his chapter explores digital media and computer software that contribute to anthropological research and exposition. Its goal is to describe how social scientists can use these media to collaborate with community partners. The collaborations described take place in the field, as face-to-face individuals share media and work together with computers. Since this chapter focuses on elementary forms of media, it only takes a quick glance at online collaborations between distant allies.

Because of the Internet, interactive media have become ubiquitous, but few anthropologists use it in their research or publications. Personal and transpersonal factors account for this: the first group of factors includes the difficulties of mastering digital media and the necessity for a visual anthropologist to have both artistic and social scientific skills; the second includes the paucity of graduate programs, the lack of professional venues, and the skepticism of academia toward all media except text.

Until recently, the criteria used by departmental committees for hiring, retention, and tenure in anthropology had rarely included the production of nonprint and digital media as significant professional contributions. In 2002, however, official acknowledgment of that significance was published by the Executive Board of the AAA (American Anthropological Association 2002), and the development has helped many individuals advance their careers. Nevertheless, many disincentives to media production still exist and make most time-stretched academics fearful of taking the digital plunge.

Yet, with encouragement from the Society for Visual Anthropology, the Commission on Visual Anthropology, the Nordic Anthropological Film Association and related organizations around the world, many social scientists now do engage in digital visual production. Those who practice applied and action research, who work with nonliterate peoples, and who use media in social justice campaigns understand the importance of communicating with the public, and they take the digital revolution seriously (Pink 2006).

In the following, I introduce software that can be used by visual anthropologists for community action research. I do not discuss interactive media, that in which user input accesses text, graphics, and movies as a part of designed instruction. My concern is software that brings digital media up only to the
Hi! This is Tom. He's a r...of mine. Tom, the...ople ... have ask...how ...
first stage of interactivity. The software I discuss creates subtitles and attaches them to digital media, allows the media to be edited and reviewed, and facilitates qualitative and statistical research. Media that are studied and enriched with elementary software can later become part of complex interactive learning environments (Biella 2007, this volume).

In the following, I evaluate ten software applications (Table 15.1). Eight of them are available for both Macintosh and Windows computer platforms. The two Mac-only programs, iMovie and Final Cut Pro, are used to edit digital video, and they have close equivalents in Windows. Seven of the applications (Word, QuickTime, InqScribe, iMovie, Final Cut Pro, Magpie Pro, and Transana) are particularly useful in the creation of synchronous transcriptions, translations, subtitles, and annotations. Five (Octopz, Final Cut Pro, FileMaker Pro, Transana, and HyperResearch) facilitate the description and coding of audiovisuals and the inclusion of digital media in archives and databases.

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I evaluate the ten applications in terms of six attributes: cost of software, learning curve, ease of use, types of research facilitated, special advantages, and special disadvantages.

I conclude the chapter with some philosophical reflections on the impact of digital media on research, teaching, and collaboration in visual anthropology.

MICROSOFT WORD:
SOFTWARE FOR TRANSCRIPTION, TRANSLATION, AND ANNOTATION

Research in visual anthropology is enhanced by the synchronization of text-based and time-based media. Good transcriptions are essential for anthropological collaborations, linguistic research, and language preservation. They improve the accuracy of translations and are also needed by film editors. Translations in the form of movie subtitles are invaluable for working drafts and finished films.

Digital transcriptions can be created in many ways, but the simplest is to juxtapose two applications, a word processor and a movie player, on a single computer screen.
In Figure 15.1, a Microsoft Word document is open next to Apple's QuickTime Player. With the Word file and movie player side by side, a transcriber (or translator or annotator) may skip back and forth between the two, listening, typing, and listening again. In this process, the video timecode should be typed in often so that the audio track and transcribed words can frequently be synchronized.

The Word and QuickTime movie documents are kept open side by side on screen.
Listening repeatedly to the video, a transcription emerges with timecode (accurate to the second), and speakers' names preceding their words.

QuickTime's timecode is visible here.

The movie may be played, and moved in Forward and Reverse by clicking the controls or sliding the Scrubber.

**COST OF SOFTWARE**

Academics own word processing software, and computers are bundled with QuickTime Player or its Windows equivalent. The simple transcription technique proposed here therefore adds no cost to the budget.

Nevertheless, this and the other techniques I describe for field collaboration are most feasible with a laptop computer, which cost as much as $3,000. They also require electricity. When a power grid is not available, a truck battery can be made to run a computer.

**LEARNING CURVE/EASE OF USE**

Word and QuickTime Player do not require special training, but their use in the creation of subtitles is not ideal. To type, stop the video, type again, and play the video again. The transcriber's fingers must constantly lose and find their place on the keyboard whenever a mouse click is needed to Play or Pause the video. This movement is fatiguing, and it slows down the work.

**TYPES OF RESEARCH FACILITATED**

Many groups benefit from transcriptions and translations: collaborators in filmmaking, focus groups that discuss applied film strategies, and anthropologists who research and annotate films. A printed transcript with timecode provides rapid nonlinear access to information about a film, lets everyone "stay on the same page," and offers the surface of the page for ideas to be jotted down as aide mémoire.

Depending on the type or stage of the research, transcribers will want to vary the accuracy of their work. Some jobs do not require frame accuracy,
FIGURE 15.2. A presentation created in Microsoft Word, including image, transcript, timecode, and data-codes. To test software for this chapter, I conducted a microanalysis of glances from a tongue-in-cheek video interview I filmed at a wedding. I gave the eye movement “events” code names such as GT (“George and Tom glance at each other”) and TF (“Tom stares at the filmmaker”).

perfect timecodes, or verbatim transcriptions. In early periods of fieldwork, a rapidly completed, rough translation (like a “slop track” in an early version of a film) or a macro-level, first-pass job of data-coding may be all that collaborators require. When research goals are ultimately clarified, though, precise translations and frame-accurate coding are often needed.

SPECIAL ADVANTAGES
The Word-QuickTime Player technique for transcription has no learning curve and the software it requires is essentially free. Once timecode, transcription, translation, and data-codes have been typed, they can be exported to XML or printed out in a multicolumn table. I have found the design of the table in Figure 15.2 particularly useful. Its still images were produced with QuickTime Pro (using the “Export > Movie to Picture” option), and the table itself was made with Word’s “Insert > Table” option.

A hard copy transcript, whether or not as complex as that shown in Figure 15.2, is invaluable to film collaborators. Transcripts typed in Word are also valuable because they can be converted into digital subtitles.

SPECIAL DISADVANTAGES
One disadvantage of the Word-QuickTime Player technique of transcription is that the player displays a timecode that is only accurate to the second. Many kinds of visual coding, including professional subtitling, must be accurate to \( \frac{1}{30} \) of a second, a single video frame. A second disadvantage of this technique is that it requires the typist’s fingers constantly to lose their place. Moreover, this technique does not offer the transcriber an auto-backwind function. Backwind increases accuracy by allowing the typist to hear for a second time the
last few words of the audio that was just played and transcribed. Solutions to these three problems are provided by other software options such as InqScribe and Transana, described below.

**QUICKTIME PRO: BASIC DIGITAL VIDEO SOFTWARE**

This movie-manipulating application is part of the Macintosh operating system and is the foundation of Apple's digital media. A version of the free QuickTime Player is also available for Windows.

Apple suggests a technique by which QuickTime Pro can be used to insert subtitles into digital movies. It is not a good technique, but I discuss it because if I didn't, people would wonder why I didn't, and because I want to show why another option, InqScribe, is better.

**COST OF SOFTWARE**

Although QuickTime Player comes with the Macintosh operating system, QuickTime Pro, an upgrade that is necessary for the techniques described here, costs under $50.2 Only the Pro version can create movie subtitles and export to still images and other file types. Apple has arranged matters so that each time QuickTime Player is upgraded for free, the new version of QuickTime Pro must be purchased.

**LEARNING CURVE**

To master this technique, I needed several hours of trial and error and had to make repeated references to Apple’s QuickTime 7 User’s Guide (2005).

**EASE OF USE**

QuickTime Pro creates subtitles in a prohibitively difficult way. Subtitle text files must be moved several times between Word and QuickTime, and the accuracy of the timecode numbers typed into the text can only be achieved through guesswork, trial, and error. The possibility of making typographical errors is great, too, because the timecode numbers that must be changed are embedded within other incomprehensible data (Figure 15.3).

**TYPES OF RESEARCH FACILITATED**

Just as printed transcripts are valuable for collaborators, subtitled translations benefit a video project team or focus group when members do not all speak the language on the tape. Subtitles need not be translations. Movies can be annotated in other ways to sensitize viewers to nonverbal movements or provide synchronous counterpoint to the action. Subtitled movies, originally made for an applied purpose, often end up in other research contexts, in the classroom, or on TV.

**SPECIAL ADVANTAGES/SPECIAL DISADVANTAGES**

QuickTime Pro is a necessary complement to the visual anthropologist’s toolkit because it is the foundation of Mac-based multimedia. It can perform basic editing tasks, export video and video stills, and translate file formats. It is not a good choice for making subtitles.

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1. To purchase or acquire evaluation copies of the applications discussed in this essay, see "Electronic References Cited" below. Prices and software descriptions reflect the state-of-the-art in May 2007. Up-to-date information about Mac and Windows applications is available at the VersionTracker Web site.
In Word, the transcript is typed and saved, then opened as a text file within QuickTime, as shown here. Next it is exported from QuickTime in the “Text to Text” mode, to be reopened in Word with the results shown here. At this point, the correct durations for each title are typed in. The Word file is then resaved and reopened in QuickTime. Finally, the QuickTime text and movie files are merged.

**FIGURE 15.3.** The insertion of subtitles using Word and QuickTime Pro: at the stage of the process represented here, the Word file displays a confusing excess of computer code.

**INQSCRIBE: SOFTWARE FOR DIGITAL TRANSCRIPTION AND ANNOTATION**

The most elegant software I have found for making transcripts and transforming them into subtitles is InqScribe. I have a special affinity for this program because my own work with digital media required me to create an application that did the same job, and I’ve used mine diligently for ten years. InqScribe, though, is simpler and more versatile than the program I created.

**COST OF SOFTWARE**

Available for a free one-month trial, InqScribe has an academic price of less than $100, and less than $50 for students. It requires QuickTime Pro, approximately $30. I also recommend the optional foot pedal. Sylvan Software sells one for less than $100.

**LEARNING CURVE**

The basic technique of InqScribe requires only an hour to learn: the user loads the digital movie, listens to it a phrase at a time, types each phrase, and, in the process, breaks the transcript up into subtitles with in- and out-point time-codes. The process is intuitive. The application, however, also includes many valuable nonintuitive keyboard shortcuts and options. A second hour with the manual is therefore advisable.

**EASE OF USE**

Accurate transcription is tedious under the best conditions, but InqScribe makes it tolerable. Use of the foot pedal or the tab key causes the video to Pause, Start, and Backwind while allowing the transcriber’s fingers to keep their places on the keyboard. Accurate assignment of subtitles is made possible by inching the video forward and back, a frame at a time. Like Fast Forward and Rewind, frame-by-frame movement may be controlled with keyboard commands or on-screen
buttons. InqScribe’s playback speed can be set to match typing speed, and the duration of the Backwind can also be set to preference.

As shown in Figure 15.4, the “Snippets” keyboard shortcuts can either be clicked or activated with a keystroke to load speakers’ names, data-codes, and keywords into the transcript.

FIGURE 15.4. The InqScribe interface with a timecoded transcript: at the right of the screen are “Snippets” and “Shortcuts,” codes and keywords that may be inserted into the transcript with a keystroke or mouse click; overlaid at the bottom of the screen is a QuickTime movie window displaying an InqScribe subtitle.

TYPES OF RESEARCH FACILITATED
InqScribè can benefit collaborative research and filmmaking projects, focus groups, and any other screening venues that need transcripts, subtitled translations, or the synchronization of annotations with audio or video.

SPECIAL ADVANTAGES
A simple keystroke gives the InqScribe subtitles their in- and out-point timecodes (Figure 15.4). Once a timecode number appears in the transcript, it becomes hot text, which, when clicked, causes the video to begin playback at the numbered frame. This feedback and the frame-accurate video controls help correct the timing and accuracy of subtitles. Accuracy can also be checked in drafts of the subtitled QuickTime movie (see bottom of Figure 15.4) effortlessly generated by InqScribe.

Occasionally, new sections of video need to be inserted into footage that has already been transcribed. In order to correct for the fact that the inserted media will displace the timecode numbers of subtitled media subsequent to it,
InQsribe has a feature that adjusts all timecodes subsequent to the insertion point by the required amount.

Transcript data may be searched within the InQsribe application. They may also be exported in a number of formats, including HTML and XML, standard for statistical applications. Of particular convenience to filmmakers, InQsribe's subtitles are also exportable in a format ready to use by Final Cut Pro.

**SPECIAL DISADVANTAGES**

I have not found anything in InQsribe that I don't like or find unnecessary. The program would be even more useful if it had a playback mode in which lines of the transcript were highlighted sequentially as the audio played back. InQsribe would also be more useful if it had a waveform timeline. It is easier to place the first frame of a subtitle in synchrony with the image of a sound than with sound itself. Transana has these two features and they help to ensure the accuracy of a transcript and the best placement of subtitles.

**IMOVIE: SOFTWARE FOR BASIC DIGITIZING, EDITING, AND SUBTITLING**

iMovie and its no-frills Windows equivalents offer simple video editing and playback and satisfy many collaborative needs. Because these programs are easy to learn and relatively foolproof, they can easily be taught to research associates. iMovie would certainly have thrilled Robert Flaherty, the first visual ethnographer who in the 1920s so valued feedback from his Inuit collaborators that he hand-developed his own 35mm movie film in the Arctic (Calder-Marshall 1966).

**COST OF SOFTWARE**

Since iMovie comes with the Mac operating system, and Windows' Movie Maker may be downloaded for free, they do not add expense to a project. Digital video editing, though, does require other costly peripherals—at minimum, a video player or camera (from $500 to many thousands of dollars) and an external hard drive ($100 and up).

**LEARNING CURVE/EASE OF USE**

iMovie is made for beginning filmmakers and is easily mastered. In its Record mode, iMovie accepts digital input from a camcorder and can control the camera's playback with on-screen buttons for Pause, Stop, and Fast wind. iMovie can also capture VHS and DVD video input, though less conveniently.

Using iMovie's Edit mode, beginners can learn to cut picture and sound in only a few hours (Figure 15.5). Creating subtitles from scratch is complicated, but mastery of iMovie's technique took me no more than an hour. (InQsribe's technique is superior, however.)

**TYPES OF RESEARCH FACILITATED**

Consumer-grade software like iMovie is useful in the field because it can trim down lengths of raw footage into short, representative clips. iMovie's simple edits are useful, too, in planning collaborative video projects, since even rough edits give collaborators a good idea of project achievements and future needs.
SPECIAL ADVANTAGES
Whereas movie film is physically cut in the editing process, digital editing is "non-destructive": this means that the original video files always remain whole and intact on the hard drive regardless of how much they have been digitally edited. iMovie is easy to learn and its nondestructive editing allows alternative versions to be produced by different members of a team. For that reason, it nurtures rich discussion of filmmaking strategies and encourages the focus onemic perspectives. As I suggest later, this fact has important philosophical and practical implications.

iMovie has several export options. It can create movie files that are small enough for the Web or sharp (hence big) enough for DVDs.

SPECIAL DISADVANTAGES
No-frills digital editing programs do not allow frame-accurate cutting or complex sound mixes. (This is no doubt intended to encourage consumers to buy expensive software.) Moreover, in editing, these applications have only one opportunity for "undo." This means that a keyboard or mouse decision must immediately be reversed before the next decision makes the previous one permanent. (Cuts and undos pertain to iMovie timelines only: they do not alter the original video files, because only copies of them exist in the timeline. Final Cut Pro offers up to ninety-nine levels of "undo.") Low-end programs also lack an exportable edit decision list (EDL), the foundation of professional-grade Final Cut, Avid, and Premier editing.

FINAL CUT PRO: SOFTWARE FOR PROFESSIONAL DIGITAL VIDEO EDITING
This Macintosh-only professional video editing program is probably used by the majority of shallow-pocketed independent filmmakers. Final Cut Pro (FCP)
allows frame-accurate editing and subtitle placement, multiple audio tracks, audio sweetening, sophisticated color correction, and enough tools, options, effects, and tricks to fill a 720-page manual (Brenneis 2007).

COST OF SOFTWARE
The academic price for the Final Cut Studio suite of applications, with tutorials and manual, is under $600. I add the reminder that the laptop Macintosh computer needed to run this application to its best advantage has a price near $3,000. Like iMovie, Final Cut and its competitors, Premier and Avid, require an external hard drive; a terabyte of hard drive storage, now the expected amount, costs about $400. Back-up copies of the edit decision list should be stored not only on an external drive but also on a second removable medium such as a Flash key ($10 and up) or CD (25¢).

LEARNING CURVE
When I started to learn FCP, I had ten years’ experience in film and analog video editing, but I only began to feel at ease with the digital controls after several weeks of practice. Even experienced editors keep the manual nearby. A friend told me that he is still learning shortcuts after several years of using the program every day.

Unlike iMovie, Final Cut offers many complexities, and it permits many editing styles. Heavy with icons, folders, and options, Final Cut accepts media in a dozen digital formats, accepts many input sources and compressions, and can export video to many different file types. Little mistakes cause big problems in Final Cut, and Final Cut offers many chances to make little mistakes.

EASE OF USE
At least three different ways can be found to do anything in Final Cut Pro. This embarras de riches is confusing to beginners and useful for advanced editors.

The design of the application, like that of the first digital editing program, Avid, allows digital editors to think like—but work more conveniently than—the film and analog video editors who preceded them. The lower half of the FCP interface, as laid out in Figure 15.6, is dedicated to a Timeline with a waveform sound track across the very bottom and two video timelines above it. The Browser, in the upper left, stores icons for sequences, bins, and media clips. To its right are two video editing windows. This two-window configuration is the grandchild of two-screen flatbed editing machines that have been used to cut film for more than eighty years. The design is therefore intuitive to earlier generations of film editors.

TYPES OF RESEARCH FACILITATED
Anything iMovie does, Final Cut can do better. The kinds of research facilitated by iMovie’s roughly hewn productions are also achievable, with more elegance, in FCP.

SPECIAL ADVANTAGES
The learning curve is steep, but mastery of a professional editing program offers many advantages to digital visual anthropologists. Its frame-accurate, nondestructive editing tools—Slip, Slide, Ripple, and Roll—arouse speechless
In the Browser window, each of the subtitles generated in Final Cut are listed as separate, numbered clips. The video of the interview is itself just another clip.

The Viewer window allows each clip to be shown, independent of its place in the movie and in its original length, before any trimming. Subtitles may also be generated in the Viewer window, as shown.

The Canvas window plays back the current edit, as organized in the Timeline.

Also on screen is the Timeline, with a waveform audio track and two picture tracks, one for video, one for subtitles.

admiration in those of us who still sometimes wake up sweating from the memory of destructive splicing tape and analog edits. Among its other wonders, Final Cut has the capacity to magnify and isolate small portions of the video for special emphasis. It can create slow and fast motion, useful for certain kinds of empirical research. Final Cut can throw portions of the moving image out of focus, allowing anonymity that can circumvent some ethical difficulties. In the blink of an eye, it creates the subtitles for which 16mm film editors once paid a fortune and waited a week or more to discover were out of sync. The most recent release of Final Cut Pro offers subtle color correction and state-of-the-art audio manipulation.

Multiple versions of the same scene or scenes can be stored as different "sequences" in the Browser. Final Cut can also export its edit decision list to other computers, allowing collaborators to edit similar but different versions. The exportable EDL also allows an almost-finished movie to be tweaked to perfection in an online editing house.

Finally, like database applications described below (and in some ways better than those applications), Final Cut can tag film clips with keywords. The clips may then be searched, and the icons of the found clips are presented together...
in the Browser. This is very convenient for editing, though it does oblige editors to be somewhat scrupulous when keywording. It also gives viewers a convenient means to review editing options, as when members of a focus group wish to see several alternate takes of the same shot.

SPECIAL DISADVANTAGES
Final Cut comes at a price—at several prices. The software is expensive and is difficult to learn. Recent versions are not backwards compatible: timelines created on the new software cannot be used on the old. This obsolescence, obviously planned by Apple, is inconvenient for the user and exhibits avarice on the part of the manufacturer. One might say, too, that Final Cut Pro is habit-forming. Each new version, marginally differentiated from the last, offers new features that consumption-bewitched filmmakers are persuaded they must own. Academics, who ought to be saving their modest discretionary incomes for retirement, instead drop them on “HD” or “Studio” or “USB” or “OSX” or whatever costly new gadget Apple whispers to them is wonderful and then ultimately forces them to buy.

MAGPIE PRO: SOFTWARE USEFUL IN THE ANALYSIS OF SYNCHRONOUS VERBAL AND NONVERBAL COMMUNICATION

One application stands out as best for research in kinesics and other multicorrelate phenomena; it is particularly appropriate for research that needs statistical analysis. Magpie Pro software, sold by Third Wish (not to be confused with MAGpie freeware, distributed by WGBH), allows each frame of image to be synchronized against its waveform sound track as well as its text data-codes (Figure 15.7).

Magpie Pro facilitates the type of animation called rotoscope that was used in Disney classics. In the rotoscope technique, an animator begins with a sync-sound live-action movie and then traces or draws each frame of picture. Magpie provides the platform for tracing. It thus not only serves animators but also provides social scientists with an excellent platform for the study of synchronized gesture and speech.

COST OF SOFTWARE
Magpie Pro’s single-user license is $250. Educational institutions are eligible for a 50 percent discount on volume licenses.

LEARNING CURVE/EASE OF USE
Many of this software’s subtleties are irrelevant for the gesture research suggested here. Still, gaining a rudimentary understanding of the application (which necessitates learning which subtleties to ignore) took me several hours with constant references to the manual.

TYPES OF RESEARCH FACILITATED
Magpie Pro’s digital synchronization of sound waveform with image frame makes gestural research much easier and more precise than was possible with the use of analog video or film. The researcher can create multiple “panes” in the Timeline,
Magpie Pro’s juxtaposition of a sound waveform with individual frames of video picture facilitates research into the synchrony of voice and nonverbal expression.

In this example, at frame number 609, Tom’s utterance of the /k/ phoneme in the word *kind*...

...is synchronous with the “TU,” “Tom’s Unique” gesture, the first frame of his wink.

Each one to house a different kind of data. In Figure 15.7, the transcription of the *Eyecontact* interview appears in the first timeline pane beneath the waveform. Below that is a second pane for eye-movement codes: GA (“George Looks Away”), TP (“Tom Looks at His Pal”), and the rest. Another pane could be created to track different features, perhaps using symbols for Labanotation.

MagPie creates exportable XML tables of its data panes correlated against frame numbers. This permits analysis in statistical applications.

**SPECIAL ADVANTAGES**

Magpie Pro supports many formats of audio and video. All can be viewed at different magnifications. Though video playback is ordinarily limited to 30 images per second, temporal distinctions of less than \( \frac{1}{300} \) of a second can be seen in the waveform audio track.

Magpie Pro includes two features that increase the accuracy of perception and coding. A loop playback button permits a short selection of sound to be heard repeatedly. Also, a selection of synchronous image and sound can be opened in a small window for looped viewing.

Not only can Magpie Pro export data-codes to Excel and statistics programs, it can also export, as a PDF file, an animation “exposure sheet” that...
synchronizes the waveform with timecode and text data. This document can be used to increase accuracy and to cross-check the work of multiple coders.

**SPECIAL DISADVANTAGES**

Although members of the Magpie Pro user group discuss many problems, almost all of the problems are so specific to animation that they are irrelevant to the research purposes suggested here. A few may be relevant. One user complained about poor performance in audio playback when she used the left and right arrow keys to scroll through the waveform; another had trouble magnifying single audio frames from a lengthy clip. In my limited experience with Magpie Pro, I did not encounter such difficulties.

**OCTOPZ: SOFTWARE FOR ONLINE COLLABORATION IN SOUND, VIDEO, GRAPHICS, AND TEXT**

Because my focus in this chapter is software used in face-to-face collaboration, Octopz is the only application I discuss that is designed exclusively for Internet use. As an example of developments in Web 2.0, it deserves mention. Online collaborations—whether large-scale, like Wikipedia, or more modest, like e-mail, instant messaging, and video conferencing—represent an important trend in globalized fieldwork and the future of collective action.

Octopz allows virtual collaborators to work simultaneously with digital media. Multiple partners meet together in a private, online “conference room” to subject graphics, text, video, and audio files to collective scrutiny and annotation.

Graphic images alone can be permanently altered online. The other media available in Octopz—audio, video, text, and spreadsheets—can be discussed and annotated, but alterations must be made off-line and the revised files uploaded anew. Real-time communication may take place through Webcams and microphones, through graphic markup tools (Pencil, Lines, Shapes, and Text), through text messages saved in a permanent string, and through alterable sticky notes. New uploads, and new versions of altered graphics, are automatically added to the menu at the left of the Octopz screen (Figure 15.8) and are available there for later study.

**COST OF SOFTWARE**

Access to Octopz “conference rooms” costs about $100 per month. A month’s free trial is available.

**LEARNING CURVE/EASE OF USE**

Proficiency in the Web site’s features and tools can be gained in less than an hour. The tasks required by the group’s administrator—to pay the rent, create “conference rooms,” and invite participants—are also simple.

**TYPES OF RESEARCH FACILITATED**

Octopz’ promotional video shows an international team of furniture designers collectively deciding to remove the feet from the drawing of an over-stuffed sofa. Yet more important decisions of many kinds can be facilitated in virtual collaborations, just as they are from the nonvirtual collaborations I discuss above.
The “Eyecontact” video is uploaded for collaborative discussion; here participants scroll to a frame with a mutual gaze.

**SPECIAL ADVANTAGES**

Octopz is valuable when immediate collaborative feedback is useful, when collaborators are far apart, and when they all have access to computers linked to the Internet.

Distant stakeholders in digital media may need to see or to select from alternative graphics or edited versions of a film. Octopz is convenient because it allows collaborators to work together online or visit their “rooms” in off-hours to see what has been done in their absence. The frame-accuracy of Octopz’ handling of sync-sound video makes it possible to collaborate for hours at a time with a translator who is halfway around the world. This scheme, if absurd, is less absurd than traveling halfway around the world to tie up a few loose ends.

Most action research takes place through the medium of face-to-face communication. Yet, in the future, many collective actions and struggles will involve disparate indigenous groups that are partners and stakeholders in the success of collaborative digital media. Such groups will benefit from Octopz-like software. The potential is great for globalized visual anthropology.

**SPECIAL DISADVANTAGES**

Notwithstanding the price and the requirement that Octopz collaborators need online computers, the application performs its task well. Only one person may use the markup tools at a time, but this can be accepted as a way to encourage polite sharing.
The most serious drawback of Octopz' markup options is that only graphic files can be altered permanently online. Text files are not machine-readable online; neither can movies be edited. Octopz participants can discuss online how they want to revise these file types, but the actual revisions have to be performed offline. The revised files must then be uploaded again, giving partners the opportunity to evaluate the new results.\(^6\)

**FILEMAKER PRO: MEDIA-FRIENDLY DATABASE**

FileMaker Pro (FMP) is a useful database for still images and texts; it is less useful for archiving and analyzing videos and audio tracks.

When a digital document is stored in a database, it is not altered. Archiving in a program like FileMaker, though, does help people find documents, make sense of them, and present them in useful ways on-screen and on paper.

The accessibility of digital media through databases has become an essential part of repatriation, cultural resource management, and indigenous control of audiovisual archives (Hennessy 2005). Media databases are valuable in collaborative and applied visual anthropology projects because they allow many people to research them independently and generate independent analyses. A collection of FileMaker records may be saved as HTML and hosted on the Web where they can be made to function as they did on a single computer.

**COST OF SOFTWARE**

The educational price of FileMaker Pro is approximately $150. An advanced version, with more sophisticated reporting, better debugging and menu tools, and additional options costs about $250.

**LEARNING CURVE**

A major advantage of FMP is that the user creates a new layout appropriate to each job. Layout design is particularly important to coders because it affects the efficiency of data entry. The characteristics of an efficient design, however, are not intuitive, and even experts improve their designs through trial and error. Learning to make strong FileMaker layouts requires considerable experience.

A well-designed layout involves appropriate selection from among various types of fields. Look-up fields are useful for the automatic entry of data, which is the same throughout a single coding session (such as the coder’s name and the date of coding); pull-down menu fields save typing and prevent errors; Calculation and Summary fields perform mathematical functions.

**EASE OF USE**

FileMaker’s Layout mode is illustrated, on the left of Figure 15.9, at a point near completion of the design of a record for the Eyecontact video. (A “record” is the entity that stores all data correlated with a single event, such as a glance.) Tools along the left edge of the screen, and menu selections across the top, provide color, font, field type, and many other options for the design of records. In Figure 15.9, small squares at each corner of the rectangular “Glance Code” field indicate that it is selected and may be moved about the layout. With some practice, good graphic effects are not difficult to achieve in FileMaker.
Data entry occurs in the Browse mode. The coder can use the tab key to advance from field to field. Look-up fields save unnecessary coding, and pull-down menus (Figure 15.9, lower right) speed the data entry process and prevent typographical errors.

Like other database programs, FileMaker includes a labor-saving option with which large files of data may be imported in bulk. (FileMaker automatically creates as many records as the data require.) It can bulk import, for example, XML-coded subtitles produced in InqScribe or tab-separated entries created in Word. (Cautiousness is needed during bulk entry since a minor error can spoil many records.) Images, too, may be imported in bulk, with FileMaker automatically creating a thumbnail for each one to keep file size low and access time rapid. Representative film stills, created in QuickTime Pro or Final Cut Pro, can also be loaded into the database.

FileMaker's Boolean and hierarchical Find tools are very useful.

**TYPES OF RESEARCH FACILITATED**

FileMaker Pro is excellent as a digital photo archive, but it is not the best application for the analysis of videotaped events. The most common research that is likely to be conducted in photo archives concerns content. Users search for photographs of people, activities, locations, and objects. Dates, photographers, compositions, and genres may also be coded and searched.

A FileMaker archive may also be explored with Boolean searches and used to export data for statistical research. Databases help people find what they are looking for, but a well-designed database is open-ended: it will not restrict
discoveries only to answers that have been anticipated by the user or the designer (Biella 2007).

**SPECIAL ADVANTAGES**

Data for each FMP record need only be posted once, but alternate layouts for the same record can easily be made to display different combinations of fields. The alternates encourage multiple perspectives on research and permit the most efficient use of space in printouts.

FileMaker does not have the statistical power of programs like SPSS, but, through its export options, works in conjunction with them. Its strength is to sort textual, numeric, and audio/visual data in user-determined ways. FileMaker can provide rapid access to specific types of images from a huge collection. By juxtaposing photos sorted on the basis of known criteria, Filemaker facilitates the discovery of unanticipated results. Its capacity to be exported into XML serves statistical ends. When exported to HTML, it gives distant users access to its information.

**SPECIAL DISADVANTAGES**

FileMaker is very good at what it does. I have only minor criticisms. Design work in the Layout mode is rather awkward. Search engine performance slows when FMP is loaded with large files, such as digital movies: these cannot be transformed into thumbnails. Movies, too, always revert to the first frame when their record is closed. This is annoying if a different frame is of greater interest.

**TRANSANA: SOFTWARE FOR VIDEO TRANSCRIPTION**

An important group of applications is designed especially for the coding of digital video. In the following, I describe two such applications, Transana and HyperResearch, but ignore their major competitors, Observer and EthoVision (Windows only) and Atlas-ti (Windows and Mac). Transana, good for transcription, is weak for coding. HyperResearch is efficient at coding but unsuited for transcription. Unlike InqScribe, the Transana group of applications has search engines that find video clips according to specified criteria. These applications can also subject coded data to elementary statistical analysis.

**COST OF SOFTWARE**

Transana costs $50 for the single-user and $500 for the multi-user version.

**LEARNING CURVE**

Considerable documentation exists for Transana, but the manual is difficult. It seems to have been written for someone who already understands what beginners are trying to learn. I struggled with the manual for half a day before I could grasp the basic ideas.

**EASE OF USE**

Transana is useful for visual anthropology only if two conditions are met: 1. it is used only for the transcription of audio (with or without synchronous image); 2. it is not used for coding data (even though it is designed for coding data).
Transana is reasonably adapted to transcribing audio and synchronizing it with a sound track as timecode-accurate subtitles. To transcribe, the coder types a keystroke to enter a sync-point marker, hits the Play keystroke to hear a phrase of audio, hits the Pause keystroke, types the phrase, enters a new marker, hits the Play keystroke and begins the process again (Figure 15.10). The accuracy of the transcriptions is enhanced by Transana’s automatic Backwind feature.

In contrast to Transana’s utility for transcription, its procedure for coding data is prohibitively tedious. The user scrubs through the video to find the first frame of the event to be coded, enters the sync-point marker in the transcript field, types a code for the event into the transcript, opens the coding window, selects the appropriate data-code, closes the window, scrubs the video forward to find the timecode of the event’s last frame, and enters a new marker. Two keyboard and five mouse actions are thus required to code each entry. Only three mouse actions are required by HyperResearch to accomplish the same task.

Transana exports tables of its data in a format that does not meet the requirements of XML. Users must therefore either restrict themselves to the weak statistical calculations available in Transana or (perhaps manually) alter each line of data output to conform with XML. Only then will Transana’s data be comprehensible within more powerful statistical programs like SPSS, SAS, and STATA.

**TYPES OF RESEARCH FACILITATED**

Particularly because of its Backwind function, Transana can be used efficiently in transcription. Its ability to highlight parsed sections of the transcript in synchrony with audio playback increases the accuracy of transcription. This playback feature can also be used in language training.

Transana’s promotional literature claims that it is capable of searching thousands of hours of coded video. Because no one can remember so much material,
this aspect of the software would be valuable if coding were reasonably easy, but it is not. In any case, once transcripts are coded, the application can perform simple statistical calculations.

SPECIAL ADVANTAGES
Transana is free, and it has the advantage of being written in open source code. Programmers may thus redesign the application to suit their own needs. Like InqScribe, Transana allows subtitles to be created. Also like InqScribe and Dictaphone machines, Transana has the Backwind feature.

Apart from its waveform, the utility of which is seriously compromised by the absence of frame-accurate video controls, the significant advantage of Transana over InqScribe is that its playback of video causes sequential phrases in the transcript field to be highlighted as if they were subtitles. This way of representing verbal discourse on-screen is superior, for some purposes, to subtitles. In my text- and audio-centric Maasai Interactive, for example, I prefer to see an entire page of text remain on-screen, while consecutive phrases of transcription (or translation) within it are highlighted in sync with the audio.

SPECIAL DISADVANTAGES
Transana has several debilitating qualities. Its tools for coding are inefficient in general and particularly inefficient for coding transient, nonverbal data. (Magpie Pro is far better for that purpose.) The Transana application requires frequent saves that are annoyingly slow. Further, the export tables generated by Transana are not standard XML.

When Transana’s in- and out-points are placed in the transcript, they are not represented with visible timecode. Rather, each point is identified with a small, red ship’s steering wheel icon (Figure 15.10). Although the visual presence of timecode in a transcript might seem intrusive, to filmmakers, timecode is useful and ship steering wheels, usually, are not.

Transana is particularly difficult to use on Macintosh computers because it demands extra work in preparing video files for analysis. Both on Mac and Windows, Transana only accepts video files that are comparatively low in resolution, and thus not best for visual coding.

HYPERRESEARCH: SOFTWARE FOR VIDEO CODING AND ANALYSIS

HyperResearch software permits data to be coded rapidly. It also can find and display found sets of video clips on the basis of coded criteria and can subject data records to statistical analysis.

COST OF SOFTWARE

HyperResearch costs $370. Like most of the applications described in this chapter, a free trial version may be downloaded for a month’s evaluation.

LEARNING CURVE

HyperResearch is difficult to master. I had to pour over the manual for half a day before I began to understand it.
EASE OF USE
Once I got the idea, though, I found that the HyperResearch strategies to import video, create data-codes, and conduct data entry were very efficient. In this application, it is as easy to code brief nonverbal events as it is to code long verbal transcripts. No special confusion arises in HyperResearch from coding more than one kind of data at a time. As is true of InqScribe, but not of Transana, all of the features necessary for coding in HyperResearch are always copresent on the screen (Figure 15.11). This reduces effort because it requires the transcriber to make fewer keystrokes and mouse moves.

TYPE OF RESEARCH FACILITATED
In its Video mode, HyperResearch has no transcript field and is unsuited for transcription. It serves media research in a number of other ways. In the first place, it is very efficient for coding audio and video. It also has Boolean search tools, strong statistical tools to test hypotheses, and it outputs data as properly-formatted XML. It achieves for video what FileMaker achieves for photographs. Finally, HyperResearch, alone among the software described here, permits the coding of still photographs, with x and y axis points posted along with the data-codes.

The HyperResearch application also includes an efficient Text mode, not shown in Figure 15.11, which is used for coding existing transcripts, field notes, and other text documents.

SPECIAL ADVANTAGES
If data entry and not transcription is desired, the convenience of HyperResearch is so great that its price is justified by the hours of work it saves. In HyperResearch, data entry is simple and fast. Moreover, HyperResearch

![Image of HyperResearch interface](image-url)
can play back high resolution video formats. This feature makes it easier to identify subtle visual data.

In addition, HyperResearch has a Text mode that is made particularly valuable by its “auto-coding” feature. Through its use, all instances of a word can automatically be assigned data-codes.

**SPECIAL DISADVANTAGES**

In Transana, transcription is efficient and may be incrementally highlighted in synchrony with sound. In HyperResearch, video and transcripts must be coded and studied independently of one another. This fact makes research into image/spoken word correlations prohibitively difficult. HyperResearch has no waveform, a feature that is particularly valuable in Magpie Pro. Like Transana, HyperResearch lacks frame-accurate video control, reducing the precision of coding.

**CONCLUSION**

Although in recent years ideas about teaching and exposition have flourished in visual anthropology, the discipline has taken hardly one step in the direction of developing tools for empirical analysis. Anthropology’s resistance to film research results in part from its valid critique of ivory-tower positivist bias and less valid suspicions about the intellectual accessibility of the empirical. This resistance is unfortunate. The worst dangers of positivist sterility and the most egregious biases that affect empirical analysis are, I believe, both mollified when collaborative film projects include an action component in the real world and when they are shaped fundamentally by the emic understandings and aspirations of indigenous collaborators. The material world is (thankfully) allowed to rematerialize in visual anthropology’s commitment to applied action research and indigenous aspirations.

Anthropology’s resistance to empirical film analysis also results from serious technological constraints that, in the era of linear media, hobbled textual scholarship about film (Biella 1993:144–149). To put it bluntly, it was really hard to research movies in the past because they kept moving. Moreover, when 16mm and video were the only available media, anyone who wanted to include film in a scholarly exposition met a further panoply of technological constraints. It used to be a major undertaking just to project several film clips onto the wall of a classroom; it was almost impossible to make the clips play back slowly or often enough for an audience to understand them. Now, the qualities that make digital media so easy to study and edit also make them simple to use in teaching. New media-taming software has collapsed the distinction between text-based and time-based information and lifted the technological constraints that held back film research and classroom exposition.

The change brought by digital media has not only affected visual anthropologists’ ability to teach their students but has also transformed their relationship with indigenous research participants. In the same decade that visual anthropology voluntarily sought the strictures of local accountability, the digital revolution forged tools to aid community input and scrutiny. Tools for the qualitative and quantitative evaluation of media have increasingly allowed
visual anthropology's collaborators to share in decisions and produce autonomous works. In the days of the lone-auteur ethnographic filmmaker, such evaluation was extremely rare and often impossible. Now it is not.

As our researcher colleagues learn forms of digital media, they add their own answers to questions that collaborating visual anthropologists might never think to ask. In whatever way collaborators' answers may arise, though, they must ultimately be linked to material interventions. After all, the point of applied action research in visual anthropology is not merely to research the world, but also to change it. If digital media make theory and practice more intelligible to everyone involved, they also make it easier for all of us, working together, to do a good job.

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STUDY QUESTIONS

1 Video transcriptions can be created with different degrees of care. What factors should influence the choice of producing a transcription that is merely acceptable or one that is very accurate?

2 How can access to digital video improve the quality of translations?

3 In what ways can collaborative research on digital video improve the quality of ethnographic fieldwork?

4 What negative or positive consequences might arise if different research participants on an ethnographic video project were asked to produce their own edited versions of the same film?

5 Describe a possible scenario in which Octopz was used to host long-distance conversations between communities that share a common interest in an applied media project.

6 Filmmaking skills and the understanding of computer applications require years of commitment. Given the fact that mastery of concepts in anthropology is also very difficult, is it worth the effort to become a digital visual anthropologist?
ELECTRONIC REFERENCES CITED

Information about the software packages mentioned in this essay may be found in the following Web sites:
- Google Docs and Spreadsheets. http://docs.google.com
- SAS. http://www.sas.com/
- SPSS. http://www.spss.com/
- STATA. http://www.stata.com/

REFERENCES CITED