Classification of Presentation MathML Expressions
Using Multilayer Perceptron
多層パーセプトロンによる Presentation MathML 式の分類

Student No: 201621624

Name : Yuma NAGAO

MathML (Mathematical Markup Language) is a markup language for describing math expressions. MathML consists of two set of elements: Presentation Markup and Content Markup. The former describes layout structure of math expressions, and is widely used to display math expressions in Web pages. On the other hand, the latter describes semantic structure of math expressions, and is suited to automatic calculation of math expressions. One of the challenging problem related to Presentation MathML is classification, i.e., given a MathML expression e , identify the class (e.g., hypergeometric function, bessel-type function, etc.) that e belongs to. If we can identify the class of a given Presentation MathML expression automatically, it is helpful for various applications, e.g., Presentation to Content MathML conversion, text-to-speech, and so on.

In this thesis, we propose a classification method for Presentation MathML expressions. Our method classifies MathML expressions by using multilayer perceptron, which is a kind of deep learning model having a simple structure. The difficulty in taking such an approach is that the size of MathML expressions are arbitrary, while multilayer perceptron requires input of fixed length. Thus, it is impossible to input MathML expressions to multilayer perceptron directly. To address this problem, our method converts a Presentation MathML expression into a fixed length vector, which is based on binary branch vector. We train a multilayer perceptron by using such vectors and classify MathML expressions by the multilayer perceptron. Experimental results show that our method classifies math expressions with high accuracy.

Academic Advisors: Principal: Nobutaka SUZUKI

Secondary: Taro TEZUKA