The potential of handwriting recognition for interactive mathematics textbooks

The Problem

\[ x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a} \]

Handwriting

\[ y = \int_{0}^{x} \frac{3x^2 - 7}{4} dx \]

Recognition

\[ 4y = 8 - 14 \]

\[ y = -\frac{3}{2} \]

Fig. 1: Use of non-intuitive codes interrupts the natural flow of mathematical thinking

Fig. 2: Writing naturally allows users to focus on the mathematics without technological concerns

Fig. 3: Educationally-informed design to support learning and reduce technical difficulty

Background Literature

- “the development of e-Learning in the sciences in general, and mathematics in particular, has not met the general expectation”[1]
- This may be, in part, because “practical and intuitive mathematics input for users is still under investigation”[2]
- “Current input methods for online mathematics communication are cumbersome”[3]

Design Rationale

- Simplify digitisation of mathematics expressions
- Use handwriting recognition techniques to turn handwritten work into computer codes
- Develop educationally-informed interface to reduce technology-induced cognitive overload while working electronically
- Could also be used to interface with interactive textbook and mobile apps

Milestones

- Dec 12 – Mar 14: Software design and development of 1st prototype
- Apr - Aug 2014: Piloting and consultation with Partner schools
- Sep 14 – Jan 15: Tool evaluation with current students in Partner schools
- Post-Doc: Prototype refinement to make product available for public

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References: