“SAVE”; Web based application for risk communication using Virtual Reality

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Introduction

Communication is an important consideration that should be addressed at each step of risk management process. [AS/N2S 4360] Rowan [1] has identified five possible goals of risk communication. Because of this multiplicity of purpose, different strategies of risk communication may be appropriate for different goals. Gonzalez and Wallsten [2] found that graphical methods of communication of numerical information seemed to yield fewer “preference reversals”. This paper presents a web-based application to combine different strategies to communicate to the mass using computer science technology especially Internet and Virtual Reality (VR). SAVE (*Survive in Avatar Virtual Earthquake*) developed as an interactive teaching/learning model shows complicated numerical analysis and earthquake concepts to the public using Virtual Reality in the case of earthquake. TODA bridge, as an example will be considered in which we can feel lateral vibration induced by pedestrian load in reality that is so rare in the world. Even though Tarnanas[3] developed a VR setting that tries to model some special population’s behavior in the time of earthquake but never studied to make the system to communicate to the public.

Analysis

EDABS an object oriented VC++ program based on DABS program can draw structure, related graphs and display vibration. Graphic output file is a metafile that can be converted into “.avi” using popular converter such as Thumbnail. To make “.avi” file, Merging Slides Method has been applied. Using EDABS, user can zoom and rotate different parts of structure. In the other hand risk analysis software give us necessary numerical result.

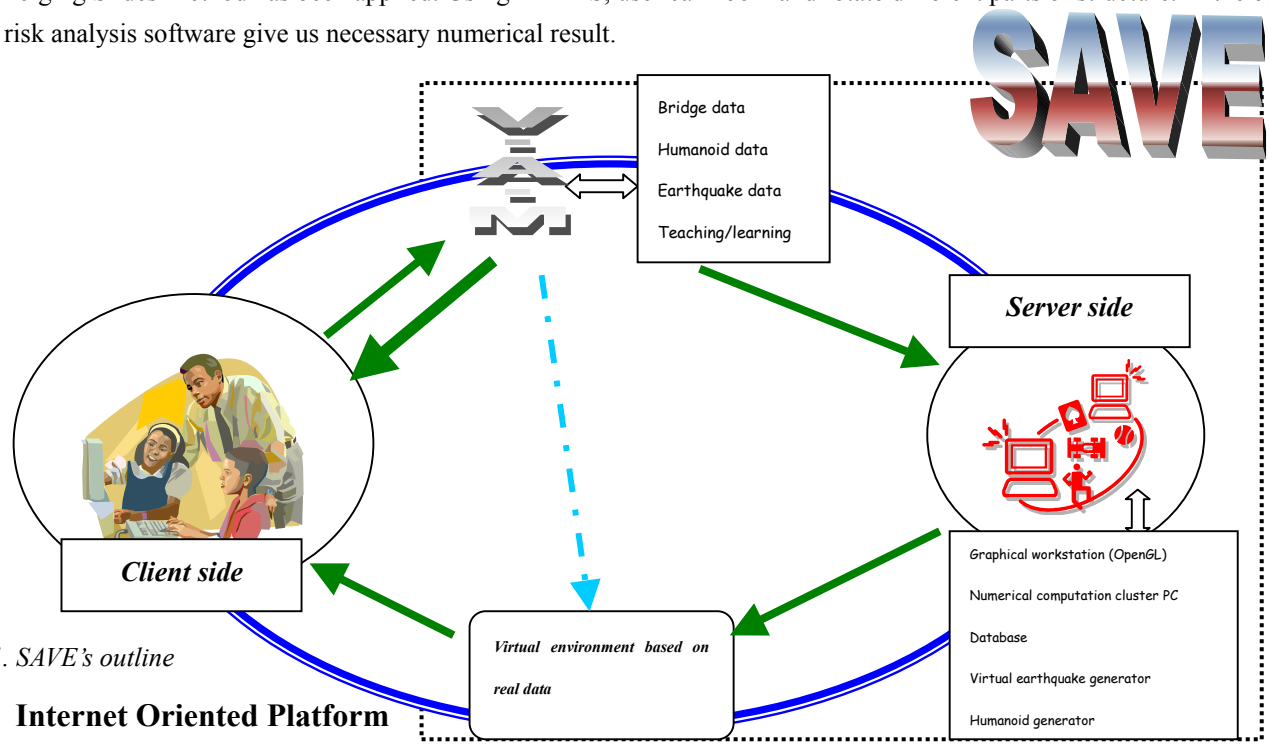

Fig 1. SAVE’s outline

Internet Oriented Platform

As the Internet tools of the information, communication, and computing technology revolution became integrated into the risk communication, the traditional classroom reliance on the lecture format becomes increasingly anachronistic. There are dozen to perhaps hundreds of accessible web sites that contain materials that maybe appropriate to the teaching of Risk.

However, ‘visiting’ web pages by pointing, clicking, reading and viewing can only engage the public superficially. SAVE’s server software can be linked to the other computer programs (called common gateway interface or CGI scripts) that create new documents ‘on the fly’ in response to remote requests from the user. Distributed Java ‘applets’ and scripts can empower

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the public with dynamic content within a web page. A Virtual Attractive Model (V.A.M) guides user to communicate to server as a virtual friend. V.A.M teaches to the user what's earthquake, VR, SAVE, how to cope in real earthquake and examines the user. Using user's answers (*post* method in *html form*), computation and image generating starts at server-side. Users can survive longer in virtual earthquake of SAVE according their ability to learn from and reply to V.A.M. *Compatibility*, *Flexibility* and *Simplicity* principles make it necessary to test SAVE under different platforms and OS such as Mac, PC, Win, Unix, IRIX.

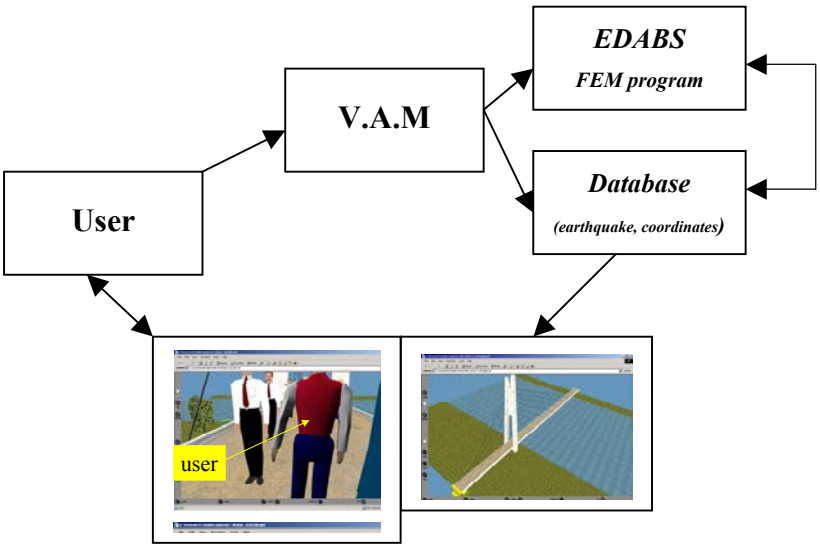

Fig 2. An example: TODA bridge in Saitama prefecture

Communication using Real Time Computer Graphic

VR is a strong tool that can help us to mitigate earthquake disaster by showing real data in a virtual and attractive world to the public. VRML (X3D) has opened new window to combine VR and Internet programming. SAVE starts to use VRML to show earthquake risk to the mass. Special player for SAVE prevents user confusion due to plug in players to the browser.

Create vibration and user's model in Virtual Reality

Due to the clock not match at the moment the vibration starts (Bob Crispen) especially in the torsion, deformation and vibration synchronism, standard codes of VRML are not able to make such a vibration. So a new *node* developed to make the vibration using extrusion an interpolation. Getting user's face picture, height, weight and using *body weight distribution factors* make user's model in SAVE. 2D picture is modified into 3D one to be compatible in VR world.

CAVE and SAVE

Although motion-tracking and key framing are useful in creating movements of characters and objects they cannot be used alone in VR. Because SAVE is interactive, the user is an integral part of it (as RPG). We can pre animate elements of the action but these elements have to be combined dynamically in response to the user. Creating this level of interaction is the most challenging aspect of CAVE animation. SAVE is compatible with CAVE (Cave Automatic Virtual Environment), can produce ".wrl" files and using CAVE converter ".atf" file can be produced and displayed.

Conclusion

Combination of different risk communication strategies was studied in the case of earthquake using VR and Internet programming. SAVE endeavors to show real numerical and probability information to the public in real time, and guides them how to survive in avatar virtual environment.

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