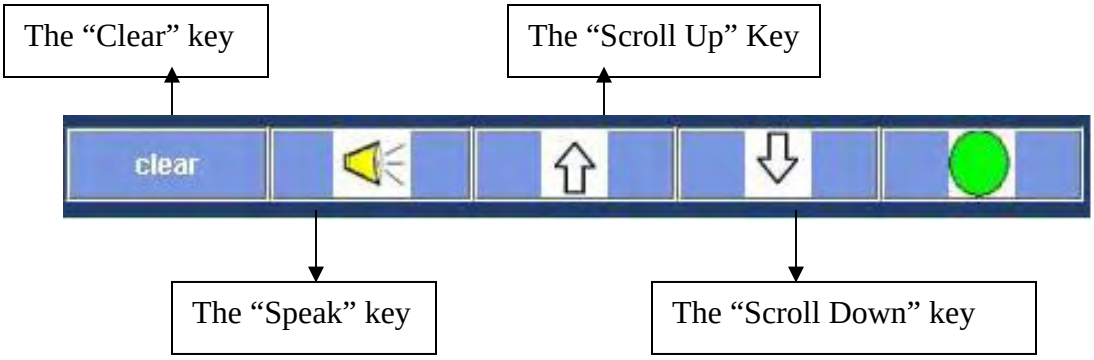


Fig. 7.4

These keys perform the following functions.

- You can clear the content of the text display area using the “Clear” key.
- If you select the “Speak” key, the text present in the text display area will be read out automatically.
- To scroll up or scroll down in the text display area, you can use the “Scroll Up” or “Scroll Down” keys, respectively.

Please remember that,

- You need to use “Scroll Up/Down” keys only if you are using access switches to operate the interface. If you are using mouse, you can use normal scroll bar present in the text display component to scroll up/down.

7.5.3 Other Special Purpose Keys

Apart from the keys mentioned above, the soft keyboard interface has an entire block of some more special purpose keys, shown in Figure 7.5. In the Bengali and Hindi interface, this is block 7 (Figure 7.1) and in English interface, this is block 6 (Figure 7.2).

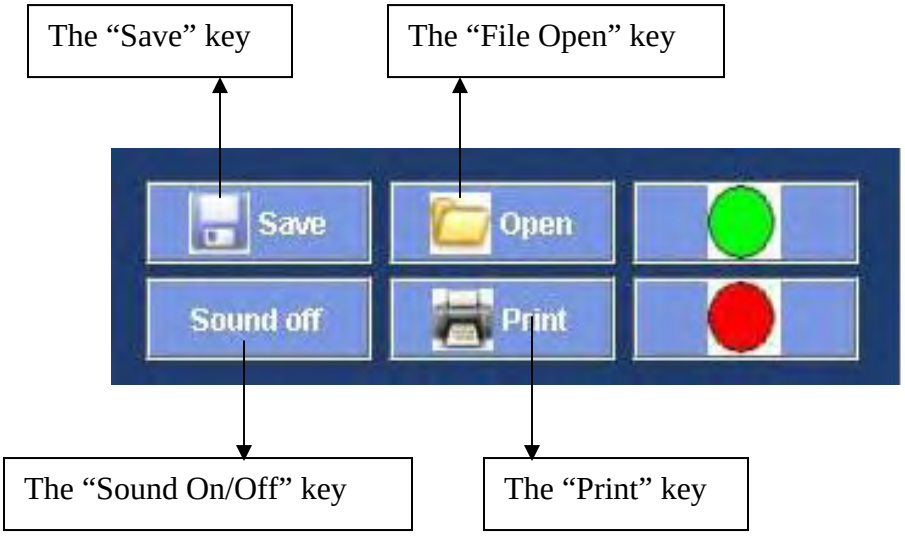


Fig. 7.5

These keys are used for the following purposes.

- With the “Save” key, you can save the text you have composed in a file. The steps you need to perform to save your text in a file using the “Save” key are,

    1. After you finish your text, select the “Save” key.
    2. You will see a symbol appear (Which is different for Bengali, Hindi and English) in the text display component at the end of your text.
    3. Write the name of the file where you want to save your text after the symbol.
    4. Select the “Save” key again. This will save your text in a file with the filename given by you.

- Using the “File Open” key, you can use the content of a previously saved file. To view the content of a previously saved file using the “File Open” key, do the following.

    1. Select the “File Open” key. A file name list will appear as shown in Figure 7.6.

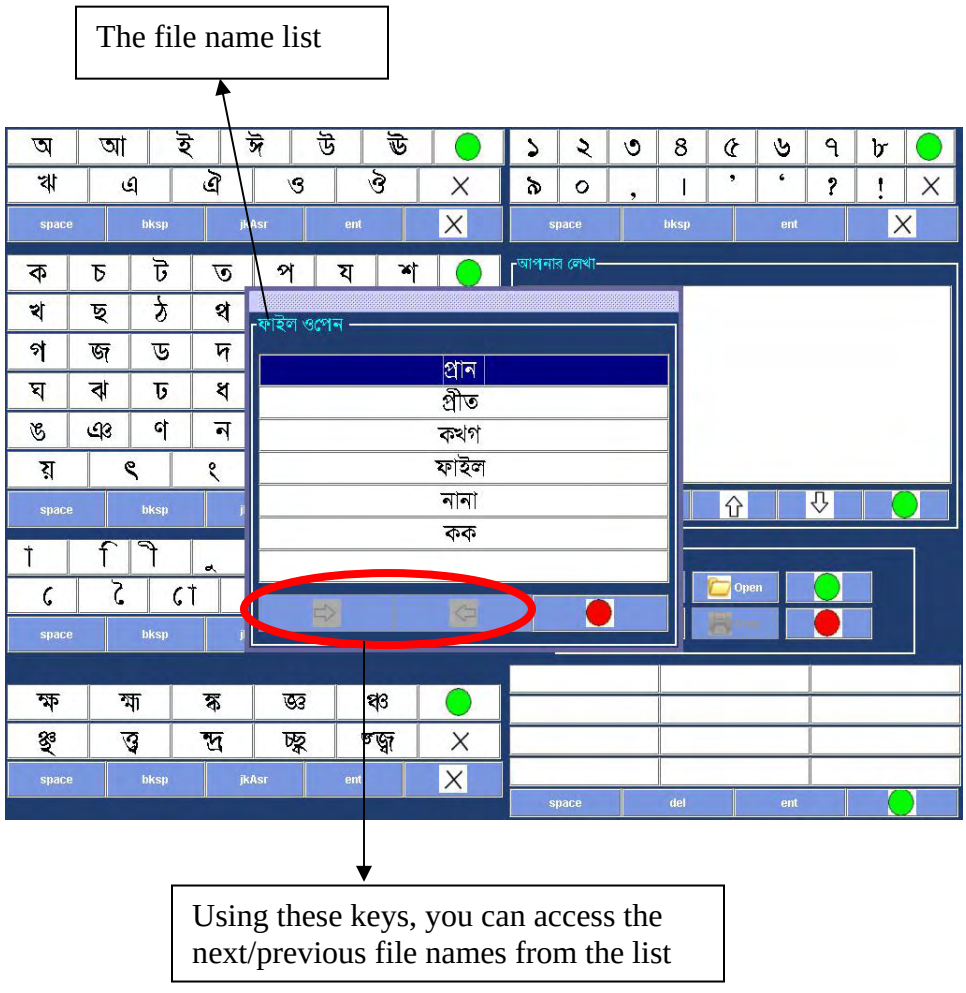


Fig. 7.6.

2. Select the file name whose content you want to view.
3. The content will appear in the text display area.

- If you select the “Print” key and a printer is connected with your computer, the text currently displayed in the text display will be printed.
- While selecting keys from the interface, you can get auditory feedback with selection of each key. To get auditory feedback, select the “Sound On” mode of the “Sound On/Off” key. Otherwise select “Sound Off” mode.

7.6 Operating the Interface with Special Access Switches

The keyboard interface can be operated with mouse, keyboard or special access switches. To operate the initial screen with keyboard or special access switch, do the following.

7.6.1 Operating with One Switch

You can operate the interface with single switch if you have selected the single switch option from the initial configuration screen (see chapter 4, section 4.2). In that case, when the interface appears, the individual blocks in the interface are auto-scanned. That means a highlighter moves from one block to the next.

To select a particular key, identify the block which contains that key. When the highlighter comes to that block, press the access switch designated “Register” to select the block.

Once a block is selected, the rows in that block are auto-scanned. When the row highlighter comes to the row containing the desired key, press the “Register” switch to select the row.

Once a row is selected, the individual keys in that row are auto-scanned. Press the “Register” switch when the desired key is highlighted.

You can use the “Enter” key of the keyboard in stead of the “Register” switch to operate the interface.

7.6.2 Operating with Two Switches

You can operate the interface with two switches if you have selected the two switch option from the initial configuration screen (see chapter 4, section 4.2). In that case, when the interface appears, the first block (block 1 in Figures 7.1 and 7.2) is highlighted. To move highlighter from one block to the next, press the access switch designated “Shift”.

To select a particular key, identify the block which contains that key. When the highlighter comes to that block, press the access switch designated “Register” to select the block.

When a block is selected, the first row of that block is highlighted. Press the “Shift” access switch to move the highlighter from one row to the next. When the row highlighter comes to the row containing the desired key, press the “Register” switch to select the row.

Once a row is selected, the individual keys in that row are auto-scanned. Press the “Register” switch when the desired key is highlighted.

You can use the “Enter” key and the “Shift” key of the keyboard in stead of the “Register” switch and the “Shift” switch respectively, to operate the interface.

7.6.3 The Block Cancel Icon

If you have selected a block in the interface, the scanning will start in that block. The **Block Cancel Icon** (Figure 7.7) present in each of the block is provided to exit from a block if you have selected the block wrongly and want to come out of it.

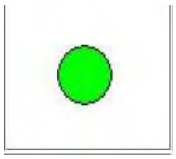


Fig. 7.7

7.6.4 The Row Cancel Icon

If you have selected a particular row, then the scanning will start on the individual keys present in that row. If your selection is wrong, then you can undo the wrong row selection using the **Row Cancel Icon** (Figure 7.8) present in each row.

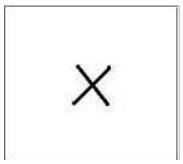


Fig. 7.8

Chapter 8

The Personalization Interface

You can change the contents of various communication sub systems of Sanyog. The content here refers to the icons and the pre-stored messages that are displayed in the Iconic Communication Interface and the Pre-stored Message Based Communication Interface respectively.

To facilitate such personalization, the Sanyog system contains a Personalization sub system. To access different interfaces of the personalization sub system, select the appropriate from the initial configuration screen (see chapter 4, section 4.5). If you select that option, the screen shown in Figure 8.1 appears.

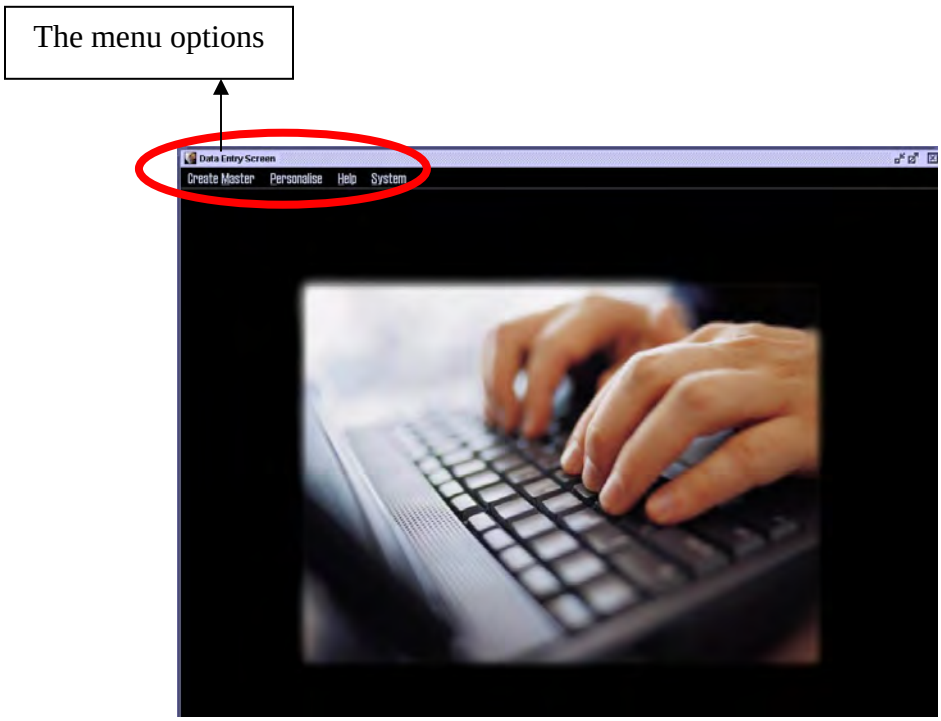


Fig. 8.1

Fig 8.2

There are four menu options in the interface shown in the red circle in Figure 8.1 and enlarged in Figure 8.2. Among them, the first two from left, namely **Create Master** and **Personalize** are described later. The third menu option is the **Help** option**.** If you click on this option, you will get to know in brief what you can do with the personalization sub system and also the features

present in Sanyog. The fourth and final option is the **System** option which you can use to exit from the interface.

Please Remember that,

- The personalization interface can be operated with mouse and keyboard only. You can not use access switches to operate the interface.

8.1 Create Master Database

The "Create Master" menu option allows you to incorporate new set of icons and stored messages in Sanyog, which is referred to as "Master Database" in this manual. Please remember that,

- You can personalize the content of the master database only. So, to use the iconic communication and pre-stored message based communication sub systems of Sanyog, you have to create master database using this menu option.
- You can still use the soft keyboard interface without creating the master database.

When you click on the "Create Master" menu option, a drop down menu shown in Figure 8.3 appears.

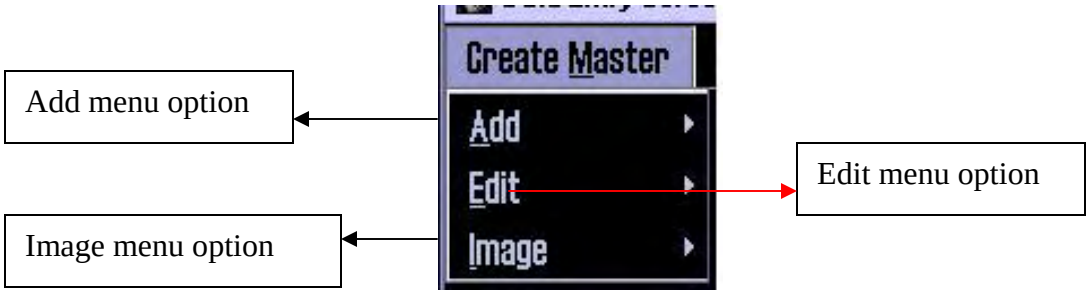


Fig. 8.3

8.1.1 The Add Option

With the Add menu option (Figure 8.3), you can add new words (that appears with an icon in the iconic interface. see chapter 5) or messages in the master database of Sanyog. If you click on this menu option, a new list of sub menus appear on the interface, shown in Figure 8.4.

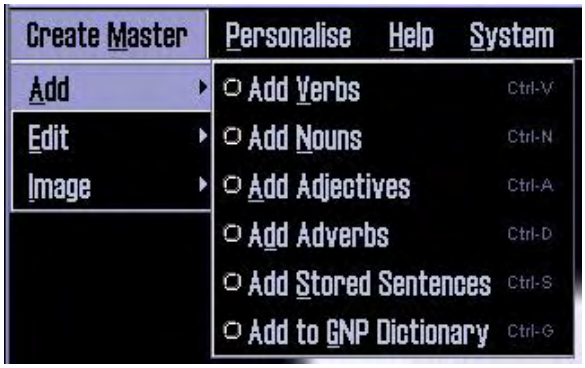


Fig. 8.4

Among the sub menu options, the first four (**Add Verbs**, **Add Nouns**, **Add Adjectives**, **Add Adverbs**) are used to enter text part of the icons in the iconic interface. The fifth option (**Add Stored Sentences**) is used to enter the text part of the pre-stored messages for the pre-stored message based communication. If you click on any one of these five options, the interface shown in Figure 8.5 appears.

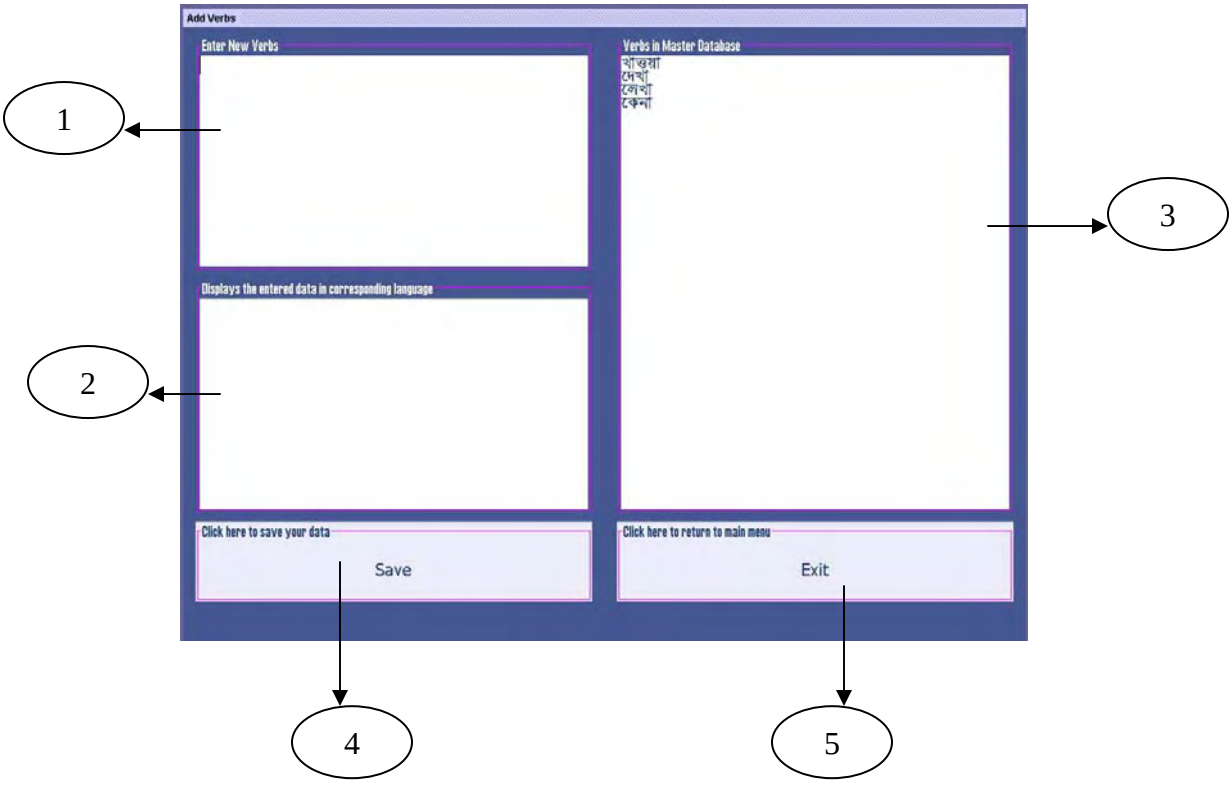


Fig. 8.5

The interface of Figure 8.5 has five components labeled numerically in the Figure. The purposes of these components are listed below.

- If you type new words/messages, that will be displayed in component 1. You can enter more than one words/sentences at a time by placing "," between them. **For Bengali and Hindi, you must enter the words/sentences using ITRANAS notation** (see Appendix A).
- In Bengali and Hindi, the text you enter in component 1 using ITRANS is displayed in component 2 in the corresponding language. **This component (component 2) is not present in English**.
- If you have already entered some words/sentences before, those will be shown in list form in component 3.
- Using the **Save** button in component 4, you can save the text you entered.
- Using the **Exit** button in component 5, you can return to the main interface (Figure 8.1).

The final option in the list of Figure 8.4, the **Add to GNP Dictionary**, is used to develop a dictionary. The dictionary is needed to form grammatically correct sentence from icons in the iconic communication sub system. If you click on this option, the interface shown in Figure 8.6 appears.

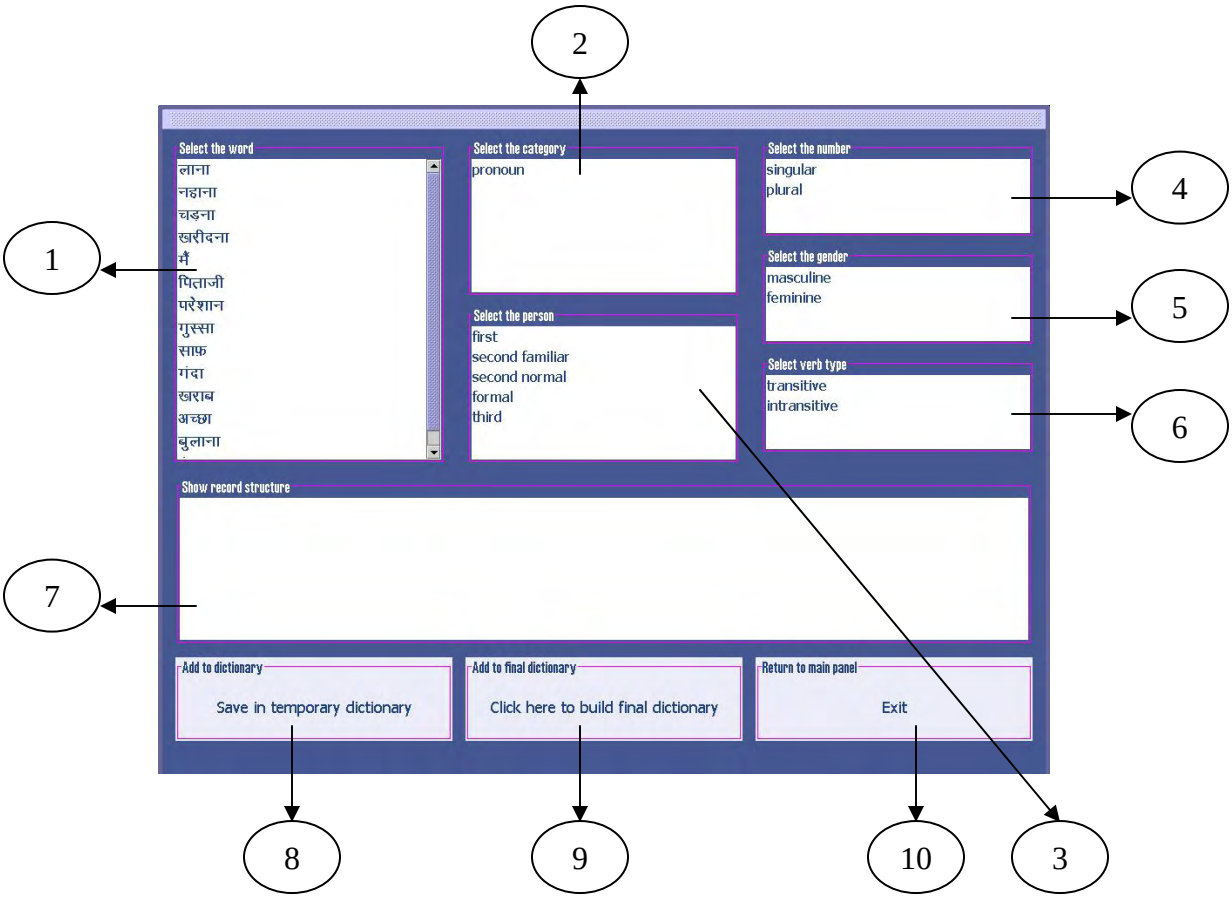


Fig. 8.6

The interface for developing GNP dictionary contains ten components, labeled numerically in the Figure. The functionalities of these components are enumerated below.

- The list of words you have entered using the **Add** options will appear in component 1. You have to select a word from the list by clicking on it. The selected word will appear in component 7.
- If the word you have selected is a verb and the language is Hindi, select an appropriate verb type from component 6. The selected verb type will appear in component 7. Please remember that,

    - You need to select verb type only for Hindi. **In Bengali and English, this component (component 6) is not present**.
    - For verbs in Hindi, you need to select only the verb type. Ignore all other components and save your selection.

- If the selected word is not a verb then from the list of word categories in component 2, select an appropriate category for the word. The selected category will appear in component 7.
- If the selected word is not a verb then from the list of persons in component 3, select an appropriate person for the word. The selected person will appear in component 7.
- If the selected word is not a verb then from the list of numbers in component 4, select an appropriate number for the word. The selected number will appear in component 7.
- If the selected word is not a verb then from the list of genders in component 5, select an appropriate gender for the word. The selected gender will appear in component 7.
- Check your selection from component 7. If you are satisfied then save the record. You can save the record temporarily using the button in component 8 and continue with next record. You can save the record permanently using the button in component 9.
- Use the button in component 10 to exit and return to main interface (Figure 8.1).

Please remember that,

- **The gender option (component 5) is not present in Bengali**.
- For non-verb words, you must enter the information in the order specified (category, person, number, gender).

8.1.2 The Edit Option

With the Edit menu option (Figure 8.3), you can edit the already entered text (word or sentences) in the master database of Sanyog. If you click on this menu option, a new list of sub menus appear on the interface, shown in Figure 8.7.

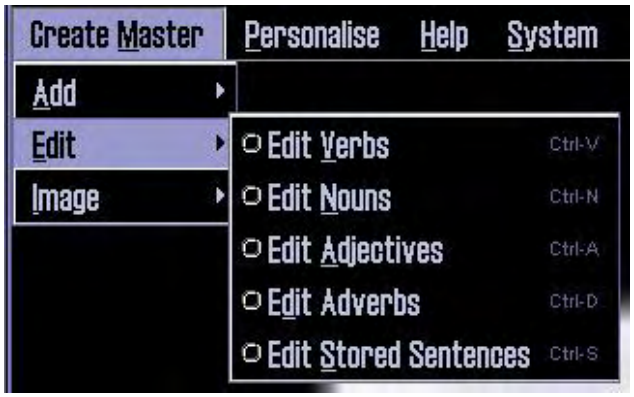


Fig. 8.7

If you click on any one of these sub menu options, the interface shown in Figure 8.8 appears.

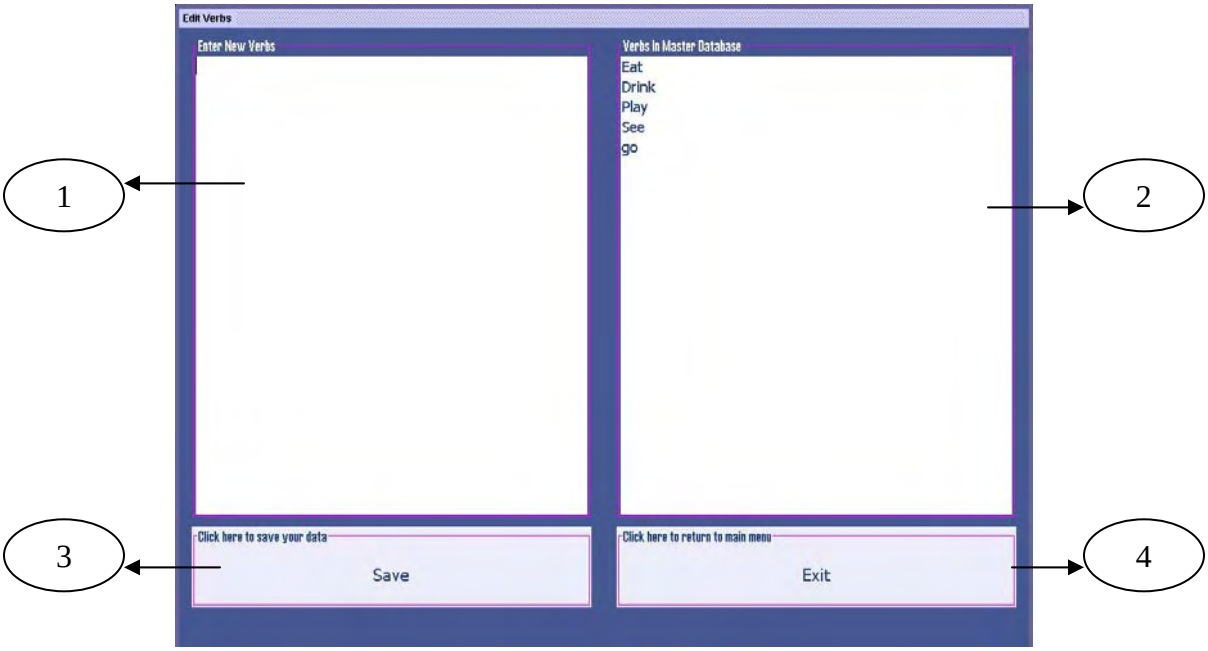


Fig. 8.8

The edit interface has four components labeled numerically in the Figure. Their purposes are listed below.

- The list of words/messages entered using the Add option appears in component 2. You need to select a word or sentence from the select to edit that word or sentence. To select, click on the word or sentence.
- You can enter the new text in component 1. **This step must be done only after you have selected a word or sentence from component 2.**
- Use the **Save** in component 3 to save the changes you have made to the text. The edited text will appear in the list of component 2 in the place of the original text.
- Use the **Exit** button in component 4 to return to the main interface (Figure 8.1).

8.1.3 The Image Option

With the Image menu option (Figure 8.3), you can add icons to the text you have entered (using Add option). If you click on this option, a new list of sub menus appear on the interface, shown in Figure 8.9.

Fig. 8.9

If you click on any one of these sub menu options, the interface shown in Figure 8.10 will appear in front of you.

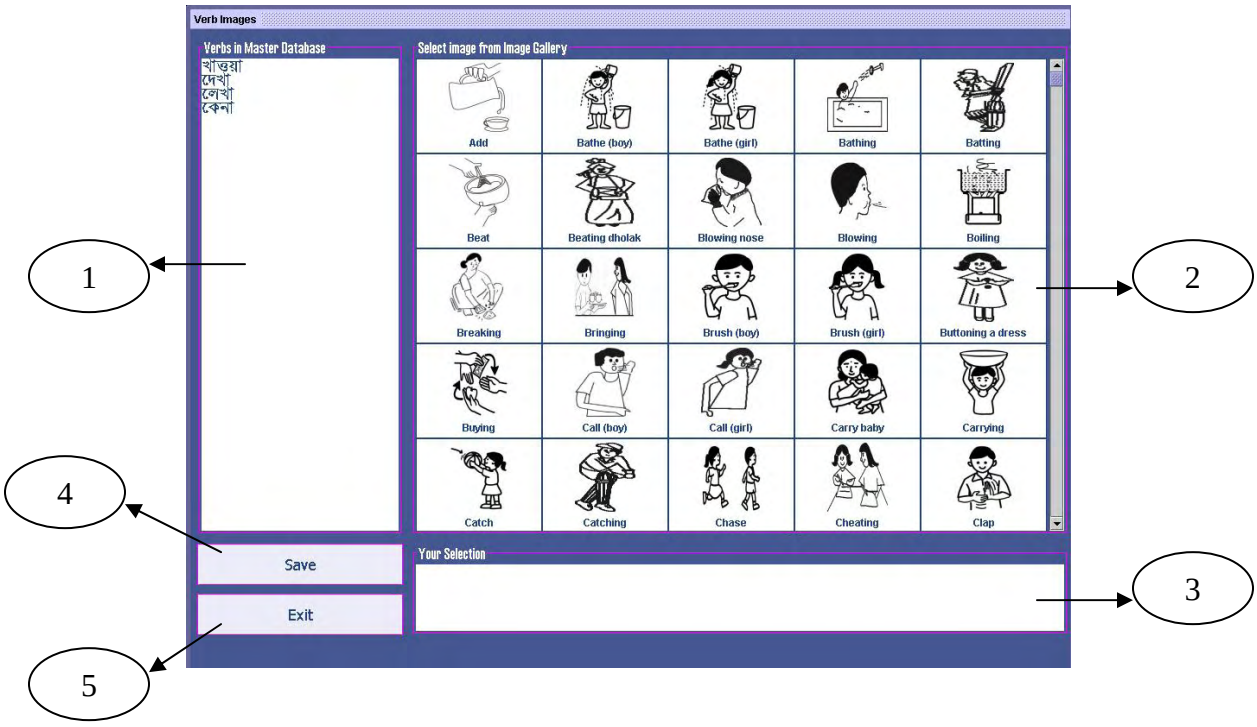


Fig. 8.10

The interface contains five components labeled numerically in the Figure. The purposes of these components are enumerated below.

- Component 1 displays the list of texts (words or sentences). You need to select a text first from this list. To select a text, click on the text. The selected text will appear in component 3.
- Once you have selected a text, select corresponding image (s) from the image gallery displayed in component 2. The name of the selected image (s) will appear in component 3. Please remember that,

    - You can select only one image with a word.
    - With a sentence, you can select one or more images. To select more that one image for a sentence, select all the images before you save.

- To save your selection, use the **Save** button in component 4. To exit and return to main interface (Figure 8.1), use the **Exit** button in component 5.

8.2 Personalize Database

The Personalize menu option (Figure 8.2, second from left) allows you to personalize the master database according to your requirement. Using the commands present under this menu option, you can select your vocabulary (of nouns, verbs, stored sentences etc.) from the master database. If you click on this menu option, a drop down list appears shown in Figure 8.11.

Fig. 8.11

8.2.1 The Add Option

You can add words or pre-stored messages in your vocabulary from master database with the **Add** option. If you click on this option, the list of commands shown in Figure 8.12 appears. Using options from this list, you can add corresponding words in your vocabulary.

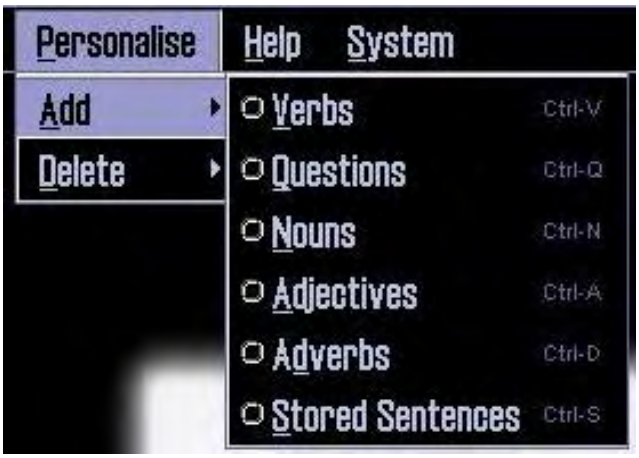


Fig. 8.12

Addition of words or sentences in your vocabulary works in the following way.

1. Click on the appropriate option to select that type of text (words/sentences) in your vocabulary.
2. If you click on either of (**Verbs, Adjectives, Adverbs, Stored Sentences**), the interface shown in Figure 8.13 appears.

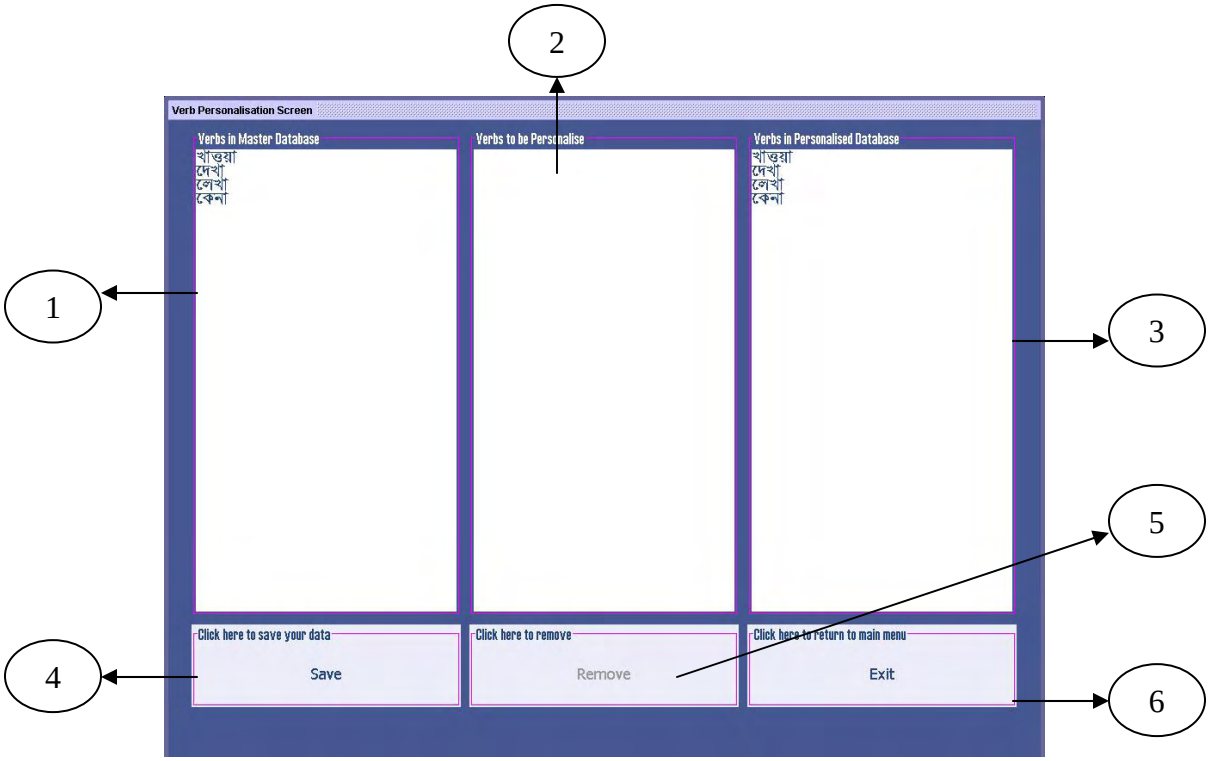


Fig. 8.13

There are six components in the interface labeled numerically in the Figure. Their purposes are enumerated below.

- The list of verbs, adjectives, adverbs or stored messages in the master database is shown in component 1. To select one or more of them from the list, click on them.
- Your selections will appear in component 2. If you want to remove any from the selected list displayed in component 2, please do the following.

  - Click on the item you want to remove in the list shown in component 2.
  - Click on the **Remove** button in component 5.

- The list in component 3 shows the items (verbs, adjectives, adverbs, stored sentences) you already personalized and saved.
- If you are satisfied with your selections shown in component 2, click on the **Save** button in component 4 to save your selections.
- Use the **Exit** button in component 6 to return to main interface (Figure 8.1).

3. If you click on the **Questions** option, the interface shown in Figure 8.14 appears. Using this interface, you can add questions to verbs that are used in the interactive icon selection process in the iconic communication interface.

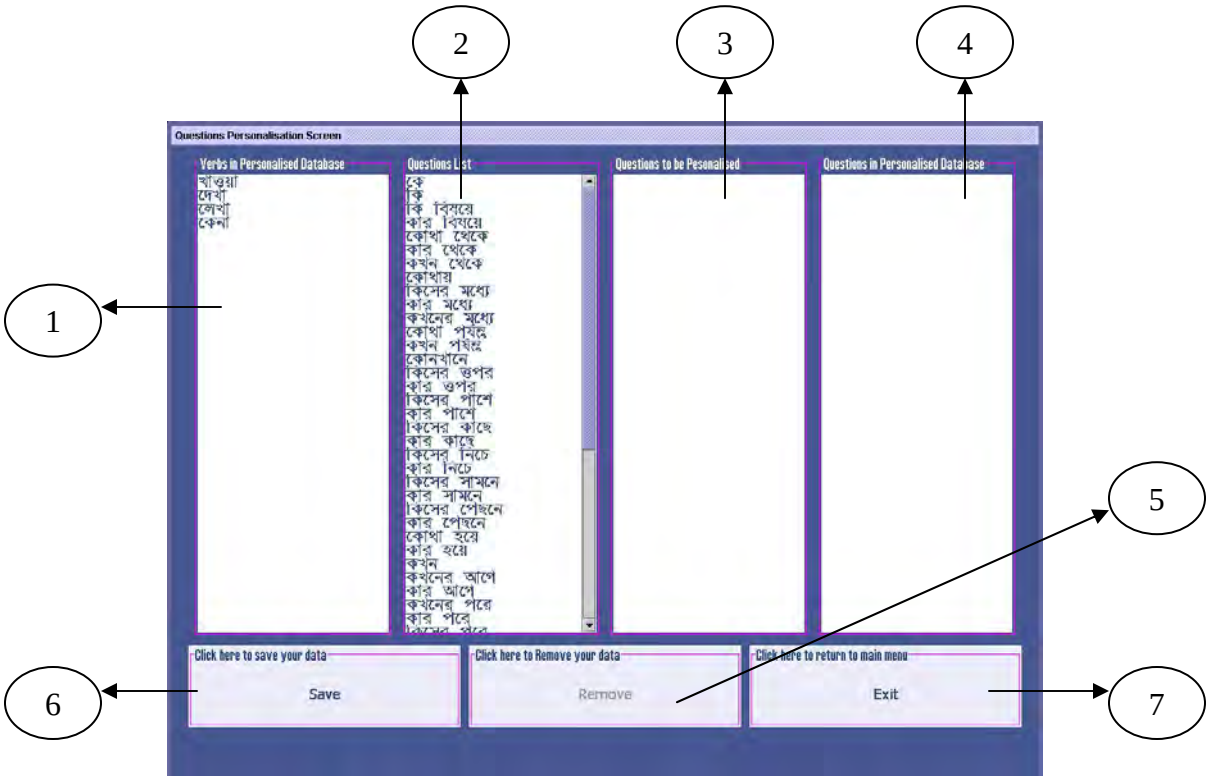


Fig. 8.14

There are seven components in the interface labeled numerically. Their purposes are enumerated below.

- Component 1 lists all the verbs present in the master database. Select a verb from this list by clicking on it.
- A list of questions is displayed in component 2. Select the questions you want to attach with the selected verb from this list. The questions you select will appear in component 3.
- If you want to remove any of the selected questions from the list shown in component 3, please do the following.

    - Click on the question you want to remove in the list shown in component 3.
    - Click on the **Remove** button in component 5.

- Component 4 displays the list of questions that are already attached (by you, previously) with the selected verb. If there are no such questions, this component will remain empty.
- Use the **Save** button in component 6 to save your selections.
- To return to the main interface (Figure 8.1), use the **Exit** button in component 7.

4. In the iconic communication system, the noun icons are displayed along with a question, which is associated with a verb. So, you need to associate nouns with questions and verbs. To perform the association, click on the **Noun** option. The interface shown in Figure 8.15 will appear.

   There are eight components in the interface labeled numerically. Their purposes are enumerated below.

   - Component 1 lists all the verbs present in the master database. Select a verb from this list by clicking on it.
   - The list of questions attached with the selected verb is displayed in component 2. Select the question with which you want to associate the nouns from this list.
   - The list of all nouns present in the master database is shown in component 3. Select the nouns from this list by clicking on them. The selected nouns will appear in component 4.
   - If you want to remove any of the selected nouns from the list shown in component 4, please do the following.

       - Click on the nouns you want to remove in the list shown in component 4.
       - Click on the **Remove** button in component 7.

   - Component 5 displays the list of nouns that are already attached (by you, previously) with the selected verb and question. If there are no such nouns, this component will remain empty.
   - Use the **Save** button in component 6 to save your selections.
   - To return to the main interface (Figure 8.1), use the **Exit** button in component 8.

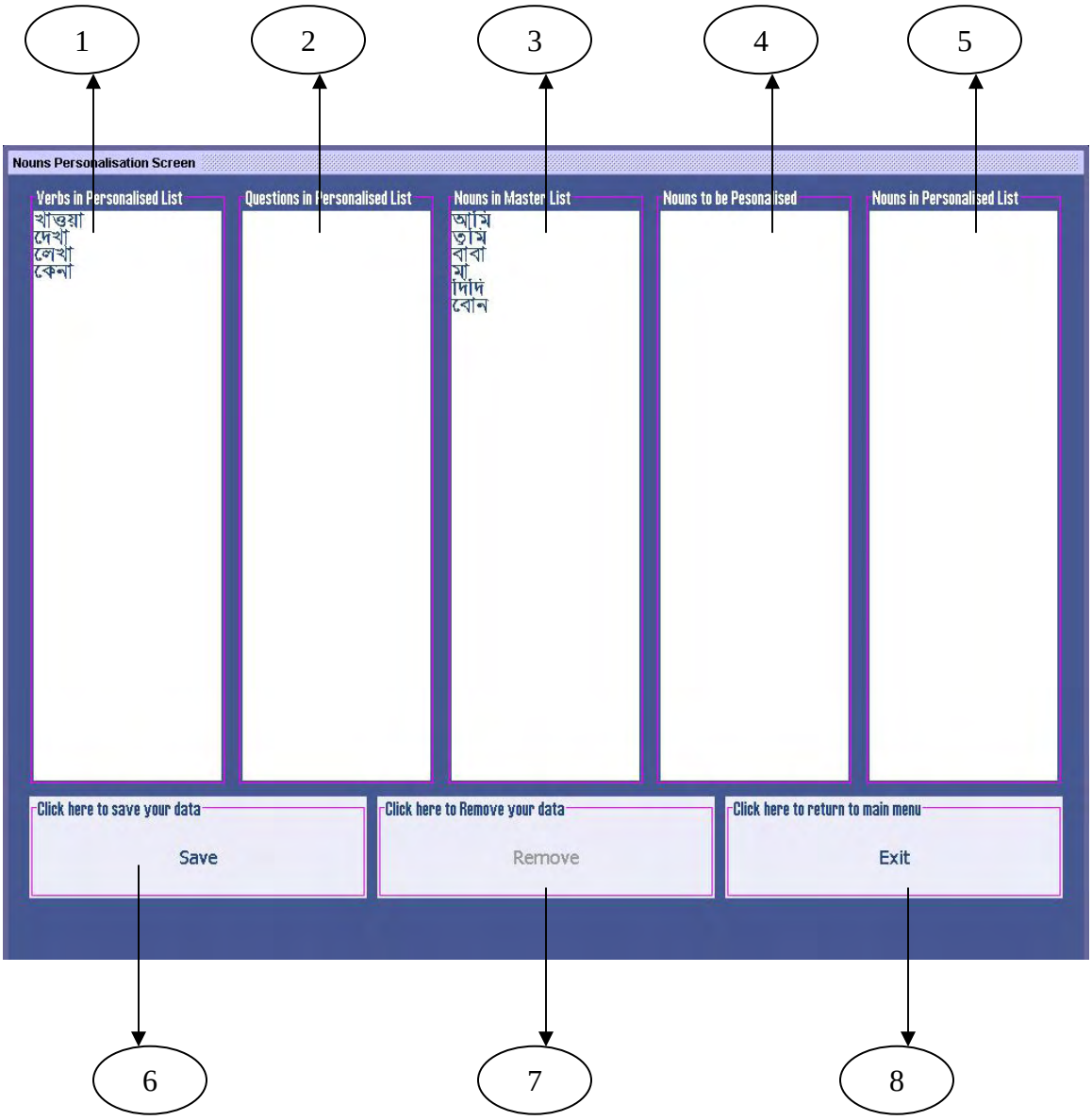


Fig. 8.15

Please remember that,

- You must select nouns in the order verb → question → nouns. Otherwise, the iconic communication sub system will not work properly.

8.2.2 The Delete Option

The **Delete** option (Figure 8.11) is used to delete words or sentences from the personalized database. If you click on this option, a list of sub menu options is shown (Figure 8.16). Using options from this list, you can delete corresponding words in your vocabulary.

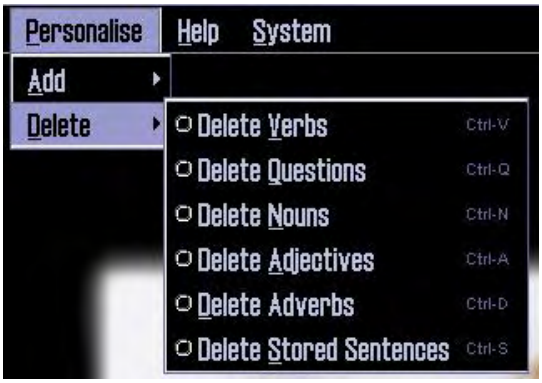


Fig. 8.16

Deletion of words or sentences in your vocabulary works in the following way.

1. Click on the appropriate option to select that type of text (words/sentences) in your vocabulary.
2. If you click on either of (**Delete Verbs, Delete Adjectives, Delete Adverbs, Delete Stored Sentences**), the interface shown in Figure 8.17 appears.

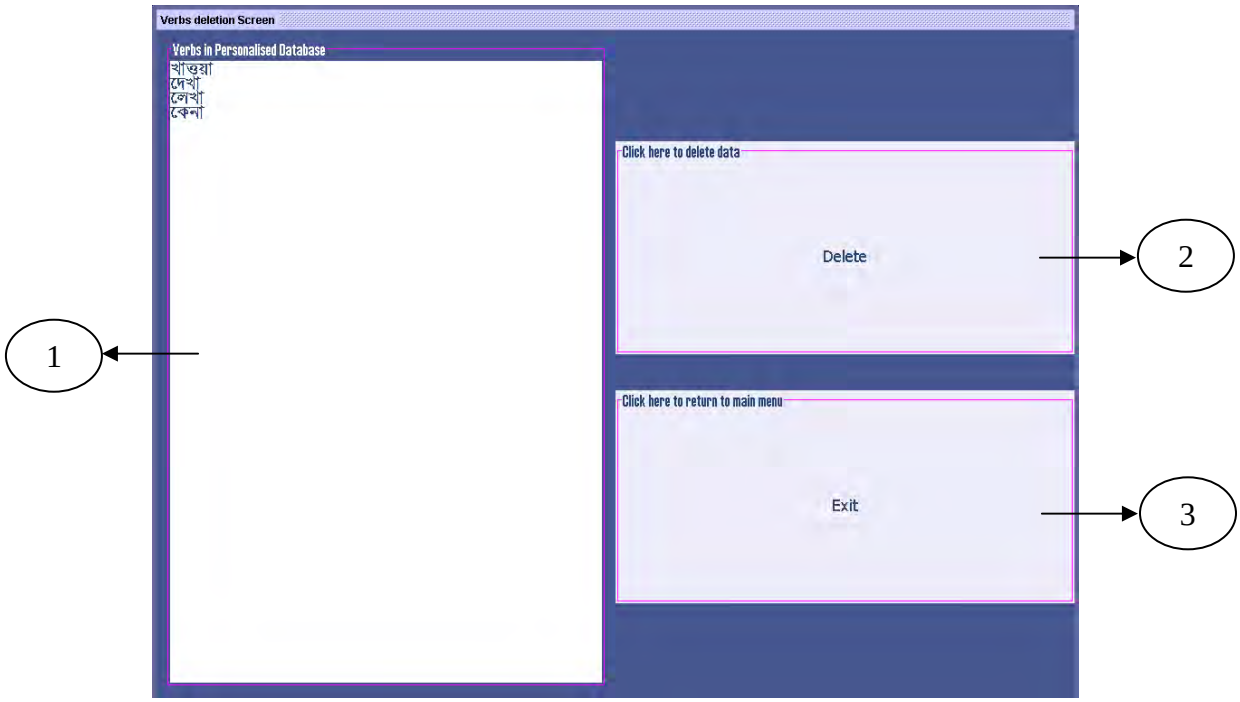


Fig. 8.17

There are three components in the interface labeled numerically in the Figure. Their purposes are enumerated below.

- The list of verbs, adjectives, adverbs or stored messages in the master database is shown in component 1. To select one them from the list, click on it.
- If you want to delete any one from the list displayed in component 1, please do the following.
    - Click on the item you want to delete in the list shown in component 1.
    - Click on the **Delete** button in component 2.
- Use the **Exit** button in component 3 to return to main interface (Figure 8.1).

3. If you click on the **Delete Questions** option, the interface shown in Figure 8.18 appears. Using this interface, you can delete questions to verbs that are used in the interactive icon selection process in the iconic communication interface.

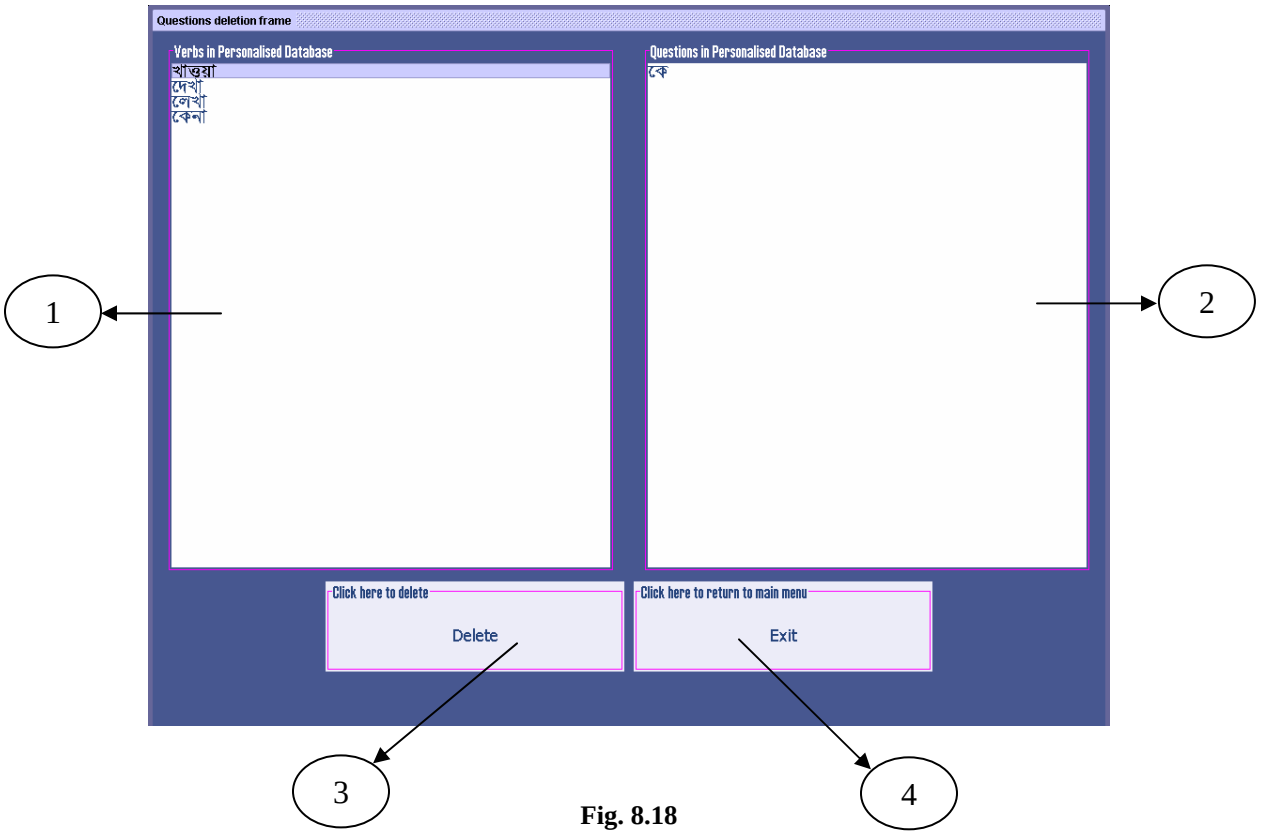


Fig. 8.18

There are four components in the interface labeled numerically. Their purposes are enumerated below.

- Component 1 lists all the verbs present in the master database. Select a verb from this list by clicking on it.
- A list of questions is displayed in component 2. Select the question you want to detach from the selected verb from this list.
- If you want to delete any one of the selected question from the list shown in component 2, please do the following.

    - Click on the question you want to delete in the list shown in component 2.
    - Click on the **Delete** button in component 3.

- To return to the main interface (Figure 8.1), use the **Exit** button in component 4.

4. If you click on the **Delete Nouns** option, the interface shown in Figure 8.19 appears. Using this interface, you can delete nouns which are associated with the question.

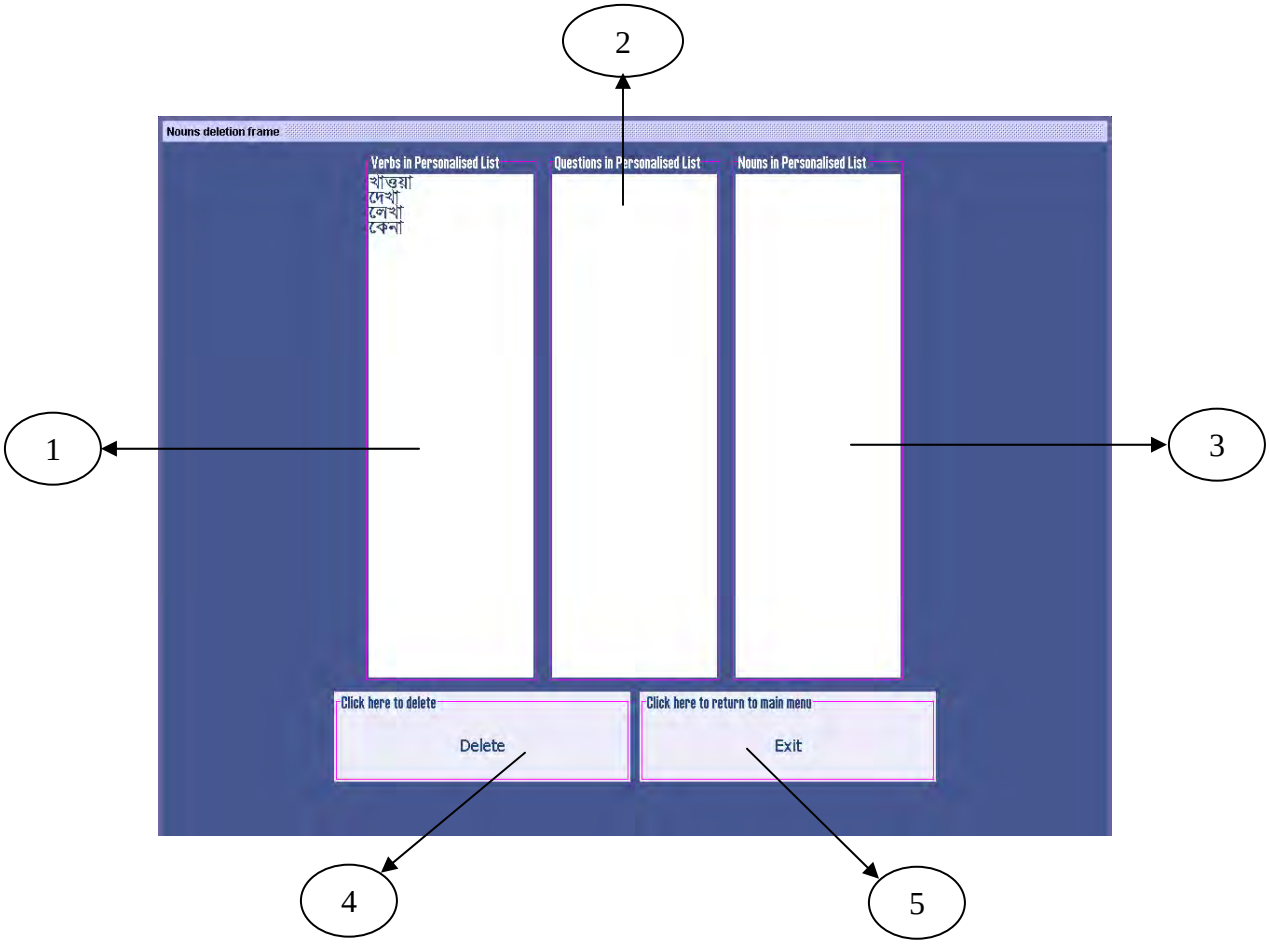


Fig. 8.19

There are five components in the interface labeled numerically. Their purposes are enumerated below.

- Component 1 lists all the verbs present in the master database. Select a verb from this list by clicking on it.
- The list of questions attached with the selected verb is displayed in component 2. Select the question from which you want to detach the nouns from this list.
- If you want to delete any one of the selected noun from the list shown in component 3, please do the following.

    - Click on the nouns you want to delete in the list shown in component 3.
    - Click on the **Delete** button in component 4.
- To return to the main interface (Figure 8.1), use the **Exit** button in component 5.

Appendix A: The ITRANS Notation

ITRANS is a notation used to enter Indian language text using Roman alphabet. In Sanyog, we have incorporated Bengali and Hindi **ITRANS to Text Converters** that convert texts written ITRANS to corresponding language (Bengali or Hindi) fonts so that you can see the texts in these languages on the interfaces of Sanyog.

To enter Bengali or Hindi text in ITRANS notation, use the following tables.

name	itrans	dev-1	dev-2	ben-1	ben-2	guj	kan	tel	gur	tam	rom
A	a	अ	অ	অ	অ	અ	ಅ	అ	ਅ	அ	a
AA	aa	आ	আ	আ	আ	આ	ಆ	ఆ	ਆ	ஆ	ā
I	i	इ	ই	ই	ই	ઇ	ಇ	ఇ	ਇ	இ	i
II	ii	ई	ঈ	ঈ	ঈ	ઈ	ಈ	ఈ	ਈ	ஈ	ī
U	u	उ	উ	উ	উ	ઉ	ಉ	ఉ	ਉ	உ	u
UU	uu	ऊ	ঊ	ঊ	ঊ	ઊ	ಊ	ఊ	ਊ	ஊ	ū
V. R	RRi	ऋ	ঋ	ঋ	ঋ	ઋ	ಋ	ఋ	–	ரு	ṛ
V. RR	RRI	ॠ	–	–	ৠ	–	ೠ	ౠ	–	–	ṝ
V. L	LLi	ऌ	–	–	–	–	ಌ	ఌ	–	–	ḷ
V. LL	LLI	ॡ	–	–	–	–	ೡ	ౡ	–	–	ḹ
E	e	ए	ए	এ	এ	એ	ಎ	ఎ	ਏ	எ	e
EE	E	–	–	–	–	–	ಏ	ఏ	–	ஏ	E
AI	ai	ऐ	ঐ	ঐ	ঐ	ઐ	ಐ	ఐ	ਐ	ஐ	ai
O	o	ओ	ও	ও	ও	ઓ	ಒ	ఒ	ਓ	ஒ	o
OO	O	–	–	–	–	–	ಓ	ఓ	–	ஓ	O
AU	au	औ	ঔ	ঔ	ঔ	ઔ	ಔ	ఔ	ਔ	ஔ	au
VISARGA	aH	:	ः	ঃ	ঃ	ઃ	ಃ	ః	ਃ	◌ஃ	ḥ

name	itrans	dev-1	dev-2	ben-1	ben-2	guj	kan	tel	gur	tam	rom
KA	ka	क	ক	ক	ক	ક	ಕ	క	ਕ	க	ka
KHA	kha	ख	খ	খ	খ	ખ	ಖ	ఖ	ਖ	க	kha
GA	ga	ग	গ	গ	গ	ગ	ಗ	గ	ਗ	க	ga
GHA	gha	घ	ঘ	ঘ	ঘ	ઘ	ಘ	ఘ	ਘ	க	gha
NGA	~Na	ङ	ঙ	ঙ	ঙ	ઙ	ಙ	ఙ	ਙ	ங	ṅa
CA	cha	च	চ	চ	চ	ચ	ಚ	చ	ਚ	ச	ca
CHA	chha	छ	ছ	ছ	ছ	છ	ಛ	ఛ	ਛ	ச	cha
JA	ja	ज	জ	জ	জ	જ	ಜ	జ	ਜ	ஜ	ja
JHA	jha	झ	ঝ	ঝ	ঝ	ઝ	ಝ	ఝ	ਝ	ஜ	jha
NYA	~na	ञ	ঞ	ঞ	ঞ	–	ಞ	ఞ	ਞ	ஞ	ña
TTA	Ta	ट	ট	ট	ট	ટ	ಟ	ట	ਟ	ட	ṭa
TTHA	Tha	ठ	ঠ	ঠ	ঠ	ઠ	ಠ	ఠ	ਠ	ட	ṭha
DDA	Da	ड	ড	ড	ড	ડ	ಡ	డ	ਡ	ட	ḍa
DDHA	Dha	ढ	ঢ	ঢ	ঢ	ઢ	ಢ	ఢ	ਢ	ட	ḍha
NNA	Na	ण	ণ	ণ	ণ	ણ	ಣ	ణ	ਣ	ண	ṇa
TA	ta	त	ত	ত	ত	ત	ತ	త	ਤ	த	ta
THA	tha	थ	থ	থ	থ	થ	ಥ	థ	ਥ	த	tha
DA	da	द	দ	দ	দ	દ	ದ	ద	ਦ	த	da
DHA	dha	ध	ধ	ধ	ধ	ધ	ಧ	ధ	ਧ	த	dha
NA	na	न	ন	ন	ন	ન	ನ	న	ਨ	ந	na
PA	pa	प	প	প	প	પ	ಪ	ప	ਪ	ப	pa
PHA	pha	फ	ফ	ফ	ফ	ફ	ಫ	ఫ	ਫ	ப	pha
BA	ba	ब	ব	ব	ব	બ	ಬ	బ	ਬ	ப	ba
BHA	bha	भ	ভ	ভ	ভ	ભ	ಭ	భ	ਭ	–	bha
MA	ma	म	ম	ম	ম	મ	ಮ	మ	ਮ	ம	ma

name	itrans	dev-1	dev-2	ben-1	ben-2	guj	kan	tel	gur	tam	rom
YA	*ya*	य	य	য	য	ય	ಯ	య	ਯ	ய	ya
RA	*ra*	र	र	র	র	ર	ರ	ర	ਰ	ர	ra
LA	*la*	ल	ल	ল	ল	લ	ಲ	ల	ਲ	ல	la
LLA	*La*	ळ	ळ	–	–	ળ	ಳ	ళ	ਲ਼	ள	lda
VA	*va*	व	व	ব	ৰ	વ	ವ	వ	ਵ	வ	va
SHA	*sha*	श	श	শ	শ	શ	ಶ	శ	ਸ਼	ஶ	śa
SSA	*Sha*	ष	ष	ষ	ষ	ષ	ಷ	ష	–	ஷ	ṣa
SA	*sa*	स	स	স	স	સ	ಸ	స	ਸ	ஸ	sa
HA	*ha*	ह	ह	হ	হ	હ	ಹ	హ	ਹ	ஹ	ha

name	itrans	dev-1	dev-2	ben-1	ben-2	guj	kan	tel	gur	tam	rom
QA	*qa*	क़	क़	–	–	ક઼	–	–	–	◌ ◌	qa
KHHA	*Ka*	ख़	ख़	–	ঌ	ખ઼	–	–	ਖ਼	–	Ka
GHHA	*Ga*	ग़	ग़	–	–	ગ઼	–	–	ਗ਼	–	Ga
ZA	*Ja*	ज़	ज़	য়	য়	જ઼	–	–	ਜ਼	ழ	za
DDDHA	*.Da*	ढ़	ढ़	ড়	ড়	ઽ	–	–	ੜ	–	.Da
FA	*fa*	फ़	फ़	–	–	–	–	–	ਫ਼	–	fa
YYA	*Ya*	–	य़	য়	য়	–	–	–	–	–	–
KA-SHHA	*xa*	क्ष	क्ष	ক্ষ	ক্ষ	ક્ષ	ಕ್ಷ	క్ష	–	க்ஷ	kṣa
JA-NYA	*GYa*	ज्ञ	ज्ञ	জ্ঞ	জ্ঞ	જ્ઞ	ಜ್ಞ	–	–	ஜ்ஞ	jña
	Ra	ऱ	ऱ	ড়	ড়	ર	–	ఱ	–	ற	Ra
ANUSVARA	*k.n*	कं	कं	কং	কং	કં	ಕಂ	కం	ਕਂ	க்	kaṃ
	k.h	क्	क्	ক্	ক্	ક્	ಕ್	క్	ਕ੍	க்	k
CANDRA E	*k.c*	कॅ	कॅ	–	–	કૅ	–	–	ਕੱ	–	ka.c
C. BINDU	*k.N*	कँ	कँ	কঁ	কঁ	કઁ	–	–	ਕਁ	–	ka.N
AVAGRAHA	*.a*	ऽ	ऽ	–	–	ઽ	ಽ	ఽ		–	.a