

# Abstract

The thesis presents new quality optimization methods in neural machine translation systems. It is based on seven scientific papers presented at international conferences.

Chapter 1 introduces the research problem, motivation, structure and scope of the thesis. It provides an overview of the included papers, together with details on authors, venues, presentation type, and the contribution of the thesis author. The chapter also contains a short description of each paper included in the thesis.

Chapters 2 to 5 present research papers on quality optimization methods in neural machine translation systems. They also include descriptions of methods applied in the solutions of shared tasks held at scientific conferences. Chapter 2 introduces a new method for integrating hand-crafted lexicons in machine translation involving morphologically rich languages. Chapter 3 reports on the methods used in the solutions of shared tasks organized as part of the PolEval 2021 workshop on translation quality estimation and evaluation. Chapters 4 and 5 describe the methods used in the solutions of shared tasks organized as part of the WMT 2021 and WMT 2022 conferences.

Chapters 6 to 8 present development papers that describe real-world neural machine translation systems developed as part of participation in the Industrial PhD program. Chapter 6 reports on the machine translation system created for the Polish Border Guard within the R&D project "Advanced Internet analysis supporting the detection of criminal groups". Chapter 7 discusses the challenges encountered in implementing and deploying a machine translation system for the EY corporation. Chapter 8 describes POLENG MT, an adaptive machine translation platform that can be used as a cloud-based web application or as an on-site solution.

The appendices include a certificate from the WMT 2022 conference organizers and declarations of contribution from the co-authors of each paper.

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