

# Towards Social Application and Sustainability of Digital Archives: The Case Study of 3D Visualization of Large-scale Documents of the Great Hanshin-Awaji Earthquake

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## Abstract

The present study is raising an issue of the method and possible ways to apply and increase the sustainability of digital archives for cultural heritage and social institutions. Advances in technology over the past decade enabled digital archiving of the large amount of data. Although digital archives deliver the vast amount of information, accessing key information remains difficult. Therefore, the present study offers a way to access key information in order to increase sustainability and social merit of digital archives. Our system is to be applied for visualizing key information related to Great East Japan Earthquake March 11, 2011.

We visualized the database of the great Hanshin-Awaji earthquake in 1997 that is created and published by the government of Japan, for the cases of the other great earthquake happened. The database included the information such

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as what happened in towns and local places at the time the earthquake struck and the timeline of events in each and every social sector. For the visualization, we utilized KACHINA CUBE (KC) system that is a web-based platform that allows us to store, plot and display information in three-dimensional space. Putting the data of the governmental database into KC system, we designed a KC output. It showed geographical 2D space map and time line on the vertical axis and the segmented information were plotted into the three-dimensional space.

With the KCs having and displaying the information of the database of the earthquake, we analyzed the mapped pattern of segmented information in each time period. In other words, where, when, and what types of information exists was visualized. As the results, we found that the information gathered into particular places, time, and topics whereas there was little information for some places, time and topics.

**Keywords:** digital archives, social application, sustainability, 3D visualization, Hanshin-Awaji earthquake

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# 數位典藏應用的社會效益與永續經營

## ——以阪神大地震資料 3D 視覺化為例

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### 摘要

本研究旨在探討如何針對文化遺產保存與社會機構等，找到應用數位典藏、與提升數位典藏永續性的可行方法。過去十年，由於科技發展，大量的資料得以進行數位典藏。然而，數位典藏雖然產出豐富的資料，但許多重要資訊仍然不易使用。本研究希望能開發出重要資訊的方法，以提高數位典藏的永續性與社會價值。我們希望未來能利用這套系統，將 2011 年 3 月 11 日東日本大震災的重要資料作視覺化呈現。

本研究以日本政府建置公布的 1997 年阪神大地震資料庫，作視覺化平台的試驗，未來將可作為其他震災資料視覺化的參考。此資料庫除記錄地震期間市鎮與地方的狀況，也以時間軸記載當時的社會事件。我們利用 KACHINA CUBE (KC) 網路平台，在立體空間中儲存、模擬、與顯示資料，我們將政府建置的阪神大地震資料庫輸入，利用所設計的輸出界面，結合 2D 地圖與時間縱軸，將一個個時間片段繪製在 3D 空間，使之視覺化呈現。

透過 KC 系統所展示地震庫的資料，我們可以進一步分析每一個時間片段的資料。由於每筆資訊的地點、時間與類型等都可以直接觀察到，我們可以發現，在某些特定地點、時間或主題上，資料特別集中；但對有些地點、時間與主題而言，資料卻很稀少。

**關鍵字：**數位典藏、社會應用、永續性、3D 視覺化、阪神大地震

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