Emotional Experience of Elementary Students in Online Computer Programming

Tongxi Liu
PhD student at University of Florida
Email: tongxiliu@ufl.edu
Homepage: https://laraine08.github.io/

Maya Israel
Associate professor at University of Florida
Email: misrael@coe.ufl.edu
CTRL Lab: https://education.ufl.edu/ctrl/

1 Introduction

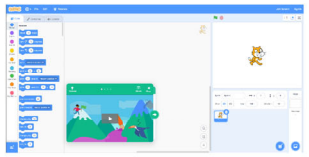
This study aims to investigate what emotions elementary students experience in their online computer programming activities, which can lead to better understanding when and how instructors should provide proper and efficient interventions.

1.1 Previous Work

1.1.1 Blocked-based programming

Online block-based programming tools such as Scratch and Tynker are suitable for children aged between 8 to 12 years old who are too young to understand and learn the logic and scripting of text-based programming languages in view of their developmental age and lack of programming.[1]

Block-based programming languages are widely used by elementary instructors and students.[2] In spite of all effort, high dissatisfaction and low efficiency of online programming courses has been reported.



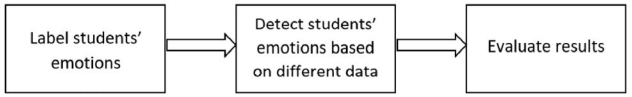
1.1.2 Emotions

Students' Emotions When They Engage in Computational Activities	
Positive	Negative
relief/pride/contentment/enjoyment hope/surprise/delight	shame/disappointment/isolation sadness/frustration/hopelessness boredom/confusion/anxiety

2 Methodology

2.1 Research Design

2.1.1 Process of Detection



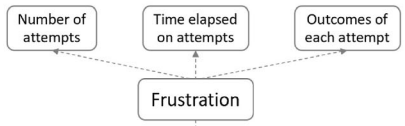
2.2.2 Data type

- Students' performance data extracted from interaction logs.
  - Learning time- potential evidence for labeling. Based on Derick' s work[3], there is a model related to the number of attempts and duration of learning time to calculate students' emotions.[4]
  - Performance- detect and evaluate.
- Students' interactions (e.g., conversation with both instructors and peers).

3 Current Work

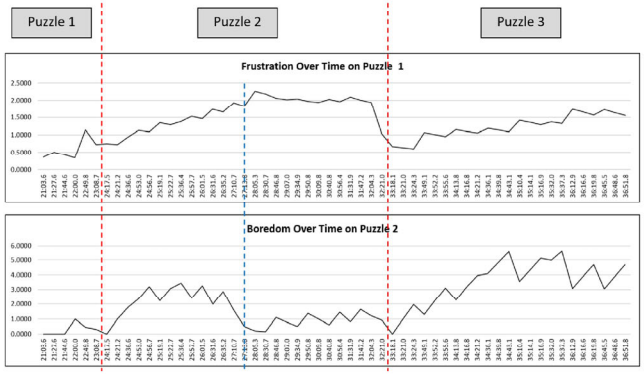
3.1 Algorithm of frustration detection

Frustration is a frequent emotion reported by elementary students during their online programming activities.[5] Based On Bosch' s study, frustration can be induced by students' unresolved impasses.[6] In our current work, the model of frustration detection related three variables as follows, which have been approved to be associated with frustration in Arroyo's research.[7]



$$Frustration = attempt_{weight} \cdot \sum_{i=0}^{n} a_i \cdot Variables_i \text{, where } a_i \text{is the constant.}$$

3.2 Results of frustration detection



- Puzzle 1- level 1
  - Frustration keeps lower.
  - Boredom keeps lower, almost no boredom.
- Puzzle 2- level 2
  - Frustration grows up with the cumulative numbers of incorrect attempts; after students got a correct attempt, the frustration tends to be stable.
  - Boredom keeps higher at the beginning of puzzle 2; then becomes lower after students got correct attempt.
- Puzzle 3- level 3
  - Frustration becomes lower than before, but still grows up with the cumulative numbers of incorrect attempts.
  - Boredom becomes higher than before, then arrives at peak with the cumulative numbers of incorrect attempts.

4 Future Work

- Other emotions detection.
- Analyzing students' learning performance.
- Evaluating the results.

Reference

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