Pie Menus vs. Linear Menus

D. Hopkins, The Design and Implementation of Pie Menus, Dr. Dobb’s Journal, Dec 1991

- Advantages
  - Reduced seek time
    - Faster to select angle than distance
  - Fixed distance to travel
  - Increased target size
  - “Mouse-ahead” possible before drawing menu
- Disadvantages
  - Large footprint
  - Angles vary with # items
  - Loses scale invariance with hierarchy
- Examples
  - The Sims, Second Life
    (original viewer), OLPC Sugar…
Marking Menus  G. Kurtenbach 93

http://www.youtube.com/watch?v=dtH9GdFSQaw
(Used in Autodesk Maya, Inventor, …)

- Much like pie menu if user holds mouse still after pressing (i.e., menu appears)
- When user moves immediately after pressing, only an "ink trail" is shown
- Back up by touching parent menu center
- Menu selection → Gestural interaction
- Scale invariance retained with hierarchy

Marking Menu Refinements


<table>
<thead>
<tr>
<th>Principle</th>
<th>Refinement</th>
</tr>
</thead>
<tbody>
<tr>
<td>Maintain visual context</td>
<td>Display only the labels</td>
</tr>
<tr>
<td></td>
<td>Violate pie wedges</td>
</tr>
<tr>
<td></td>
<td>Make labels symmetric</td>
</tr>
<tr>
<td>Hide unnecessary information</td>
<td>Hide parent menus (Show only centers)</td>
</tr>
<tr>
<td>Support skill development using</td>
<td>Use eight item menus</td>
</tr>
<tr>
<td>graphical feedback</td>
<td>Use compass star around menu center</td>
</tr>
<tr>
<td></td>
<td>Show idealized marks</td>
</tr>
</tbody>
</table>
Simple vs. Compound Mark Hierarchical Marking Menus  

- Problem: Scale invariance means certain mark combinations for hierarchical menus are ambiguous in regular ("compound") marking menus
  - Many leaves must be left unassigned

S-S in 2-level vs. S in 1-level

Unambiguous

S-S-N in 3-level vs. S-N-N in 3-level

Ambiguous
**Simple vs. Compound Mark Hierarchical Marking Menus**  

- **Problem:** Compound marks can get big!

- **Solution:** Use sequence of separate marks
  - Eliminates ambiguity
  - Much more accurate
  - Takes less space when strokes are overlapped
  - Slightly faster
  - Can back up by touching parent center

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Sliding Widgets T. Moscovitch, Proc. UIST 2009
https://www.youtube.com/watch?v=k-bbgS8vUto

- Avoid accidental activation in area-based selection by requiring selection area to slide in designated direction(s)
- Activation areas can overlap
- Directional activation
  - Creates radial-menu–like behavior with on-screen documentation
  - Allows multiple actions based on direction from a single widget or overlapping widgets
OctoPocus  O. Bau and W. Mackay, Proc. UIST 2008
http://www.olivierbau.com/octopocus.php

- Provide help for gestures using
  - Feedforward
    - Help before action
  - Feedback
    - Help during/after

Marking Menu  OctoPocus  Before  During