Multimedia application for teaching visual art to handicapped children

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Abstract

The article presents an implementation of a teaching tool for handicapped children. Emphasis is on easy and intuitive handling of the various controls. The multimedia application is developed in Macromedia Director. The modules of the program are described and example screenshots are given.

Keywords:

Multimedia, multimedia application, computer graphics, handicapped children, teaching program, visual art, Macromedia Director

1. Introduction

The goal of this work is to create a multimedia application for teaching visual art. The project deals with teaching visual art in kindergartens and primary stage of elementary school with specialisation for physically handicapped children. The work is trying to present visual art to the children in an entertaining way and to make them familiar with modern computter technology. The age of users was taken into consideration, because this program may be the first computer application the child could have seen. That is why the emphasis on simple control was taken into focus, so the choice of right graphics symbols (icons, bitmaps) is very important and text dialogs are supplemented by vocals.

This multimedia application uses creations of modern Czech artists:

- Jan Koblasa: Cyklus K (Kafkovský); 1959
- Karel Nepraš: Velký dialog; 1966

This application is developed in Macromedia Director (development kit for multimedia). Director supports different multimedia elements as picture formats (jpg, gif, bmp, psp, tga, etc.), movies (shockwave, flash, gif, avi, mov, mpg, etc.), sounds (wav) and other own formats. Applications are programmed by built-in Director's multimedia operations and scripting programming language - Lingo [1] [2]. The project was produced as a co-operation between the Faculty of Information Technology (VUT Brno) and Pedagogic Faculty of Masaryk University.

2. Content and structure of the project

Goals of the project:

- Introduction to modern Czech visual art (20th century)
- Teaching children basic work with personal computer
- Introduction to interaction with computer graphics in entertaining form
- Introduction to interaction with computer sound in entertaining form
- Stimulating children's fantasy

Structure of the application:

The program is structured into several separate modules, which are created in Macromedia Director environment. Modules are inter-connected and share global variables. The advantage of this solution lies in possibility to develop every module separately. The modules are then integrated into application. Such concept is supported within the Director. Project includes one special module root, several main modules and several auxiliary modules.

Main modules:

- Magic Tree – initial module, setting values of global variables
- Tree – root module, "crossroad" for main modules
- Karel Nepraš – interactive program with sheet music
- Jan Koblasa – mosaic
- Painting – simple painting program
- Gallery – gallery of user's creations
- Dictionary – dictionary of used headwords in application

Inter-connection of main modules:

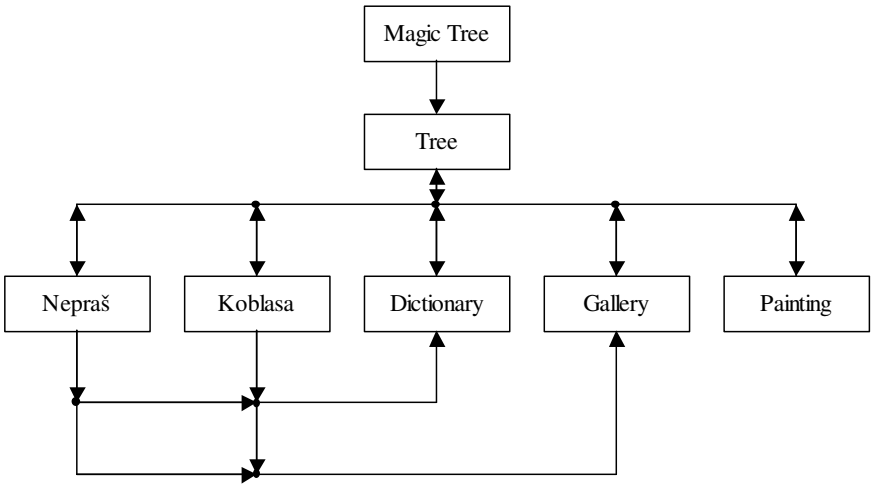

Fig. 2-1 – inter-connection of main modules

Auxiliary modules:

- Setting – setting volume of sound, setting global variables

- Help – help to every part of program
- Loading – loading and saving for module Nepraš
- Data – data about user's song for module Nepraš

Possibility of connection between main module and auxiliary modules:

The connection between main module and auxiliary modules is shown for module Nepraš. Nepraš is the only module, which is using all auxiliary modules and that, is why it is the best module for presentation of communication within application (Fig. 2-2).

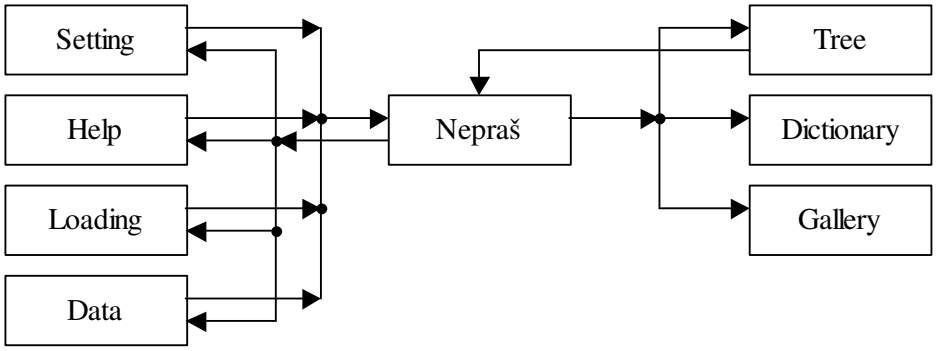

Fig. 2-2 – main module Nepraš and his connection to other modules

3. Implementation

3.1 Technical requirements and operating system

Project is designed and implemented with consideration to availability and usability on a majority of today's PCs with operating system Windows 9x, Windows NT, Windows 2000 and Windows XP.

System requirements:

- Intel processor Pentium (133MHz) or compatible.
- 32MB RAM operating memory
- 16-bit sound card
- 16-bit graphic card (hi-colour)
- Other standard attachment of PC (mouse, etc.)

The size of active area of application is 800 x 600 pixels.

3.2 Implementation of modules

Modules Tree and Magic Tree

Module Magic Tree is used at the start of the application. Its function is the initialisation of global variables. Module Tree directly follows module Magic Tree. It's a "crossroad" of modules visually shown as a tree with four apples. Each apple represents a certain main module. The picture of module Tree can be seen in Fig.3-1.

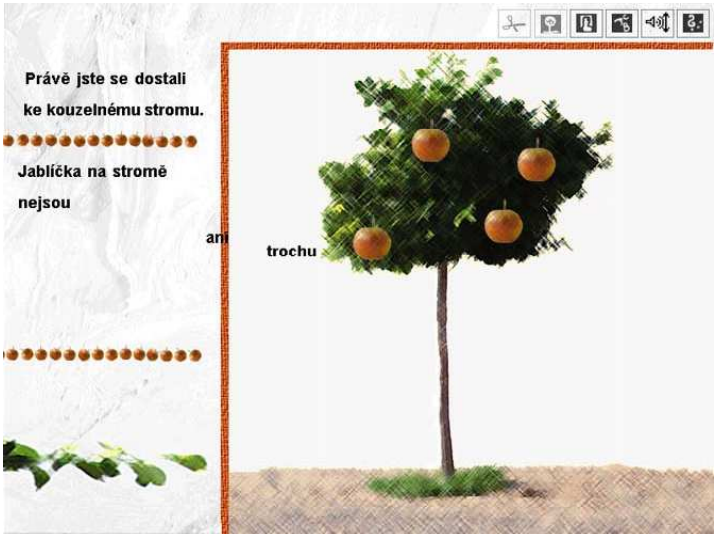

Fig. 3-1 – module Tree

Nepraš – music editor

The task of this module is to teach children the foundation of theory of colour and theory of musical teaching [3]. Children may change the colour of robots in the creation by Karel Nepraš ("*Velký dialog*"). Following part of module is dedicated to musical teaching. Users can play a simple piano and two music editors. First editor is simplified – it does not force the user to follow certain musical rules. User can save their creations into the Gallery. The picture of module Nepraš can be seen in Fig.3-2.

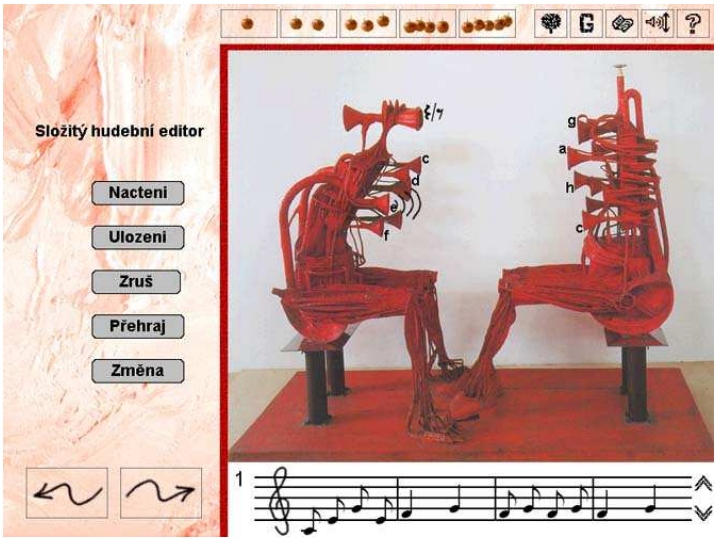

Fig. 3-2 – module Nepraš, music editor

This module uses all auxiliary modules (Setting, Help, Loading and Data). Auxiliary modules are called as modal dialogs. The picture of module Setting can be seen in Fig.3-3.

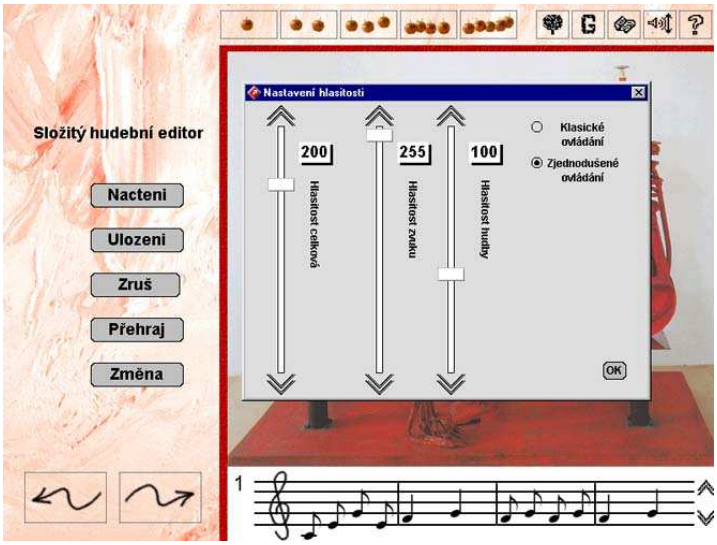

Fig. 3-3 – module Nepraš, modal dialog Setting

Koblasa – mosaic

The task of this module is to teach users the composition of a picture. Users may change colour of mosaic (by Jan Koblasa: Cyklus K), add new elements and save their creations to the Gallery. There are two different modes of control in this module: Normal mode uses standard drag&drop control, and in simplified mode, unlike as in the normal mode, it is not necessary to hold down the mouse button during drag&drop operation. The picture of module Koblasa can be seen in Fig.3-4.

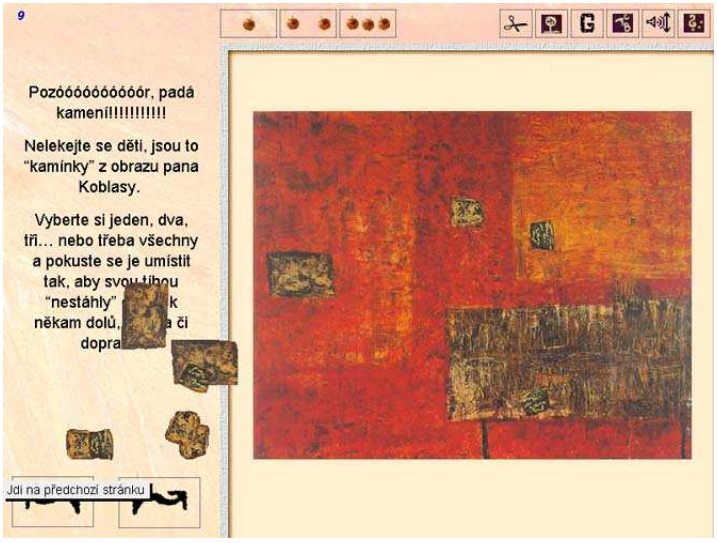

Fig. 3-4 – module Koblasa

Painting

Children can draw simple pictures. They can change colour and pen width. Their creations can be cut out and put into the Gallery. The picture of module Painting can be seen in Fig.3-5.

Fig. 3-5 – module Painting

Dictionary

It is a dictionary of complicated words from dialogs in the application. Words and their meanings are placed into an external text-file.

Gallery

Users can store their creations in this module. Two different types of elements can be put into the Gallery (graphic pictures from modules Koblasa and Painting and songs from module Nepraš). Parts of the work can be stored into clipboard using the print screen function. From clipboard there are moved into the Gallery. Sounds are stored as list of notes. The picture of module Nepraš can be seen in Fig.3-6.

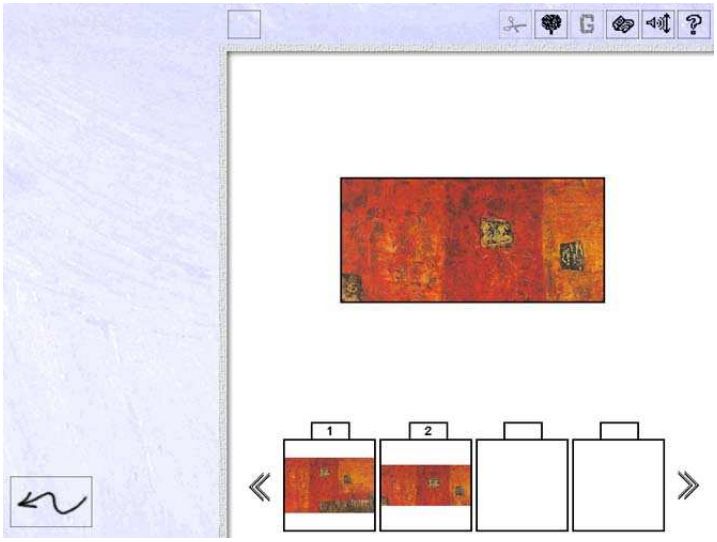

Fig. 3-6 – module Gallery

4. Conclusion

Completed CD-ROM is going to be used as teaching tool at elementary school with specialisation for handicapped children. The application has not been completed yet (voice dialogs, commands, music support are not finished yet, also the graphics design of the application and final beta testing are not completed). Preliminary version was tested on handicapped children, their reactions were positive, that is why I hope this work is going to be useful as a teaching tool. The project will be finished as my diploma thesis.

5. Acknowledgements

I would like to thank Martin Dobšík and Andrea Dobšíková, Ph.D. for their help and assistance.

6. References

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[3] Lýsek, F.: Základy hudební nauky. Státní nakladatelství krásné literatury, hudby a umění, 1955. A/170.427 ai 1948-V/4