COMS W4170
Case Study: Marking Menus

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Linear Menus

- Mouse/stylus/finger-based linear menu
  - Selection based on distance traveled
  - Longer travel distances and smaller target sizes each make selection time longer
    (as we’ll see formally, later)
Radial Alternatives to Linear Menus

Pie  
Wiseman, Lemke, & Hiles, 69

Bull's eye  
Distance, not angle

Dart board  
Angle and distance

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…


http://www.donhopkins.com/drupal/taxonomy/term/64
Marking Menus  G. Kurtenbach 93

http://www.youtube.com/watch?v=dtH9GdFSQaw

- 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 graphical feedback</td>
<td>Use eight item menus</td>
</tr>
<tr>
<td></td>
<td>Use compass star around menu center</td>
</tr>
<tr>
<td></td>
<td>Show idealized marks</td>
</tr>
</tbody>
</table>

- 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

- 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. Moscovich, Proc. UIST 2009

- 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

https://www.youtube.com/watch?v=k-bbgS8vUto
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