INTRODUCTION

This concept shows a GUI design solution for the collaborative exploration of a scalable database of Chinese characters in an interactive 360° environment. The Interface structure is based on the following data information:

Amount of content:
1 Buddhist canon (digitized from wooden blocks)
1.504 texts
160,465 pages
52,000,000 glyphs
1 text includes 107 pages (34,674 glyphs)
1 page includes 324 glyphs arranged in 23 rows and 14 columns

Contextual information:
1,504 colophons with titles, translators, dates, places, and other information.
202 people names (translators, authors, compilers)
98 monastery names
The user interaction should be as directly as possible. Thus, the navigation device allows direct on-screen interaction. The HID in the form of a stylus, provides two different ways of interaction.

1. Projection wall interaction (long distance)
If the HID is used for interacting with the projection wall, it becomes a kind of (virtual) laser pointer. A beam enables interactions in a wide radius and distance, which makes it comfortable, efficient and fast to navigate in a large immersive information space.

1. Table interaction (short distance)
If the HID is used at one of the additional screen-tables, the HID becomes a writing device. The accuracy of the HID and DPI resolution of the screens are much higher here. Thus the screen tables are optimal for precise input actions like text writing.
Using computer based research tools for text analysis, data mining and information visualisation became a common procedure, and the Internet opened new possibilities of collaborative work flows. The aim of transferring virtual information back into a physical space is to fuse the advantages of computer based research with the benefits of a collaborative working environment in which scholars can share the same space and exchange thoughts face to face instead of working on separated desktops and screens.

The physical space turns into an information space that can be explored on multiple levels of detail. From statistical information on large volumes of written text, interconnections between authors, translators, dates places, till specific characteristics of a selected glyph.
By sending a search command, the sorting of the results is as important as the search itself. The main search menu combines elementary search and sort functions. Each search can be related and sorted in different contexts. For example, the search result of a character can be sorted by title as well as by people (author, translator), time, place or even character itself. Sorting the search result by time shows the characters in a linear time-based order, while sorting the same search by place will arrange the search results into places. Even if there is no specific place selected in the search, all characters will be arranged according to their places. By adding one or more places to the search, the result will show only characters that are related to this places.

This example shows a glyph search sorted by title. The search result will show all titles which are involving the characters.

This example shows a glyph search sorted by two selected titles. The search result will show the characters filtered by the selected title(s).

This example shows a glyph search filter by two titles and a time frame. Time is the activated sort mechanism, so the result will be sorted in a time-line manner.

This example shows a Glyph search sorted by time and filtered by title, people and place.
According to the huge amount of possible search result data, the visual representation of the result is divided into two sections. The first section shows the full result represented by abstract dots or lines. It gives a good overview on its distribution on time, space, or any other sorting criterion.

8,000 items in the X-axis and 208 items in the Y-axis can be displayed, giving a total amount of 8.640,000 objects. With this amount the search result can be visualized till the level of one page. For giving additional information on how many searched characters are placed each page, the luminance levels of the page representation will be used. By encoding the result into this three information dimensions, the whole result of one search can be displayed in real time in the 360° environment.

Section 2
From this result the user is able to select a partial sequence which is then displayed in form of real characters in the second section. 360 lines of 20 characters can be shown on this level (6400 characters). To be able to show as much results as possible, the alignment of the sorting grid becomes relative to the amount of data (avoiding gaps).
Additional information and modification of the final result can be archived by using contextual menus. A contextual menu appears in the final search result area (section 2) right beside the activated character.

Possible functions accessible via contextual menus:
- Show original glyph
- Show original page
- Show variations
- Show history

Standard functions accessible via contextual menus:
- Copy (copies a selected glyph into the HID, so the user is able to transfer it to a table)
- Send to table (send the selected glyph to a specific table for further investigation)
The image below shows the main GUI elements:

- Search/sort menu
- Search/sort result Selection shown in the detail
- Selected search/sort result (shown in content area)
- Content detail window
- Context menus
- Marked secondary

Other elements:
- Search/sort area
- Total results (diagram)
- Selected results (content)
- Marked search result
- Interactive tables
ADVANCED INFORMATION VISUALISATION

In a next step advanced multidimensional information visualisation can be used in section one and two to show additional information and relations between the variables of the selected content.
ADVANCED INFORMATION VISUALISATION

A data analysis based on artificial neural networks can lead to new, unexpected results. Hidden patterns in the data can be discovered and the system could be trained to search for specific characteristics. As the result is often very diverse at the first glance, it is helpful to translate it in a multidimensional data visualisation.
Aesthetics of different writing styles
An information visualisation can be also based on the stroke diameter and the drawing speed and angle. It could give an intuitive overview of changes in writing styles.
Top view

Top view example of a three dimensional visualisation along the edge of the 360° projection cylinder.
COLLABORATIVE EXPLORING

The systems allows multiple user interactions at the same time. Once the basic search parameters are defined, the result can be investigated by all participants simultaneously. As the users are sharing the same workspace on the 360° area, they can move a specific element to the interactive tables for using enhanced individual functions, writing notes or browsing additional information sources like the world wide web.