COMS W4170
Case Study: Marking Menus

Steven Feiner
Department of Computer Science
Columbia University
New York, NY  10027

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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

- Angle, not distance
- Scale invariant

Bull's eye

- Distance, not angle
- Angle invariant

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, OLPC Sugar
- http://www.donhopkins.com/drupal/taxonomy/term/64

Pie Menus vs. Linear Menus


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Marking Menus  G. Kurtenbach 93
http://www.youtube.com/watch?v=dtH9GdFSQaw

- Much like pie menus 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</td>
<td>Use eight item menus</td>
</tr>
<tr>
<td>development using graphical</td>
<td>Use compass star around menu center</td>
</tr>
<tr>
<td>feedback</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

- Problem: Compound marks can get big!
**Simple vs. Compound Mark Hierarchical Marking Menus**  

- **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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**Space:** Compound vs. Simple for NE-E-NE-E

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Sliding Widgets  T. Moscovich, Proc. UIST 2009
http://www.moscovich.net/tomer/papers/moscovich-sliding-uist09.wmv

- 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