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Voice Recognition Technology for Collecting Field Data

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SUMMARY

A digital voice recorder and voice recognition software were used to record rangeland data over two years in central Australia. A high degree of accuracy was achieved. Advantages of the system include much higher productivity per labour unit and the streamlining of a previously arduous task, thereby reducing mental fatigue. The use of proprietary software allows voice recorded data to be entered automatically onto a spreadsheet.

INTRODUCTION

Collecting data in the field for scientific research, monitoring programs, and other purposes, can be an arduous task. Moreover, there is often a need for a second person to record data while the investigator is taking measurements or making informed estimates. If data is recorded on paper, it needs to be transcribed into a computer for most analysis. Small hand-held computers can be awkward to use in the field. Also, continual re-focussing from a small screen to a broad field-of-view may increase mental fatigue over the course of a day.

RECENT ADVANCES

Advances in voice recognition technologies of the 1990s now allow data to be collected by speaking into a portable voice recorder, which can then be converted into text by computer software. In addition to voice recognition software, text filter software is used to readily convert text strings into a spreadsheet format, thereby mostly automating the entire data collection and storage process. Most importantly, the collection of field data becomes a much more heads-up and hands-free operation, which is conducive to increased efficiency and accuracy. We have used the system successfully in the last two years for field operations, including general dictation and for the collection of large amounts of data on the composition of vegetation.

Voice recognition software is advancing at a rapid rate with continued improvements in newer versions of the major available brands. Programs typically work by learning the characteristics

of people's individual speech patterns and by creating a user profile or speech files. These files are updated after training and each time corrections are made during transcription and editing. When purchasing voice recognition software, it is important to consider a number of points such as the input quality of sound cards, the compatibility of some laptop computers, and if enough random access memory is available. You will also need a compatible, portable digital voice recorder, which is often packaged together with a particular software brand. Headset microphones, which are used at desktop computers, may also be used with portable recorders in the field for true hands-free operation, if required. Note that different sets of speech files will need to be created for the internal microphone of the portable recorder and for the headset microphone.

Voice recognition software has been developed mainly for business and professional applications, as well as for people who cannot easily operate keyboards. It therefore has many features not generally required for field data collection applications. One such feature is a very large vocabulary, most of which is not needed. Depending on the software used, there are ways of stripping this vocabulary back for particular user profiles, allowing the software to run faster and recognise words more accurately. Following this process, text files typical of the data to be collected can be transcribed and relevant words added to the vocabulary. This may include lists of species' names or jargon terms used in the field. Training should continue until 100 percent accuracy in transcription of typical data is achieved.

Software specifically designed for use with the text files created by voice recorders is used after accurate transcription of data has been achieved. Act Naturally™ of Rapid City, South Dakota, U.S.A. provides instructions on how to strip the vocabulary of a particular brand of voice recognition software, as well as gives various hints for better accuracy and general tips on field data collection. They also instruct on how data should be collected in the field to facilitate formatting from text string to a spreadsheet using their software. In the field, data is recorded using a header word for each parameter being measured or estimated, followed by its value, comment, or the category of that parameter. When each parameter has been measured or estimated from a particular plot, site, tree, power pole, etc., a particular word is used as an end of record marker. This will mark the start of a new row of data in the transcribed spreadsheet. The three steps in converting a transcribed text string into a spreadsheet format using Act Naturally™ are shown below:

Step (1) Collect field data creating an input text file

```
Paddock Dodgy site 3 species mulga status healthy height 2.5 species
witchetty status regrowing height 0.5 quadrat species mulga status dead
height 1 quadrat site 4 species mulga status healthy height 3.5 species
witchetty status healthy height 2.5 quadrat species witchetty status
healthy height 1.25 quadrat Paddock Bullock Site 1 species ironwood
status regrowing height 0.5 comments insect attack quadrat species
ironwood status regrowing height 1 species witchetty status regrowing
height 0.5 quadrat
```

Step (2) Create header file where (s) = text (n) = number (e) = categorical (r) = end of record

```
ColumnHeads=Paddock,Site,Species,Status,Height,Comments
Paddock(s)
Site(n)
Species(e)ironwood,mulga,witchetty
Status(e)healthy,declining,regrowing,dead
Height(n)
Comments(s)
quadrat(r)
```

Step (3) Act Naturally™ then formats the input file to create a spreadsheet

Paddock	Site	Species	Status	Height	Comments
Dodgy	3	witchetty	regrowing	0.5	
		mulga	dead	1	
	4	witchetty	healthy	2.5	
		witchetty	healthy	1.25	
Bullock	1	ironwood	regrowing	0.5	insect attack
		witchetty	regrowing	0.5	

Other aspects to consider in setting up a field data collection system based on voice recognition is to have a backup recorder available if possible, and of course a pen and a clipboard, in case something goes drastically wrong. No data has been lost during the two years of using the system. Portable voice recorders often have an internal memory as well as the capacity for inserting extra memory cards. The recorder in use during the last two years holds 12 megabytes of data, equivalent to about 30 pages of text. If the memory does get full while in the field, data is downloaded as compressed files to a laptop computer running the linking software that comes with the recorder.

Overall, voice recognition has reduced costs and increased efficiency of field data collection. It allows data collectors to carry other equipment like cameras and global positioning system receivers, instead of notebooks and clipboards. Most importantly, the eyes of the data collector do not need to move from the object being measured or estimated for recording that data.

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