Building a model, for genetic testing of paternity

Photometric redshifts

Hidden Markov models
e.g. Hidden Markov chain

Hidden Markov random fields

Unobserved
dependent field

Observed
conditionally-independent (e.g. discrete) field
Hierarchical mixture model for disease mapping – a hidden MRF

Eyes: Normal Mixture Model

Breslow and Clayton (1993) re-analyse 2 by 2 tables of cases (deaths from childhood cancer) and controls tabulated against maternal exposure to X-rays, one table for each of 120 combinations of age (0-9) and birth year (1944-1964). The data may be arranged in the following form:

<table>
<thead>
<tr>
<th>Strata</th>
<th>Exposure: X-ray/total</th>
<th>Cases</th>
<th>Controls</th>
<th>age</th>
<th>year - 1954</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>3/28</td>
<td>0/28</td>
<td>9</td>
<td>-10</td>
<td></td>
</tr>
<tr>
<td>120</td>
<td>7/130</td>
<td>5/130</td>
<td>1</td>
<td>10</td>
<td></td>
</tr>
</tbody>
</table>

Bowmaker et al (1985) analyse data on the peak sensitivity wavelengths for individual microspectrophotometric records on a small set of monkey’s eyes. Data for one monkey (S14 in the paper) are given below (500 has been subtracted from each of the 48 measurements):

29.0 30.0 32.0 33.1 33.4 33.6 33.7 34.1 34.8 35.3 35.4 35.9 36.1 36.3 36.4 36.6 37.0 37.4 37.5 38.3 38.5 38.6 39.4 39.6 40.4 40.8 42.0 42.8 43.0 43.5 43.8 43.9 45.3 46.2 48.8 48.7 48.9 49.0 49.4 49.9 50.6 51.2 51.4 51.5 51.6 52.8 52.9 53.2