Digital Replay System (DRS)
Distinguishing features and functions

This document is intended to be read in conjunction with the 'Choosing a CAQDAS Package Working Paper' which provides a more general commentary of common CAQDAS functionality. This document does not provide an exhaustive account of all the features and functions provided by DRS but is designed to highlight some of its distinguishing elements. The Comment section at the end details our opinions on certain aspects of functionality and usability. See also Lewins & Silver (2007) *Using Software in Qualitative Research: A Step-by-Step Guide*, Sage Publications and software developer website.

Important note: *DRS is different from most of the other CAQDAS tools reviewed here as it is one outcome of an ongoing research project. It should therefore be seen as work in progress rather than a finished or commercial software product. DRS is however, a methodologically innovative software which addresses analytical requirements which other tools do not address. It is freely downloadable and if you do decide to give it a try the developers will be interested to hear of your experiences and will be responsive to your feedback. See our Comments at the end of this review for more info on potential implications of using DRS.*

Background

http://web.mac.com/andy.crabtree/NCeSS_Digital_Records_Node/Welcome.html

Based at the University of Nottingham, UK, DRS is developed by the Digital Records for E-Social Science (DreSS) Node as a research tool to exploit heterogeneous data. It is open source and freely downloadable. Underlying its development, structure and functioning is the concept of 'digital records', which comprises the 3 elements of i) traditional qualitative data, ii) systems logs and iii) time. It offers some familiar CAQDAS tools but is distinctive in allowing multiple and diverse records to be synchronised and played back simultaneously and in enabling the combination of systems logs with conventional qualitative data records.

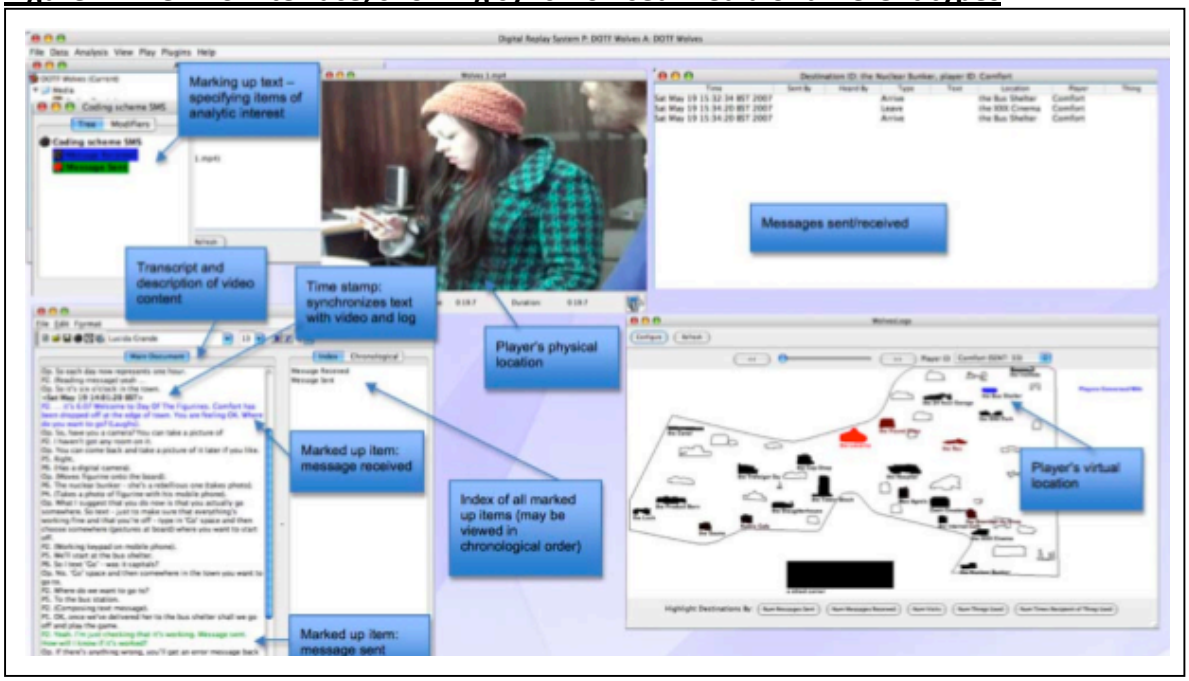
Minimum System Specifications (recommended by developer)

Windows XP or Mac OSX 10.4. (MS Vista not yet supported) • At least 1 gigabyte of RAM • Java JRE and QuickTime need to be installed on your computer • High screen resolution – 1290x1024 as absolute minimum

Philosophical underpinnings of DRS

DRS is one outcome of a research project to investigate how software tools can be developed to support the handling of heterogeneous digital data linked by time • Underlying the development and functioning of DRS are 3 core concepts: i) the need to handle diverse qualitative records simultaneously and synchronously; ii) the recognition that system logs which either automatically underlie digital data or can be generated by applying computational techniques to digital data contain valuable information which can illuminate an analysis; and iii) that both traditional qualitative data and system logs are generated within and over time and have a temporal relationship with one another • Through time-aligning and linking numerous multi-media datasets, DRS facilitates the analysis of patterns in the occurrence and co-occurrence of spoken and non-verbal (i.e. multimodal) features of discourse • This is undertaken with the aid of the DRS concordancer • This concordancing application is unique to the field of Corpus Linguistic research insofar as it is the first tool that fully enables the digital analysis of interaction across multiple modes of representation at, comparatively, current tools allow only for the analysis of data in a mono-modal, textual format • The concordancer allows the user to search for, annotate and interrogate particular words, phrases and/or coded episodes of behaviour within and across different streams (i.e. audio, video and textual records of discourse).

Figure 1. The DRS Interface, showing synchronised media of different types



Structure of work in DRS

DRS functions using an external database system whereby links are created and stored to files elsewhere on your computer or server • The project consists of 'analyses' which are sets of related resources • One project may have several analyses, perhaps to represent different phases of a longitudinal project, where different analytical perspectives are being used, or where several researchers are involved • An analysis can represent any aspect of a project, but media are usually temporally related as each analysis has a master time-line which can be associated with each media file. This enables full synchronization across diverse records • The Project Browser provides access to the main elements of the project: Media, Coding Schemes, People, Studies and Devices • Functions operate primarily from main menus or right mouse menus • Files and analytic functions are viewed through floating and resizable media viewers which are fully interactive with other views.

Data types and format in DRS

Textual Formats : Text only (txt), Html (htm, html). Transcripts for importation must be in rich text format (.rtf) • Multimedia formats : Digital video, sound and graphic files can be directly assigned to the project and treated in similar ways as textual formats • video formats : mpeg1, mpeg4, mov, avi • audio formats : mp3, wav • graphic formats : jpg, png, gif. • See developer information for complete list. • Computer generated system log-files can be imported using a wizard that allows the raw log-file to be filtered and rendered into a user specified format. Raw data in the form of media files, documents, system log files etc. are not altered by DRS but modified copies (for instance saved in different formats or structured with annotations) can be saved and exported.

Transcription tools in DRS

Versatile transcription options for audio and video files • Transcriptions can be created within DRS or imported if created in other transcription tools, including Transana • Transcripts are created and viewed in tabular format • Transcripts and audio-visual files are synchronized through timecodes.

Time-based synchronization and play-back of data in DRS

The concept and flexibility of the time-line view facilitates the visualization and analysis of the temporal relationship between data • Analyses and files can be assigned different start-times as relevant by which the temporal relationship between them is indicated • The ability to associate the same data files using separate time-lines in different analyses allows for different perceptions of time to be handled and compared • Flexible playback options for synchronized files within an analysis, allowing for the adjustment of the speed of playback, ranging from real time speed to frame-by-frame playback • User selected sections of the timeline may be looped, skipped and/or jumped forward and backwards according to fixed time intervals •

Closeness to data and interactivity in DRS

The ability to synchronize multiple records via the master timeline and subsequently view them simultaneously offers a holistic consideration of heterogeneous data not possible in other CAQDAS packages • The Track Viewer enables the concurrent visualization and play-back of associated files within an analysis • Four types of track can be visualized and manipulated simultaneously: Video, Audio, Transcriptions and Codings • The Layout of the Track Viewer can be customized by adding and removing tracks, clustering tracks and changing the time resolution (zooming) • The ability to create multiple analyses within the same project means media files can be differently synchronized for separate purposes

Annotation tools in DRS

The term 'annotation' is used in DRS to refer to free text comments, individual time-based segments of transcripts and fixed text codes • Any user-specified segment of the time-line can be annotated by text (free text) or codes (fixed text) through the track viewer and/or specific media viewers • Annotations can be viewed and organized together into annotation sets and can be subsequently treated as a form of media in their own right • There is full interactivity between the annotation viewer and other aspects of work and the parameters and content of annotations can be easily amended • Annotations can be both structured and freeform •

Coding schema in DRS

The coding schema can be as hierarchical or un-hierarchical as required. If hierarchical, the number of available levels can be specified • Several separate coding schemes can be created within each analysis if required • Coding schemes can be assigned 'timing types' to enable time-based coding • There are 4 'timing types', assigned according to the nature of the 'event' or the 'state', i.e. things that happen at particular times, such as a gesture or an action or for things that are always present or observable in some form but which may change from one form or value to another at particular times • The first timing time is for events with a variable duration, so events that have explicitly (separately) specified durations, these events do not overlap • The second type is for events with a nominal duration which do not overlap (i.e. events with durations that are specified in the coding scheme) • The third is for states with explicit switching, whereby each state continues until the next state starts (times of state changes are specified explicitly for this timing type) • The final type of timing is for states with periodic changes and 'untimed' events, in this case each state continues until the next state starts and changes to states are made at regular periods, as specified in the coding scheme • Codes can be assigned colour which is visible alongside the track viewer for easy visualisation of patterns of code application • Coding schema are stored at the level of the project, so those developed for the purposes of a particular analysis can subsequently be used across other analyses.

Coding Processes in DRS

Coding is performed in the track viewer • Codes have default and/or user-defined keyboard shortcuts for quick code assignation • Different codes cannot overlap one another within one coding track but multiple coding tracks can be created to enable concurrent coding or to record different types of coding • Coding tracks can be specifically associated with a particular media or be used across media

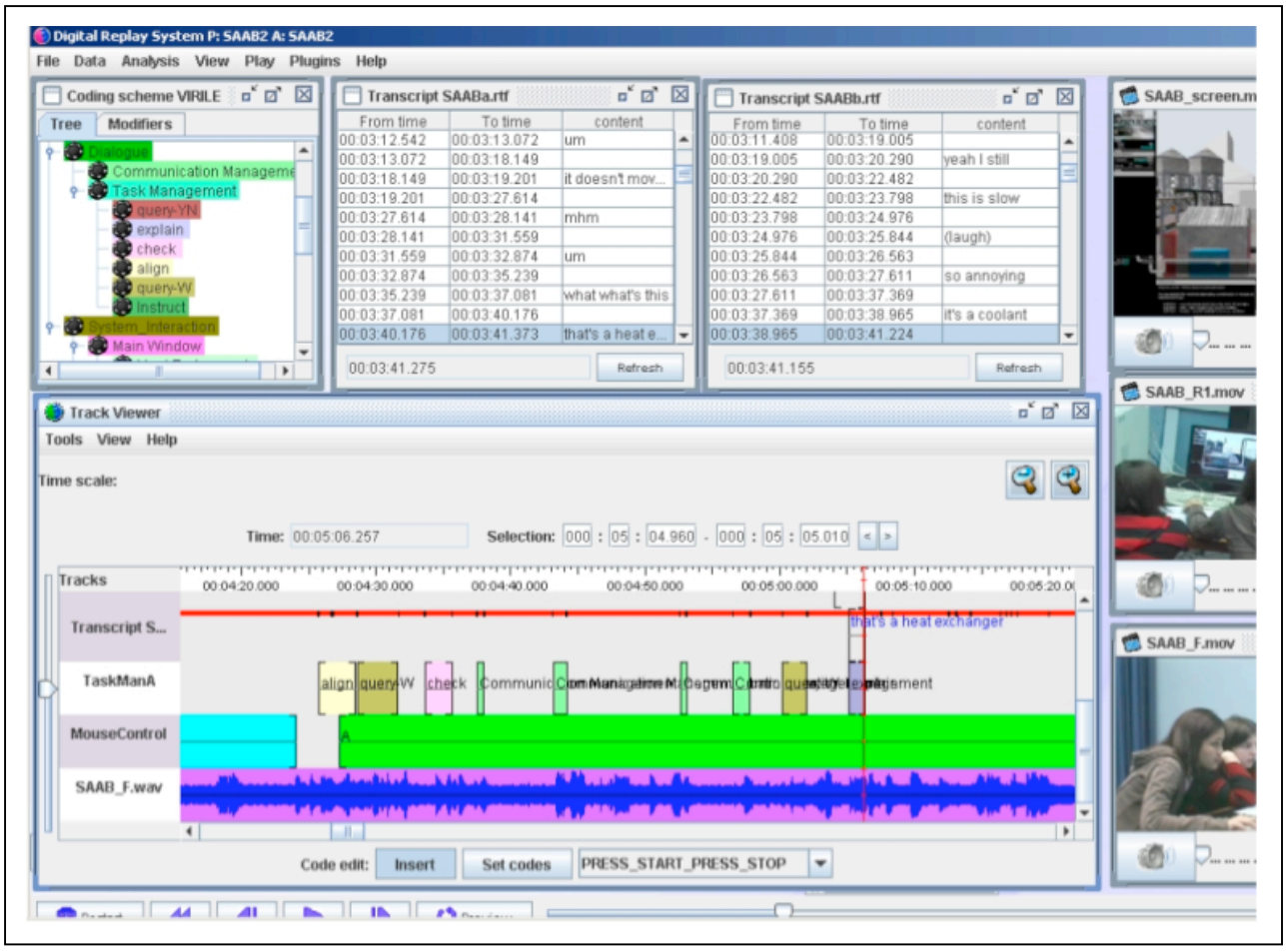
Basic Retrieval of coded data in DRS

Coding is initially viewed using the coding track(s), providing an overview of coding across the master timeline • The master time line and associated track views can be zoomed in and out to enable a holistic view, or to focus in on a particular time-frame • The Concordance tool searches for intersections of user-specified text (in annotations or transcriptions) with applied codes and provides results in tabular format. Results tables are fully interactive with track viewers for internal play-back purposes, and can be exported to spreadsheet applications for further statistical analysis.

Data organization in DRS

Metadata concerning data and respondents can be noted by creating 'people' and recording known characteristics, however, this function is currently essentially a note-taking device rather than being functional in terms of retrieval options • The Devices area similarly allows for additional auxiliary information about the project to be recorded, but the database cannot be searched according to such information

Figure 2. The Coding Scheme and Coding Track in DRS, Linked with multiple video sources



Writing tools in DRS

Researchers keep track of practical and analytic research processes in free text annotations or by creating transcripts which can act as memos • Both can be integrated with other aspects of work through means of coding or annotating

Searching and interrogating the database in DRS

Coded annotation sets can be interrogated using the Concordance Tool • Search for strings, phrases and other lexical tags in data and codes across the whole project – i.e. not just the current analysis • Tabular view of results providing information on the time at which each find occurs, the media from which it is derived and the surrounding textual context • Full interactivity between the tabular concordance results window and the source data

Linking devices in DRS

There are currently no linking devices in DRS equivalent to those discussed in relation to other CAQDAS packages in this set of reviews.

Mapping tools in DRS

There are currently no mapping tools in DRS equivalent to those discussed in relation to other CAQDAS packages in this set of reviews.

Output in DRS

Export of structured coding for further analysis ranging from simple data files to complex databases • Multiple related annotation sets (coding tracks and/or transcripts) can be exported via the Export Processor • This type of output is presented as a user configurable matrix containing text, code and time information which can be subsequently manipulated in a spreadsheet application such as Excel or SPSS • The content of tabular output can be specified in a variety of ways including the export of transcriptions with annotations • Documents and transcriptions can be exported with annotation timing information.

Team-working in DRS

It is not currently possible for individual researchers to work on the same project concurrently or for separate projects to be merged.

Current and future developments in DRS

The Research and Development team are currently working on a number of additional functions which will enhance the software. These include graphing tools and specific data visualisation tools (including geographical maps to visualise GPS data), structured metadata utilities (for organising, coding and interrogating records) as well as tools for capturing and replaying data 'in the field'.

Comments on DRS

DRS is work-in progress *and users should ensure they keep up-to-date with software updates. The developers are keen to receive feedback from pioneer users and web-based communication between users and developers is provided through a Facebook account*

DRS includes a number of features not currently provided by any other CAQDAS package. *The development team have provided a tool which fills an important gap in the CAQDAS field, and provides*

the opportunity to conduct hitherto unfeasible analysis. Of particular note are the flexibility of the time-based synchronization, the simultaneous play-back of multiple data records and the innovative handling of systems logs. Researchers with any type of heterogeneous data, analyzing interactions or interested in non-verbal communication should consider DRS

***DRS is one of very few dual-platform CAQDAS packages**. MAC users are not generally well-served in this field and it is therefore welcome that DRS is being developed for both MAC and PC users concurrently.*

DRS is free and open source and therefore extensible.

***Some of the terminology used in DRS has very different meanings** from the same terms used in other CAQDAS packages, so users familiar with other packages may need to take care in making assumptions about how certain tools function.*

Further Reading

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