EÖTVÖS LORÁND UNIVERSITY

FACULTY OF INFORMATICS

Thesis Registration Form

Student's Data:

Student's Name: Su Xiaotian

Student's Neptun code: BS8TLS

Course Data:

Student's Major: Computer Science BSc

I have an internal supervisor

Internal Supervisor's Name: *Pinter Balazs*

Supervisor's Home Institution: *Eötvös Loránd University*

Address of Supervisor's Home Institution: *Budapest, Egyetem tér 1-3, 1053*

Supervisor's Position and Degree: *senior lecturer, PhD*

Thesis Title: Program synthesis with a stack-based concatenative language

Topic of the Thesis:

(Upon consulting with your supervisor, give a 150-300-word-long synopsis os your planned thesis.)

This project aims to develop a program synthesis model to generate automatic code given sample input-output pairs. In the model, I will train a neural network to predict a composition of terms that transform the given inputs to the given outputs. The inputs and outputs are stored in stacks, the program will be able to process them using tree-lstm and with the help of the state-of-the-art best-first beam search, it can generate a concatenative program.

The DSL used in this project is a stack-based concatenative language inspired by the Cat Programming Language which does not have variables, only a list of operations where every operation manipulates a global stack. Each operation is either a command or a value. All commands in this DSL are functions that take a stack as input and return a new stack as output. Quoted is a special command in support of higher-order functions: it represents an instruction as a value and pushes it onto the stack which can be used by other commands later. For example: <6 7 dup mul sub> results in a stack with the value 43 on top.

Budapest, 2020.11.26.