Wheel Text Input and Transparent use of prediction

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Background
- The wheel can give a simple UI
- Scrolling is fast and intuitive
- Text input can be difficult

Wheel text input
- Date stamp with wheel
- Nokia 7280/7380 method

Workshop with users of Nokia 7280

Transparent User guided Prediction - TUP
- Fixed position of characters
- Dictionary for easy text input
- Dependent on finger movement speed

Design of algorithm

\[
P(\alpha) = \frac{R(\alpha)}{\sum_{\alpha} R(\alpha)}, \text{ where} \\
P(\alpha) = \frac{P(\alpha) \cdot P(\phi)}{P(\phi)} \\
P(\phi) = \frac{1}{\sqrt{2 \pi \sigma^2}} e^{-\frac{(\phi - \mu)^2}{2 \sigma^2}} \\
P(\phi) = \frac{1}{\Phi} 
\]
Design of algorithm

\[ f(\alpha|\varphi) = (\alpha_{\text{Min}} + \Theta(\alpha))^2 \cdot \epsilon_{\text{power}}^\frac{1}{2} \cdot e^{-\left(\varphi - \varphi_0\right)^2/2\sigma^2} \]

Defining \(\epsilon\)-Power and \(\sigma^2\)

\[
\sigma^2 = x \cdot \sigma^2 + (1 - x) \cdot \sigma^2_{t-1}, \quad x \in [0; 1]
\]

\[
\sigma^2 = 0.01 + \frac{2}{1 + e^{-|4| \cdot \epsilon_{\text{error}}}} - 1
\]

Prototypes

Usability evaluations

- Methods:
  - TUP 6.2 WPM (31 chars)
  - Date Stamp 4.7 WPM (24 chars)
  - Error rate: 1.2 - 2.4 %
  - iPod (experienced writer) \( \approx 10 \) WPM

Future work

- Add visualization
  - Give the user clues about most likely characters
  - Allow the user to have insight in the algorithm
- Audio feedback

Developing for the Apple iPod

- iPodLinux http://ipodlinux.org/
- RockBox http://rockbox.org/

- Installation of custom boot loader
- \( \mu \)Clinux, port of linux to embedded devices
- Graphic toolkits (TTK and Hotdog)
- Podzilla user interface
- C, C++ and python (no gui for python)
Visualization examples

New prototype based on Nokia 770

- TUP will take up less screen real estate and be usable without the stylus
- Linear input and output

Other work

- Adaptive language models
- Context aware language models
- Modeling text input with information theory
- Make prototypes with extensive data logging to analyze effects of adaptive language models and human motor precision improvements