TUHH
Technische Universität Hamburg

TUHH E-15 D-21071 Hamburg

INSTITUT FÜR
SICHERHEIT IN
VERTEILTEN ANWENDUNGEN

PROF. DR. DIETER GOLLMANN

Reviewer's report for the Ph.D. Thesis titled *Development and research of the semantic analysis models in web resources for defining an extremist orientation in the text* submitted by Bolatbek Milana Aslanbekkyzy for the Ph.D. degree in the specialty 6D100200 – Information Security Systems

The thesis submitted by Bolatbek M. A. is devoted to a comprehensive study and the creation of semantic analysis models for identifying Kazakh language extremist texts published on web resources.

The problem of identifying and classifying postings related to extremism on the Internet is of current relevance. Extremist groups use various social media sites to promote their ideology and attract new recruits to their groups. Over the past decades, the spread of extremist ideas on the Internet has increased. In this regard, new methods for detecting extremist content are being developed that foster the rapid identification – and elimination – of extremist tendencies on web resources. However, despite the fact that extremist propaganda often uses languages other than English, including Kazakh, many methods are compatible only with English texts. The situation in the field of countering extremist activities on web resources thus remains difficult, and asks for scientific research and the implementation of effective and timely measures aimed at identifying, preventing and suppressing manifestations of extremist postings written in the Kazakh language. This state of affairs explains the relevance of the dissertation submitted.

In her work, the candidate has conducted a study on creating a semantic analysis model for identifying extremist texts published in the Kazakh language on web resources. As a result of this study, for the first time, a model for identifying extremist texts on web resources was developed on the basis of deep learning methods, taking into account the peculiarities of the Kazakh language. A corpus of extremist texts in the Kazakh language has been compiled for training and testing machine learning methods, including deep learning approaches. Based on the model and methods developed, software tools for determining the proportion of extremist texts in social network groups on web resources has been developed. The relative performance of these methods has been evaluated in substantial experiments. The results of the experimental evaluation are promising.

Postanschrift
21071 Hamburg

Besucheranschrift
Am Schwarzenberg-Campus 3
21071 Hamburg

Telefon
++49 (40) 428 78-3026

Fax

E-mail
diego@tuhh.de

www.tu-harburg.de

The results of the dissertation research have scientific and practical significance. Fundamental results can be used by the world scientific community, applied results in the form of models and methods can be used by authorities tasked with information security, critical infrastructure protection, and countering internet extremism. The candidate has published her results in 19 articles, including one paper in a journal indexed in the Scopus database.

Conclusions. The thesis demonstrates the candidate's ability to work independently and creatively in the field of applying machine learning to information security challenges. The results obtained are of scientific and practical significance, and provide a solution to the important application task of determining extremist tendencies in Kazakh language texts published in web resources.

The thesis thus meets the standard requirements imposed on a dissertation in this field, and I consider that the dissertation "Development and research of the semantic analysis models in web resources for defining an extremist orientation in the text" submitted by Bolatbek M.A. satisfies the requirements for obtaining the degree of Doctor of Philosophy (Ph.D.) in the specialty 6D100200 – Information Security Systems.

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Prof. Dr. Dieter Gollmann
(Foreign Scientific Advisor)

Postanschrift
21071 Hamburg

Besucheranschrift
Am Schwarzenberg-Campus 3
21071 Hamburg

Telefon
++49 (40) 428 78-3026

Fax

E-mail
diego@tuhh.de

www.tu-harburg.de