



Practitioner's Guide:

Merging MS Excel Tables and Charts into ArcView



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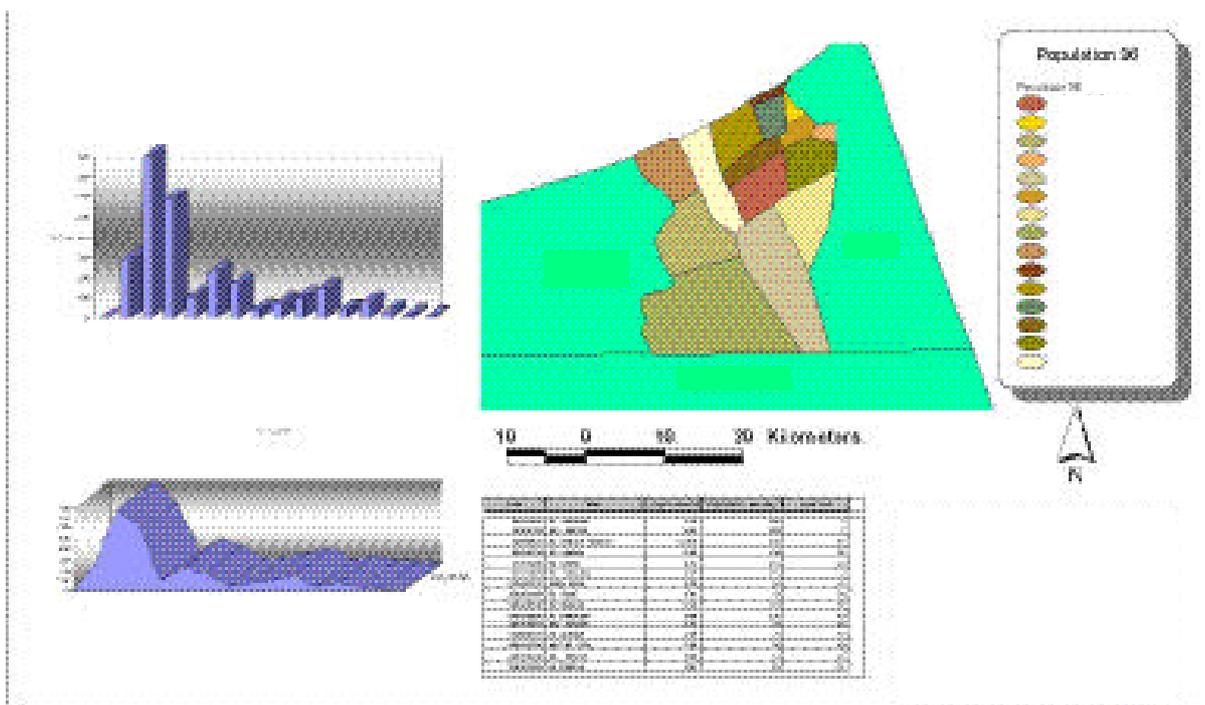
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Brief Description



For planning purposes Geographical Information Systems (GIS) require simple approaches for handling non-spatial data (e.g. population data) that are then combined with spatial data (i.e. maps) to produce thematic maps (population distribution). GIS systems that handle small amounts of data (e.g. less than 50.000 data sets) and where quick results are a requirement the use of spreadsheet programmes (e.g. Excel) has proved a practical option to the use of relational data bases (e.g. dbase, access). Once the spreadsheet has been developed it can be imported or embedded (e.g. OLE or ODBC) into almost any GIS software package. The statistical data prepared using the spreadsheet programme can be linked to the spatial objects to create thematic maps.

Figure 1: Combined map layout with ArcView maps and MS Excel charts



Merging data from MS Excel into ArcView, and combining charts and maps from both applications lead to professional map layouts

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Proposed Main Users

Technical staff, planners and GIS technicians



Purpose of the Method



Geographical Information Systems require both spatial (e.g. maps) and non-spatial data or attribute data (e.g. statistical information such as population figures, financial data, etc.). Maps can be entered or digitised into a computer either by scanning the maps or digitising them. On the other hand, non-spatial data has to be entered into tables or databases. Unfortunately, many GIS systems are not particularly user-friendly and they often do not allow the user to enter or manipulate attribute data easily. Since attribute data is a key ingredient for creating thematic maps the use of spreadsheets for entering data has grown in popularity.

There are two possible ways of entering attribute data:

- ▶ Relational databases have to be developed using professional database software packages (e.g. dBase, Access, Oracle). The advantage of using relational databases includes the ability to develop database models that combine or link data that has been entered in endless combination possibilities. The complexity and level sophistication needed to successfully develop and maintain useful databases is a distinct disadvantage of relational databases. This often necessitates qualified professionals who are capable of creating, modifying and maintaining the complex databases.
- ▶ Most GIS users do not require such sophisticated systems based upon relational databases, entering their data into spreadsheets usually perfectly satisfactory. Programmes such as MS Excel offer the possibility of entering data in spreadsheets, which can be easily created. The programme also allows calculations to be automatically undertaken (i.e. population projections). The data can then be easily exported or embedded as part of the GIS database. The use of common spreadsheet programmes and the ability for the user to familiarize themselves quickly with the programmes capability of entering and manipulating data are a distinct advantage. Most user-friendly GIS systems use Excel as the main attribute data interface. These GIS packages are ideal for relatively small sets of data. Where large volumes of data have to be applied the GIS user will have to use relational database programmes but this is more likely to be the exception and not the rule.

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Advantages



- ▶ Technical staff can be quickly taught how to enter and manipulate data using spreadsheet programmes.
- ▶ Statistical data can be easily entered and manipulated using statistical formulas in the spreadsheet programme.
- ▶ Files can be exported (e.g. in DBF format) or embedded into the GIS.
- ▶ Spreadsheet programmes such as Excel are available in many different (local) languages.
- ▶ High quality charts can be generated in order to visualise the statistical data.

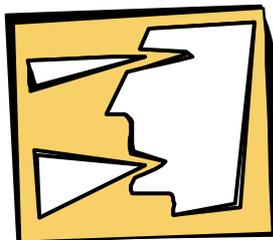
Limitations



- ▶ Attribute data has to be stored separately on the computer and the links to the spatial data (i.e. maps) has to be re-established each time the data is physically moved to another computer.
- ▶ The combination possibilities of datasets from various tables is limited
- ▶ The number of datasets per sheet is limited (e.g. in Excel the limit is to 65.536 records).
- ▶ Statistical formulas used in the table have to be repeatedly copied throughout the whole table.
- ▶ The ability to sort the datasets is limited to only 3 columns of data.
- ▶ The filtering function of the datasets is limited.
- ▶ Data integrity can not be guaranteed and has to be monitored manually.

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Principles and General Procedures



The following general procedure should be followed when establishing a database on a spreadsheet programme. The procedure has been simplified for illustration purposes.

- ▶ Define the attributes to be stored in a table.
- ▶ Define one field name as the identity attribute (e.g. ID).
- ▶ The first row of the table must contain the unique names of the table. e.g. DISTRICT_NAME, POP_HH_1988, AVG_NET_INCOME, etc.). The names must not contain any spaces or special characters.
- ▶ Define different columns for use with various languages (e.g. E_DISTRICTNAME for an English name of a district).
- ▶ Enter the identity data (ID) in the same way as it is being used for the map features in GIS. The ID should be defined in a GIS table for the respective map feature.
- ▶ Save the file both in DBF format and MS Excel format in order to prepare additional charts.
- ▶ Import or embed the DBF file into the GIS software.
- ▶ Import or embed charts into the GIS software (if possible), or merge maps and charts in Word, Pagemaker or any other DTP software.