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r.finder
a GRASS-GIS script
to perform predictive analysis
Any predictive process implies:

- Finding the areas, in the whole region, whose features combination is closest to the one of the existing record.
- Analyzing the existing record to check which key-factors (if any) may be considered of relevance in influencing the archaeological presence.
- Checking the results through the fieldwork findings (or with a new set of records not previously considered) in order to validate the model.
- Applying the model to other regions.
r.finder is a script created for GRASS-GIS to identify the areas more similar to the ones in which some presences (archaeological sites, in our case) are located, in order to look for other, unknown ones. The user can calculate such a similarity choosing any kind of thematic map: the software will check the values of the cells where input presences are and calculate the most similar area in the study region.
Quantitative vs. qualitative approach

- **Qualitative maps**: are maps whose cell categories represent independent typological units, unrelated to any sequence, range or scale (ex: geological units, administrative districts, etc.).

- **Quantitative maps**: are maps whose cell categories represent different levels in a continuous range (ex: elevation, slope, distance buffers, etc.).
r.finder GUI: **basic** tab

- **Basic** tab:
  - **Allow overwrite**
  - **Use standard deviation instead of range for quantitative map(s)**

- **Name of input raster map containing valid areas:**
  - **Input:** string, opzionale
  - **Value:** sites

- **Name of qualitative thematic raster maps:**
  - **Qual:** multiplo string, opzionale
  - **Value:** soils

- **Name of quantitative thematic raster maps:**
  - **Quant:** multiplo string, opzionale
  - **Value:** dem,slope

- **Name of output raster map containing results:**
  - **Output:** string, opzionale
  - **Value:** result

- **Button Labels:**
  - **Esegui**
  - **Aiuto**
  - **Annulla**
  - **Chiudi**
r.finder GUI: advanced tab
Output resulting map (darker areas = higher values)
For qualitative maps, the analysis is performed checking for cells with the same category values of the ones where the sites are. Valid areas (=cells whose value category contains at least one site) are set to 1 and non valid areas are set to 0.

For quantitative maps, the analysis is performed checking for cells inside the whole range between the lowest and the highest value of cells containing sites. Valid areas (= cells whose value category is contained in the range) are set to 1 and non valid areas are set to 0.
2 independent DB
Tiber Valley Virtual Museum Project Area
Tiber Valley Project case study, thematic maps used:
quantitative: DEM, Slope map, Aspect map, road buffer map, river buffer map
qualitative: Eco-landscape units map
Output resulting map (darker areas = higher values)
Distribuzione per valore delle celle occupate dai siti

Distribuzione per valore di tutte le celle del territorio
### Creation of thematic map relating features/Nulls

```bash
g.message -e "WARNING! File $mapp seems to be floating. You can't use a floating point raster as 'qual' map"  
exit 0

### OTHERWISE, if you're using rules file...
```
```bash
tf [ -n "SGIS_OPT_RULES" ]; then
    mapname="echo $mapp | sed 's/\/>/\n/g'" | grep "#(q)\|sed 's/:/\n/g'\|sed 's/\(#(qual)\)/\n/""
    # before all, check map is not floating, comment the following 5 lines to overcome check
    floattest="r.stats $mapname | grep -e "\.'\|grep -e "-\."><"
    g.message -e "WARNING! File $mapp seems to be floating. You can't use a floating point raster as 'qual' map"  
    exit 0

    g.mapcalc "Thematic_map_occurrences = $mapp * presences"
    r.stats Thematic_map_occurrences | sed s/\/+P/\ awk '{print $1="1"}';\|sed s/P=1/*=NULL/;\|r.reclass input=$mapp output=onoff --overwrite
    r.mapcalc $mapname = $mapp * onoff
    g.message "$mapp | sed 's/\/>/\n/g' | grep "#(q)\|sed 's/:/\n/g'\|sed 's/\(#(qual)\)/\n/"
    #" >> "$SGIS_OPT_OUTPUT-data" "/$SGIS_OPT_OUTPUT-rules.rul"
```
```bash

### Rules file creation (If flag -r is given) ## OK
```
```bash
tf [ "SGIS_FLAG_R" != 0 ]; then
    echo "(#(qual))$mapname",categories:"
    r.stats Thematic_map_occurrences | sed s/\/+P/\ awk '{print $1="1"}';\|sed s/P=1/*=NULL/;\|r.reclass input=$mapp output=onoff --overwrite
    r.mapcalc $mapname = $mapp * onoff
    g.message "$mapp | sed 's/\/>/\n/g' | grep -v "#(q)\|sed 's/:/\n/g'\|sed 's/\(#(qual)\)/\n/"
    #" >> "$SGIS_OPT_OUTPUT-data" "/$SGIS_OPT_OUTPUT-rules.rul"
```
```bash

### Statistics calculation (If flag -s is given)
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r.finder is freely available, together with a detailed tutorial, at:

http://www.palombini.net/sw/finder

and will be soon available on GRASS-GIS users wiki site:

http://grasswiki.osgeo.org/wiki

Thanks!