

Time Machine Oulu - Multichannel Augmented Reality

Jaakko Peltonen
Oulu, Finland
jaakko.peltonen@oulu.fi

Oulu is a city of technology, technopolis as they say, but only small number of the inhabitants know even some facts about its history. We have implemented a 'time-machine', that can represent the city in terms of past physical structures. A new dimension is also added, a database of Oulu containing not only buildings, but also all kinds of information and activities that has happened the city over the years such as fires. The material for the database was obtained from a fire-insurance company named Tarmo Oy. It was insuring most of the buildings in Oulu, and had material representing approximately 80% of the city. The insurance documents have been verified to be accurate. The characteristics for the city of Oulu in 18th and 19th century is quite unique for the region. The city was fairly large and major part of the houses were built from timber logs. The city was a vast number of small wooden 1 and 1 ½ story height buildings. The current database covers the years between two devastating fires in Oulu, 1822-1882. There are over 3500 buildings with more than 110 records at the most in the database. Soon the years 1882 to 1950, which is approximately the same time scale as the previous time period will be merged into the current database.

The interesting aspect to Time Machine Oulu is that it can provide different views according to the type of user. A researcher receives only the exact, academic view. That is, data that has been correctly validated. Researchers can update the information and add new buildings as well as other material. They can also access the original data which could be an original insurance map. Normal users receive views of the plain model, and are provided with less research orientated data. The other type of user is one that is interested in 'edutainment'. The user receives narrative descriptions to the levels and time periods, which can be used with their own imagination. Each of these different types of users demand robustness in the system and understanding of the type of client the user is using. The current system allows for browsing over the Web through an VRML compliant browser. We have had successful results using the system with a wireless LAN and a Pocket PC. In this sense, Time Machine Oulu is experimenting with what we term, Multichannel Augmented Reality, through the use of multiple different client types for examining the information in the database, as well as the possibility of been immersed in the actual world, and seeing a bygone era. The idea for using a 3D model came almost instantly when the material was started to gather. The main idea was to model a block of buildings as a stationary model, and create some still renderings and some high quality animations. It soon became apparent that the scope of the material was large and the shape of the city started to form out. Since the material and the data for each building was already in database, a natural extension was to model the city in 3D based on SQL queries. VRML was chosen and in combination with a

backend architecture of Apache, mySQL and PHP4. The first step was taken to enlarge the visual representation of historical town. The basic 3D model represents merely dimensions of object, materials, lights, animation objects and scripting are further levels.

Sharing the database to the Internet is somewhat straightforward procedure. Using VRML makes the site more dependent on the client connections, browser software, and ability to handle different constraints demanded by the client. Parameters include level of detail in the model, textures, other model features such as animations, client operating system, client hardware type, network throughput and user settings. VRML-generation for each client is different and the system is evolving constantly. Future work includes location based services where users can walk through Oulu, and visualize with their PDA, the environment in any time period. This will mean examining more issues around model optimizations, bandwidth and hybrid rendering algorithms.

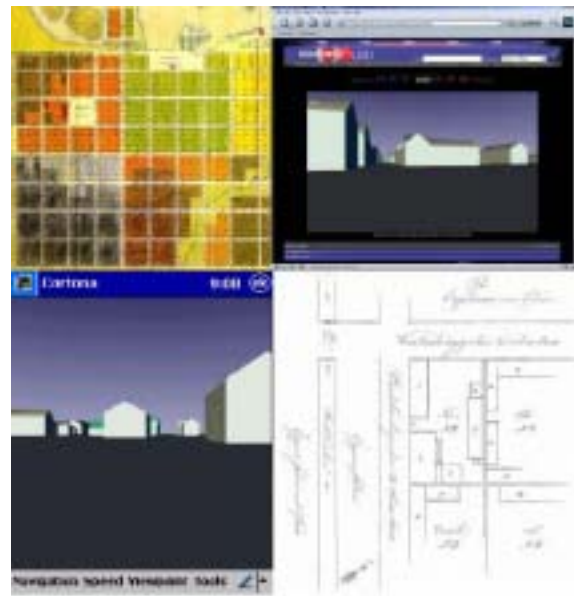


Figure: From top left moving clockwise. 1. Original insurance map of city. 2. PC based browser of VRML world generated from SQL query. 3. Original drawing from fire insurance register of a block. 4. Pocket PC browser of world over wireless LAN. For more information, visit the MediaTeam homepage on www.mediateam.oulu.fi