

Zagreb, 3 March 2017

## MASTER THESIS ASSIGNMENT No. 1417

Student: **Marko Ratković (0036471921)**  
Study: Computing  
Profile: Computer Science

Title: **Deep Learning Model for Base Calling of MinION Nanopore Reads**

### Description:

In the MinION device, single-stranded DNA fragments move through nanopores, which causes drops in the electric current. The electric current is measured at each pore several thousand times per second. Each event is described by the mean and variance of the current and by event duration. This sequence of events is then translated into a DNA sequence by a base caller.

Develop a base-caller for MinION nanopore sequencing platform using a deep learning architecture such as convolutional neural networks and recurrent neural networks. Compare base calling accuracy with the default base caller supplied by the manufacturer. For testing purposes use publicly available datasets and Graphmap tool for aligning called reads on reference genomes.

Implement method using TensorFlow or similar library. The code should be documented and hosted on a publicly available Github repository.

Issue date: 10 March 2017  
Submission date: 29 June 2017

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