USING MYIMLE SYSTEM FOR INTERACTIVE WHITEBOARDS IN EDUCATION

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Abstract

MyIMLE is a multimedia interactive educational environment which makes possible a direct connection of Flash interactive study supports with real systems connected to users' computers. This way of using Flash animations is not so widespread nowadays but it brings many advantages which had been offered only by expensive systems until now. There is a possibility of an interconnection of software applications and their control of a real electronic system connected to a computer of a user. A universality of using this solution, an easy way of creating applications and almost no requirements on HW offer a user almost unlimited possibilities of using these systems in creating study supports. The aim of this contribution is to show one of many ways of using these systems – using them together with interactive whiteboards. The principle of controlling a real system and the structure of an interactive animation is demonstrated on the example of an animation "A model of Tsunami – its beginning, behavior and its consequences" connected to a real model of an ocean and a coast. This animation can also work independently as a simulation without a real system connected. The application can run on web, it can be embedded into the working environment of an interactive whiteboard, or it can run as an independent desktop application.
Keywords: *interactive animation, multimedia, hardware systems, interactive whiteboard.*

Description of MyIMLE System

Didactic games, learning programs, multimedia encyclopedias and various study supports are widely spread in education nowadays and thanks to a great availability of development systems it is possible for teachers to create these applications. Users don't have to be necessarily IT specialists – even a skillful user is able to create interactive study supports using Adobe Captivate, LMS tools or interactive whiteboards. The only effective way of creating interactive applications for interactive whiteboards is Adobe Flash nowadays.

Technical devices such as measure and controls systems, distant laboratories, etc. can improve study supports, which aren't usually integrated directly into interactive animations nowadays. The direct integration can improve interactive animations of an important aspect which is a direct linking of theory with a real system. Students will have a possibility to directly control a game or animation using an external system. Only a digital recording, a simple interactive animation or a simulation on a computer won't ever substitute working with a real device or system.

A system MyIMLE (My Interactive Multimedia Learning Environment) is being developed at the Department of Technical Education and Information Science of Masaryk University. MyIMLE is a modular object system (a system created from cooperating modules) being developed in Adobe Flash. The interactive animation for an interactive whiteboard consists from one or more Flash animations (projecting screen, animation, application) which can communicate and cooperate with each other. The animation can contain for example audio, video, animations, simulations, camera image (Michalko, Biňas, 2008), web page or even a graphic interface of a connected electronic measure or control system.
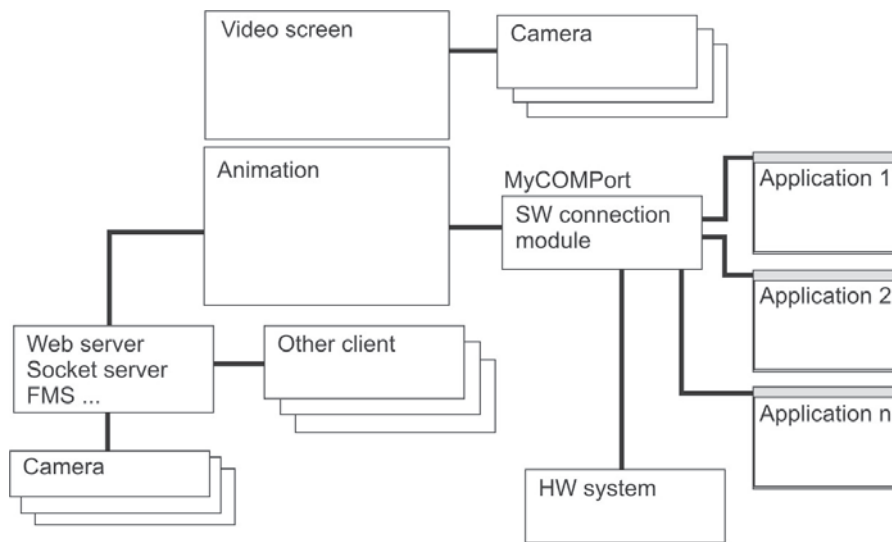

Figure 1.   Scheme of MyIMLE.

Flash animations communicate with connected hardware via a SW connection module MyCOMPort. This communication module makes possible a connection of more applications with COM port (for example an oscilloscope showing the progress of measured values, a module for writing into a database, etc.) Other applications can be for example a module for a joystick or a module realizing data collecting from the HW system. It is also possible to connect online cameras via Flash Media Server or via a PC client. It is possible to connect this system with a distant laboratory and, using a Socket server, to allow more users to control the application. Another possibility is to create multi-user online learning applications which can communicate with each other. There are many other possibilities and configurations – from a configuration without modules communicating with client PCs to full multimedia systems communicating with HW systems connected to client PCs. It is also possible to use animations and applications created for MyIMLE independently.

Flash and Interactive Whiteboards

"Flash is the only format which can bring motion into SMART Notebook applications" (Kyslinger, 2006). This is the truth not only for SMART Notebook, which is the software for interactive whiteboards SMART Board, but also for other types of interactive whiteboards. It is necessary to have Adobe Flash player installed in PC which is connected to the interactive whiteboard.

The Flash animation of the study support for an interactive whiteboard is being played in Adobe Flash player which is embedded into the environment of the interactive whiteboard using an option Control panels – Flash player. The scheme of the SWF animation in the environment of the interactive whiteboard is shown in the picture below.
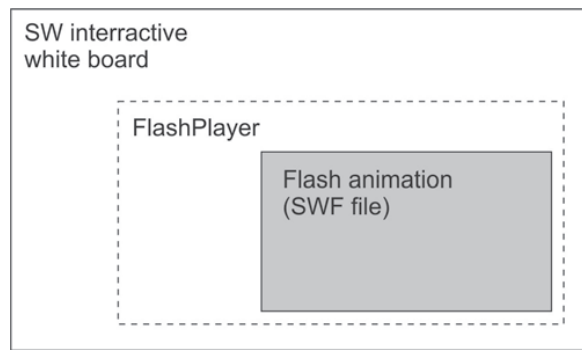
Figure 2.   **Scheme of a SWF animation in the environment of an interactive whiteboard.**

If we need to run more Flash animations on the interactive whiteboard at the same time, we need two instances of Flash player and each instance plays one SWF file (Flash animation).

MyIMLE interactive animation is not dependent on the environment in which it runs. The animation can run in the environment of an interactive whiteboard, it can be a part of a web page, or it can be published as a desktop application – it is also possible to combine all these options.
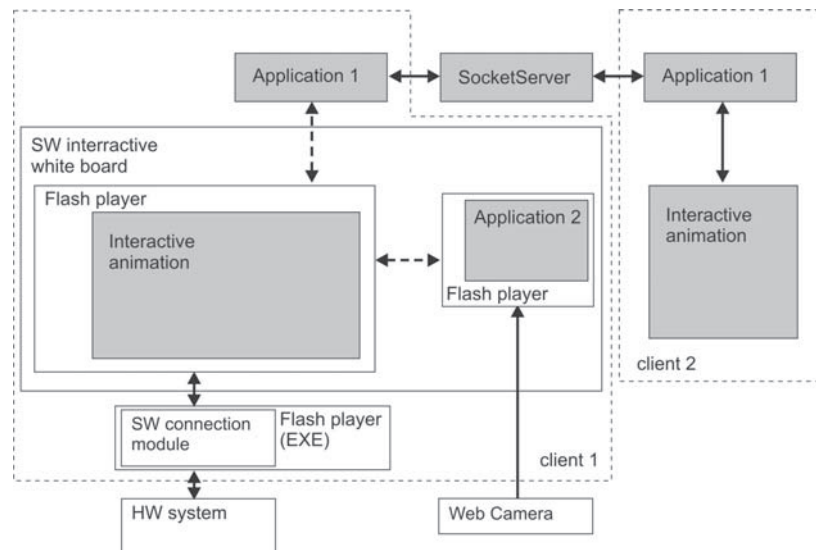

Figure 3.   **Scheme of MyIMLE cooperating with an interactive whiteboard.**

The possibilities of using MyIMLE together with an interactive whiteboard are shown in the picture above.

"Tsunami" Application for an Interactive Whiteboard

For better understanding, it is appropriate to demonstrate the cooperation of MyIMLE and an interactive whiteboard on a concrete application. The causes of tsunami are various – one of them is a landslide. A weight which slides on an oblique surface to an aquarium simulates the land. The size of the wave depends on the height from which the weight was dropped. The weight is controlled by the HW system and thanks to this it is possible to explain the mechanism of the wave step by step. The scheme of the whole system is in the picture below.
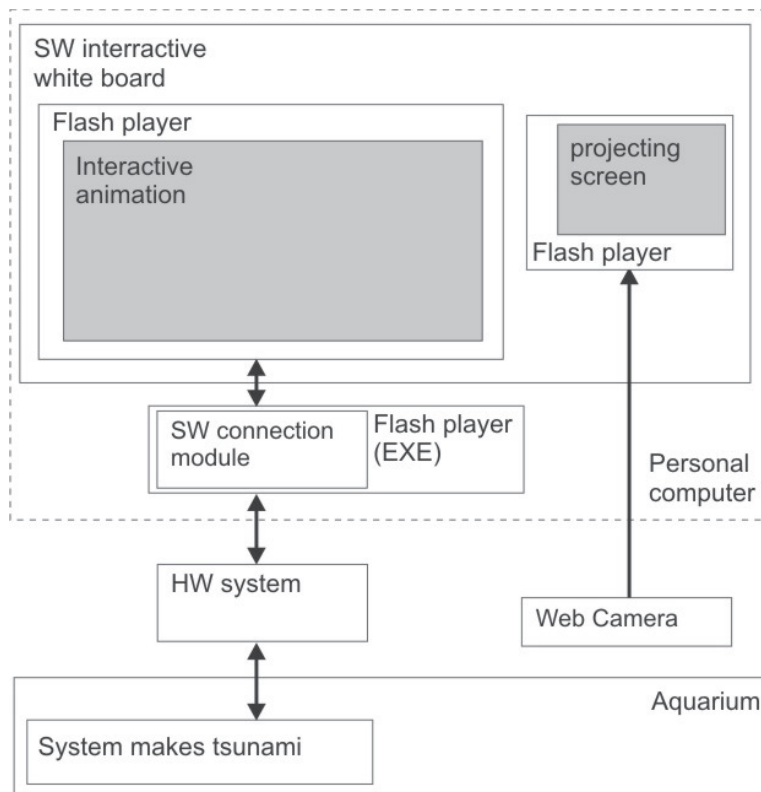
Figure 4.   **"Tsunami" application using MyIMLE.**

The software of an interactive whiteboard makes possible for a teacher to create quality study supports which can contain multimedia elements like video or audio. Even if we use many various videos or animations, the clearness won't be ever better than if we add a possibility of a real experiment. What a student see, what he can touch and try catches his attention and offers him a better understanding and remembering of important information. Therefore a direct extension of the study support of a real model improves this study support. These hypotheses are currently being verified on the study support describing causes, behavior and consequences of tsunami.

The interactive animation can very clearly describe the causes, behavior and consequences on the sea coast and boats caused by tsunami. It is possible to control the animation and divide it into smaller sequences which can be played separately. The animation is connected to the HW system, to an aquarium and to the system which creates tsunami. Everything is demonstrated on the model of an aquarium where it is possible to change the profile of the ground, the shape of the coats and where it is possible to use various models of boats and houses.

The HW system is realized by a single chip microcontroller and it can be connected to PC via USB, COM port or a Bluetooth device. Because the system is not expensive, it is available not only to schools, but also to students. The HW system contains in this case of "tsunami" application a PWN source of voltage, a 32-bit counter, four parallel inputs and four outputs. Nevertheless the configuration of the HW system can be various.

The software connection module is realized by an EXE file which is actually only a Flash player in which the SWF file runs. The function of the SWF file is to pass data between the interactive animation and the HW system. The interactive animation controls the HW system, and the HW system passes data to the interactive animation using this module.

It is possible to use a projector for students to have a better view on the model, nevertheless a projector is quite expensive and not all SW of interactive whiteboards can insert its image into the page displayed on the interactive whiteboard. Anyway Adobe Flash offers a cheap and still quality alternative – it is possible to use another Flash animation containing only the image from a web camera. The came-

ra is focused on the aquarium and a teacher can focus the camera only to the part of the model which is important for a better explanation of the current lesson topic, therefore the important details can be emphasized and the smaller details that would be probably missed by a student can be zoomed. Everything is also displayed in real time.

Conclusion

Interactive Flash animations improve the possibilities of explaining even very difficult phenomena (Stuchlíková, 2007). Using a video camera together with study supports can improve the clearness of explanation and students can focus their attention on important parts of a real experiment. The real model cooperating with an interactive animation brings a brand new dimension into study supports. The creation of these applications doesn't need a professional team – even creative teachers, who absolved a course of programming in Flash (extended of a part which explains working with the SWF connection module), are able to create these applications.

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