

COMENIUS UNIVERSITY IN BRATISLAVA  
FACULTY OF MATHEMATICS PHYSICS AND INFORMATICS

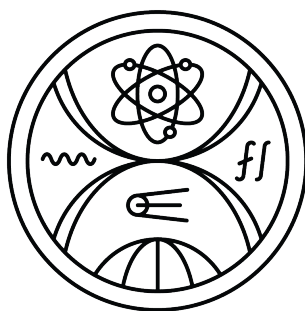


# AUTOMATED EVALUATION OF THE REY-OSTERRIETH COMPLEX IMAGE TEST

Master's thesis



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FACULTY OF MATHEMATICS PHYSICS AND INFORMATICS



# AUTOMATED EVALUATION OF THE REY-OSTERRIETH COMPLEX IMAGE TEST

Master's thesis

Study program: Applied Informatics  
Branch of study: Informatics  
Department: Department of Applied Informatics  
Supervisor: doc. RNDr. Zuzana Černeková, PhD.



Univerzita Komenského v Bratislave  
Fakulta matematiky, fyziky a informatiky

## ZADANIE ZÁVEREČNEJ PRÁCE

**Meno a priezvisko študenta:** Bc. Lucia Korbeľová  
**Študijný program:** aplikovaná informatika (Jednoodborové štúdium, magisterský II. st., denná forma)  
**Študijný odbor:** informatika  
**Typ záverečnej práce:** diplomová  
**Jazyk záverečnej práce:** slovenský  
**Sekundárny jazyk:** anglický

**Názov:** Automatizácie hodnotenie Rey-Osterriethovho komplexného obrázkového testu

*Automated evaluation of the Rey-Osterrieth complete image test*

**Anotácia:** Poruchy pamäti sú charakteristickým znakom mnohých rôznych neurologických a psychiatrických ochorení. Rey-Osterriethova komplexná figúra (ROCF) je najmodernejším hodnotiacim nástrojom neuropsychológov na celom svete na posúdenie stupňa zhoršenia neverbálnej vizuálnej pamäte. Na získanie skóre vyškolený klinický lekár kontroluje kresbu ROCF pacienta a kvantifikuje odchýlky od pôvodnej kresby.

**Cieľ:** Cieľom práce je vytvoriť automatizovaný systém pre hodnotenie neuropsychologického testu Rey-Osterriethovej komplexnej figúry (ROCF) s použitím metód počítačového videnia. Tento systém bude využívať pokročilé techniky počítačového videnia a umelej inteligencie na automatické rozpoznávanie a kvantifikáciu odchýlok od pôvodnej kresby. Účinnosť systému a jeho presnosť budú porovnávané s tradičnými metódami hodnotenia. Cieľom je poskytnúť efektívny nástroj na automatizované hodnotenie neuropsychologických testov, čo môže prispieť k lepšiemu diagnostikovaniu a monitorovaniu neurologických a psychiatrických porúch pamäte.

**Literatúra:** Davide Di Febbo, Simona Ferrante, Marco Baratta, Matteo Luperto, Carlo Abbate, Pietro Davide Trimarchi, Fabrizio Giunco, Matteo Matteucci; A decision support system for Rey-Osterrieth complex figure evaluation; Expert Systems with Applications, Volume 213, Part C, 2023, 119226, ISSN 0957-4174, <https://doi.org/10.1016/j.eswa.2022.119226>. (<https://www.sciencedirect.com/science/article/pii/S0957417422022448>)

Park, J.Y., Seo, E.H., Yoon, H.J. et al. Automating Rey Complex Figure Test scoring using a deep learning-based approach: a potential large-scale screening tool for cognitive decline. Alz Res Therapy 15, 145 (2023). <https://doi.org/10.1186/s13195-023-01283-w>

R. O. Canham, S. L. Smith and A. M. Tyrrell, "Automated scoring of a neuropsychological test: the Rey Osterrieth complex figure," Proceedings of the 26th Euromicro Conference. EUROMICRO 2000. Informatics: Inventing the Future, Maastricht, Netherlands, 2000, pp. 406-413 vol.2, doi: 10.1109/EURMIC.2000.874519.



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**Vedúci:** doc. RNDr. Zuzana Černeková, PhD.  
**Katedra:** FMFI.KAI - Katedra aplikovanej informatiky  
**Vedúci katedry:** doc. RNDr. Tatiana Jajcayová, PhD.  
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**Dátum schválenia:** 14.11.2023

prof. RNDr. Roman Ďurikovič, PhD.  
garant študijného programu

.....  
študent

.....  
vedúci práce

I hereby declare that I have independently completed this master's thesis on the topic 'Automated Evaluation of the Rey-Osterrieth Complex Image Test', including all its appendices and images, using the literature listed in the attached bibliography and artificial intelligence tools, under the careful supervision of my thesis advisor. I declare that I have used artificial intelligence tools in accordance with applicable legal regulations, academic rights and freedoms, ethical and moral principles, while maintaining academic integrity, and that their use is appropriately indicated in the work.

Bratislava, 2026

.....  
Bc. Lucia Korbeľová

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# Abstract

Abstract text

**Keywords:** Rey-Osterrieth complex figure, machine learning, Convolutional neural networks, Transformers



# Abstrakt

Abstrakt text

**Kľúčové slová:** Rey-Osterriethova komplexná figúra, strojové učenie, Konvolúčna neuronová sieť, transformery

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# Terminology

## Terms

- **Some term**  
Explanation of the term.

## Abbreviations

- **ROCF** - Rey-Osterrieth complex figure.
- **CNN** - Convolutional Neural Network.
- **FC** - Fully-Connected.
- **ML** - Machine Learning.



# Motivation

Motivation text

# Chapter 1

## Introduction

Introduction text



## Chapter 2

### Rey-Osterrieth complex figure

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# Chapter 3

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# Chapter 4

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results text

### 8.1 Summary

Summary text

# Chapter 9

## Conclusion

conclusion text



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