

Mihai Horia Popescu, PhD Student

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Education

- Nov. 2021 – Oct. 2024 📖 **PhD in Computer Science and Artificial Intelligence**, 37th cycle, University of Udine, Italy.
- Oct. 2014– Jul. 2017 📖 **Master Degree in Computer Science International**, 110/110. University of Udine, Italy. Alpen-Adria-Universität Klagenfurt (Austria).
- Oct. 2010 – Mar. 2014 📖 **Bachelor Degree Computer Science**. University of Udine, Italy.
- Sep. 2004 – Jun. 2009 📖 **High School Diploma**, Head Technician Industrial Expert - Computer Science Specialization. I.T.S.T. "J.F. Kennedy", Pordenone, Italy.

Visits

- Mar. 2023 – May. 2023 📖 **Visiting Student**, Information School, University of Sheffield, Sheffield, United Kingdom. Visiting period during PhD studies.

Work Experience

- Nov. 2024 - Today 📖 **Research Fellow**, University of Udine, Italy.
Machine Learning Techniques for Automated Coding of Medical Documents
- Jul. 2020 - Oct. 2021 📖 **Research Fellow**, University of Udine, Italy.
Automated coding of health documents. Study of new approaches for the automated coding with the auxiliary of Machine Learning techniques. Statistical analysis and refinement over DORIS rules system.
- Nov. 2019 - Jun. 2020 📖 **Research Collaborator** University of Udine, Italy.
Study and implementation of a tool for the extraction of the underlying cause of death based on the ICD set of rules defined in SMoL.
- Oct. 2018 - Sep. 2019 📖 **Research Collaborator** University of Udine, Italy.
Iris Project. Analysis and recommendations for integrating Iris with the ICD-11 Platform. Implementing of a prototype software for supporting experts in the rule transition work, with preliminary evaluation on a selected group of experts.
- Sep. 2017 - Aug. 2018 📖 **Research Fellow** University of Udine, Italy.
Analysis and development of a localization system for people with cognitive disorders based on web and IoT technologies.

Publications

- Davidson, R., Hardman, W., Amit, G., Bilu, Y., Della Mea, V., Galaida, A., ... Yanover, C. (2025). Snomed ct entity linking challenge. *Journal of the American Medical Informatics Association*, 32(9), 1397–1406.
🔗 doi:10.1093/jamia/ocaf104. eprint:
<https://academic.oup.com/jamia/article-pdf/32/9/1397/63747004/ocaf104.pdf>
- Popescu, M. H., Della Mea, V., & Roitero, K. (2025, May). Few-shot learning of medical coding systems: A case study on death certificates with bert and mistral. In *Intelligent health systems – from technology to data and knowledge*. 🔗 doi:10.3233/shti250476

- 3 Popescu, M. H., Roitero, K., & Della Mea, V. (2025). Integrating confidence, difficulty, and language model calibration for explainability in clinical documents coding. Under review at JMIR AI.
- 4 Roitero, K., Volpi, D., Lunardi, R., Popescu, M. H., & Della Mea, V. (2025). Improving medical code classification for death certificates using ontology-adapted contrastive loss in bert models. In *Proceedings of the Ital-IA Workshop 2025, June 23-24, 2025, Trieste, Italy*.
- 5 Popescu, M. H., Celik, C., Della Mea, V., & Jakob, R. (2022, May). Preliminary validation of a rule-based system for mortality coding using icd-11. In *Challenges of trustable ai and added-value on health*. doi:10.3233/shti220555
- 6 Popescu, M. H., Roitero, K., & Della Mea, V. (2022). Explainable classification of medical documents through a text-to-text transformer. (Vol. 3307, pp. 57-66). Retrieved from <https://www.scopus.com/inward/record.uri?eid=2-s2.0-85145599690&partnerID=40&md5=83279279253eeb2b7b7782e441e1feff>
- 7 Popescu, M. H., Roitero, K., Travasci, S., & Della Mea, V. (2021, August). Automatic assignment of ICD-10 codes to diagnostic texts using transformers based techniques. In *2021 IEEE 9th international conference on healthcare informatics (ICHI)*. doi:10.1109/ichi52183.2021.00037
- 8 Roitero, K., Portelli, B., Popescu, M. H., & Della Mea, V. (2021). DiLBERT: Cheap embeddings for disease related medical NLP. *IEEE Access*, 9, 159714-159723. doi:10.1109/access.2021.3131386
- 9 Della Mea, V., Popescu, M. H., & Roitero, K. (2020a, November). Underlying cause of death identification from death certificates via categorical embeddings and convolutional neural networks. In *2020 IEEE international conference on healthcare informatics (ichi)* (pp. 1-6). doi:10.1109/ICHI48887.2020.9374316
- 10 Della Mea, V., Popescu, M. H., Grippo, F., Orsi, C., & Heuser, F. (2020). Logical rules and a preliminary prototype for translating mortality coding rules from icd-10 to icd-11. *Studies in health technology and informatics*, 270, 297-301. doi:10.3233/SHTI200170
- 11 Della Mea, V., Popescu, M. H., Gonano, D., Petaros, T., Emili, I., & Fattori, M. G. (2020). A communication infrastructure for the health and social care internet of things: Proof-of-concept study. *JMIR Med Inform*, 8(2), e14583. doi:10.2196/14583
- 12 Della Mea, V., Popescu, M. H., & Roitero, K. (2020b). Underlying cause of death identification from death certificates using reverse coding to text and a nlp based deep learning approach. *Informatics in Medicine Unlocked*, 21, 100456. doi:10.1016/j.imu.2020.100456
- 13 Orsi, C., De Rocchi, D., Popescu, M. H., Heuser, F., Weber, S., Frova, L., ... Grippo, F. (2020). Implementing icd-11 for mortality statistics: Translation of decision tables embedded in the automated coding system iris. *RIVISTA DI STATISTICA UFFICIALE N. 1-2/2020*, 33-51.
- 14 Della Mea, V., Popescu, M. H., & Heuser, F. (2019, October). Transition of automated coding systems for mortality to icd11: Logical rules and a preliminary prototype. In *Who-fig network annual meeting 2019 banff, canada 2019*, Banff, Canada.
- 15 Gonano, D., Popescu, M. H., Felice, I., Placer, M., Fattori, M. G., & Della Mea, V. (2018). An iot infrastructure for alzheimer patients' tracking. In *Proc. of medical informatics europe 2018, goteborg, sweden*, MIE2018.
- 16 Basaldella, M., Helmy, M., Antolli, E., Popescu, M. H., Serra, G., & Tasso, C. (2017, September). Exploiting and evaluating a supervised, multilanguage keyphrase extraction pipeline for under-resourced languages. In *Proceedings of the international conference recent advances in natural language processing, RANLP 2017* (pp. 78-85). doi:10.26615/978-954-452-049-6_012

Other Activities

Challenges

- 2024 ■ **SNOMED CT Entity Linking Challenge** 3rd place at SNOMED CT Entity Linking Challenge. Organized by DrivenData (<https://www.drivendata.org/competitions/258/competition-snomed-ct/page/816/>). The objective of this competition is to link spans of text in clinical notes with specific topics in the SNOMED CT clinical terminology. Participants trained models based on real-world doctor's notes that had been de-identified and annotated with SNOMED CT concepts by medically trained professionals. Utilized the largest publicly available dataset of labeled clinical notes, applying advanced natural language processing (NLP) techniques to achieve accurate clinical concept mapping within this comprehensive and widely recognized clinical terminology system.

WHO-FIC Network Annual Meeting

- 2022 ■ Attended as a consultant at the annual meeting of the WHO Family of International Classifications Network held on 17-21 October 2022.

Workshop

- 2024 ■ **Mortality Rule Digitalization technical workshop** This technical workshop will bring together esteemed mortality experts from the *WHO Family of International Classifications Network* and aims to further advance the work on ICD mortality rules digitalization. It will play a crucial role in harmonizing the understanding and digital conversion of the mortality rules, while also facilitating the development of technical descriptions and interpretations of these rules and addressing any obstacles encountered during the transition. 02-04 July, 2024, Geneva, Switzerland.
- **Mortality Rule Digitalization technical workshop** This technical workshop will bring together mortality experts from the *WHO Family of International Classifications Network* and aims to further advance the work on ICD mortality rules digitalization. It will play a crucial role in harmonizing the understanding and digital conversion of the mortality rules, while also facilitating the development of technical descriptions and interpretations of these rules and addressing any obstacles encountered during the transition. 16-18 April, 2024, Conegliano, Italy.
- 2023 ■ **Mortality Rule Digitalization technical workshop** This technical workshop will bring together esteemed mortality experts from the *WHO Family of International Classifications Network* and aims to further advance the work on ICD mortality rules digitalization. It will play a crucial role in harmonizing the understanding and digital conversion of the mortality rules, while also facilitating the development of technical descriptions and interpretations of these rules and addressing any obstacles encountered during the transition. 18-20 September, 2023, Geneva, Switzerland.
- **Mortality Rule Digitalization technical workshop** This technical workshop will bring together mortality experts from the *WHO Family of International Classifications Network*, will serve to continue the mortality rules digitalization work discussions that were initiated in August 2022 and further deliberated in December 2022 and to progress the work on the conversion of the textual descriptions of the ICD mortality coding rules described in the ICD-11 reference guide into a digital knowledgebase that can be processed by the algorithm. 27, 28 February and 1 March 2023, Montreux, Switzerland. (Remotely)
- 2022 ■ **Mortality Rule Digitalization technical workshop** This technical workshop will bring together mortality experts from the *WHO Family of International Classifications Network*, will serve to continue the mortality rules digitalization work discussions that were initiated in August 2022 and progress the work on the conversion of the textual descriptions of the ICD mortality coding rules into a digital knowledgebase that can be processed by the algorithm described in the ICD-11 reference guide. 07-09 December, 2022, Geneva, Switzerland.

Other Activities (continued)

- **WHO DORIS multi-country workshop** The objectives of the DORIS workshop are to: (1) identify status, needs and prospects for automated Underlying Cause of Death (UCoD) selection at country level; (2) demonstrate how to do operate the DORIS for automated UCoD selection; (3) build-up knowledge and skills to operate the DORIS tool for automated UCoD selection using the country's ICD-11 coded CoD data sets; (4). discuss and plan for integrating DORIS in the countries ICD-11 based MCCD. 17-21 October 2022, Geneva, Switzerland.

Talks

- 2025 ■ **Interpretabilità e spiegabilità dell'Intelligenza Artificiale in ambito medico.** *SDIA Fest 2025 - Festival della Scienza dei Dati e dell'Intelligenza Artificiale*, 20 May 2025. Monfalcone, Italia. <https://sites.google.com/liceobuonarroti.it/sdiafest2025/attivita%C3%A0>
- 2022 ■ **Explainable Classification of Medical Documents Through a Text-to-Text Transformer.** *21st International Conference of the Italian Association for Artificial Intelligence (AixIA 2022), Workshop on Artificial Intelligence for Healthcare (HC@AixIA, 1st edition)*, 30 Novembre 2022. Udine, Italia. https://drive.google.com/file/d/1QROKEARsyS_yrMWDV9eQ4MhjiwRhRTLA/view
- **Preliminary Validation of a Rule-Based System for Mortality Coding Using ICD-11 Challenges of Trustable AI and Added-Value on Health.** *European Federation for Medical Informatics (EFMI), 32nd Medical Informatics Europe Conference (MIE2022)*, 29 Maggio 2023. Nice, France.
- 2021 ■ **Automatic Assignment of ICD-10 Codes to Diagnostic Texts using Transformers Based Techniques** *IEEE International Conference on Healthcare Informatics (ICHI)*, 16 Agosto 2022. (Remote) Victoria, BC, Canada.

Teaching

- 2024-2025 ■ **Tecnologie Web per il Cloud e Laboratorio**, Bachelor's Degree in Internet of Things, Big Data & Machine Learning, University of Udine. Lectures: 1. Hours: 2.
- 2023-2024 ■ **Tecnologie Web per il Cloud e Laboratorio**, Bachelor's Degree in Internet of Things, Big Data & Machine Learning, University of Udine. Lectures: 4. Hours: 8.
- 2022-2023 ■ **Tecnologie Web per il Cloud e Laboratorio**, Bachelor's Degree in Internet of Things, Big Data & Machine Learning, University of Udine. Lectures: 1. Hours: 2.
- 2021-2022 ■ **Tecnologie Web per il Cloud e Laboratorio**, Bachelor's Degree in Internet of Things, Big Data & Machine Learning, University of Udine. Lectures: 1. Hours: 2.
- 2020-2021 ■ **Tecnologie Web per il Cloud e Laboratorio**, Bachelor's Degree in Internet of Things, Big Data & Machine Learning, University of Udine. Lectures: 1. Hours: 2.

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