

Accurate prediction of international trade flows : leveraging knowledge graphs and their embeddings

Rincon-Yanez, Diego; **Ounoughi, Chahinez; Sellami, Bassem; Kalvet, Tarmo; Tiits, Marek; Senatore, Sabrina; Ben Yahia, Sadok** Journal of King Saud University - computer and information sciences 2023 / art. 101789, 11 p
<https://doi.org/10.1016/j.jksuci.2023.101789> [Journal metrics at Scopus](#) [Article at Scopus](#) [Journal metrics at WOS](#) [Article at WOS](#)

Active learning-based mobile malware detection utilizing auto-labeling and data drift detection

Deng, Zhe; Hubert, Arthur; Ben Yahia, Sadok; Bahsi, Hayret Proceedings of the 2024 IEEE International Conference on Cyber Security and Resilience, CSR 2024 2024 / p. 146 - 151 <https://doi.org/10.1109/CSR61664.2024.10679343> [Article at Scopus](#) [Article at WOS](#)

Advancing drug–target interaction prediction: a comprehensive graph-based approach integrating knowledge graph embedding and ProtBert pretraining

Djeddi, Warith Eddine; Hermi, Khalil; **Ben Yahia, Sadok; Diallo, Gayo** BMC Bioinformatics 2023 / art. 488, 41 p.: ill
<https://doi.org/10.1186/s12859-023-05593-6> [Journal metrics at Scopus](#) [Article at Scopus](#) [Journal metrics at WOS](#) [Article at WOS](#)

An alignment-based implementation of a holistic ontology integration method

Osman, Ines; **Pileggi, Salvatore Flavio; Ben Yahia, Sadok; Diallo, Gayo** MethodsX 2021 / art. 101460, p. 1–29
<https://doi.org/10.1016/j.mex.2021.101460> [Journal metrics at Scopus](#) [Article at Scopus](#) [Journal metrics at WOS](#) [Article at WOS](#)

An enhanced lightweight authentication scheme for secure access to cloud data

Hammami, Hamza; Obaidat, Mohammad S.; **Ben Yahia, Sadok** Proceedings of the 17th International Joint Conference on e-Business and Telecommunications, ICETE 2020 - Volume 3: ICE-B, Lieusaint, Paris, France, July 8-10, 2020 2020 / p. 110-117
<https://doi.org/10.5220/0009824301100117>

Arabic aspect category detection for hotel reviews based on data augmentation and classifier chains

Ameur, Asma; Hamdi, Sana; **Ben Yahia, Sadok** SAC '23: Proceedings of the 38th ACM/SIGAPP Symposium on Applied Computing 2023 / p. 942-949 <https://doi.org/10.1145/3555776.3577746>

Assessment of malicious tweets impact on stock market prices

Ishikawa, Tatsuki; Ben Sassi, Imen; Ben Yahia, Sadok Research Challenges in Information Science : 15th International Conference, RCIS 2021, Limassol, Cyprus, May 11–14, 2021 : proceedings 2021 / p. 330–346 https://doi.org/10.1007/978-3-030-75018-3_22 [Conference Proceedings at Scopus](#) [Article at Scopus](#) [Article at WOS](#)

At the crossroads of product complexity, market demand, and machine learning

Kalvet, Tarmo; Tiits, Marek; Ounoughi, Chahinez; Ben Sassi, Imen; Ben Yahia, Sadok Management & marketing 2024

BERT and Word embedding for interest mining of Instagram users

Hamdi, Sana; Hamdi, Ahmed; **Ben Yahia, Sadok** Advances in Computational Collective Intelligence : 14th International Conference, ICCCI 2022, Hammamet, Tunisia, September 28-30, 2022, Proceedings 2022 / p. 123 - 136 https://doi.org/10.1007/978-3-031-16210-7_10 [Conference Proceedings at Scopus](#) [Article at Scopus](#) [Article at WOS](#)

Big data analytics in association rule mining : a systematic literature review

Shahin, Mahtab; Arakkal Peious, Sijo; Sharma, Rahul; Kaushik, Minakshi; Ben Yahia, Sadok; Shah, Syed Attique; Draheim, Dirk BDET 2021: 2021 the 3rd International Conference on Big Data Engineering and Technology (BDET) : proceedings 2021 / p. 40-49 <https://doi.org/10.1145/3474944.3474951> [Conference Proceedings at Scopus](#) [Article at Scopus](#)

BLAIC 2022: 1st workshop on blockchain and AI for community : chairs' welcome and workshop summary

Cheah, WaiShiang; Norta, Alex; **Ben Yahia, Sadok; Hakiri, Akram; Sim, Yee Wai** WebSci '22: Proceedings of the 14th ACM Web Science Conference 2022 2022 / p. 433 - 434 <https://doi.org/10.1145/3501247.3539019> [Conference Proceedings at Scopus](#) [Article at Scopus](#) [Article at WOS](#)

Business intelligence and analytics: On-demand ETL over document stores

Souibgui, Manel; Atigui, Faten; **Ben Yahia, Sadok; Si-Said Cherfi, Samira** Research Challenges in Information Science : 14th International Conference, RCIS 2020, Limassol, Cyprus, September 23-25, 2020 : Proceedings 2020 / p. 556-561
https://doi.org/10.1007/978-3-030-50316-1_38 [Conference proceedings at Scopus](#) [Article at Scopus](#) [Article at WOS](#)

Challenges of applying e-learning in the libyan higher education system

Ghawail, Entisar Alhadi Al; **Ben Yahia, Sadok; Alrshah, Mohamed A.** International journal of advanced trends in computer science and engineering 2019 / p. 38-43 : ill <https://doi.org/10.30534/ijatcse/2019/0681.42019> [Journal metrics at Scopus](#) [Article at Scopus](#)

A comprehensive survey on digital twin for future networks and emerging Internet of Things industry

Hakiri, Akram; Gokhale, Aniruddha; **Ben Yahia, Sadok; Mellouli, Nedra** Computer Networks 2024 / art. 110350
<https://doi.org/10.1016/j.comnet.2024.110350> [Journal metrics at Scopus](#) [Article at Scopus](#) [Journal metrics at WOS](#) [Article at WOS](#)

Concise description of telecom service use through concept chains

Torim, Ants; Ben Yahia, Sadok; Raun, Kristo MEDES '19 : a Digital Ecosystem for Personal Manufacturing : an Architecture for

Cloud-based Distributed Manufacturing Operating Systems : proceedings 2019 / p. 181–186 : ill
<https://doi.org/10.1145/3297662.3365790>

Correction to: Advancing drug–target interaction prediction: a comprehensive graph-based approach integrating knowledge graph embedding and ProtBert pretraining (BMC Bioinformatics, (2023), 24, 1, (488), 10.1186/s12859-023-05593-6)

Djeddi, Warith Eddine; Hermi, Khalil; **Ben Yahia, Sadok**; Diallo, Gayo BMC Bioinformatics 2024 / art. 289

<https://doi.org/10.1186/s12859-024-05905-4> [Journal metrics at Scopus](#) [Article at Scopus](#) [Journal metrics at WOS](#) [Article at WOS](#)

Corrections to “A novel computational approach for global alignment for multiple biological networks”

Ben Yahia, Sadok; Djeddi, Warith Eddine; Nguifo, Engelbert Mephu IEEE/ACM transactions on computational biology and bioinformatics 2019 / p. 700 <https://doi.org/10.1109/TCBB.2019.2895762>

Cross-border data exchange in the Nordic-Baltic region : data intermediaries, interoperability, and e-services orchestration = Piiriülene andmevahetus Põhja-Balti regioonis : andmevahendajad, koostalitlusvõime ja e-teenuste orkestreerimine

Jackson, Eric Blake 2024 https://www.ester.ee/record=b5704325*est <https://doi.org/10.23658/taltech.54/2024>
<https://digikogu.taltech.ee/et/Item/4c85549d-2e2a-4fff-bf11-08ce2295e945>

Data fusion for ITS : a systematic literature review

Ounoughi, Chahinez; Ben Yahia, Sadok Information Fusion 2023 / p. 267-291 <https://doi.org/10.1016/j.inffus.2022.08.016> [Journal metrics at Scopus](#) [Article at scopus](#) [Journal metrics at WOS](#) [Article at WOS](#)

Data generative machine learning model for the assessment of outdoor thermal and wind comfort in a northern urban environment

Eslamirad, Nasim; De Luca, Francesco; Lylykangas, Kimmo Sakari; Ben Yahia, Sadok Frontiers of architectural research 2023 / p. 541-555 : ill <https://doi.org/10.1016/j.foar.2022.12.001> [Journal metrics at Scopus](#) [Article at Scopus](#) [Journal metrics at WOS](#) [Article at WOS](#)

Deep magnitude management of clinical code embeddings to predict unplanned hospital readmissions

Bignoumba, Nzamba; Bertl, Markus; Mellouli, Nedra; Ben Yahia, Sadok Research Square 2024 / 32 p. : ill
<https://doi.org/10.21203/rs.3.rs-4705729/v1>

Deep padding and alignment strategies for irregular multivariate clinical time series

Bignoumba, Nzamba; Ben Yahia, Sadok; Mellouli, Nedra Procedia Computer Science 2024 / p. 3275 - 3284
<https://doi.org/10.1016/j.procs.2024.09.312> [Conference proceedings at Scopus](#) [Article at Scopus](#)

Deep Reinforcement Learning for energy-aware task offloading in join SDN-Blockchain 5G massive IoT edge network

Sellami, Bassem; Hakiri, Akram; Ben Yahia, Sadok Future generation computer systems 2022 / p. 363-379
<https://doi.org/10.1016/j.future.2022.07.024> [Journal metrics at Scopus](#) [Article at Scopus](#) [Journal metrics at Scopus](#) [Article at Scopus](#)

Designing a proof of concept for a virtual competence assistant

Liutkevičius, Markko; Kõosaar, Madis; Ben Yahia, Sadok Human Factors, Business Management and Society : proceedings of the 15th International Conference on Applied Human Factors and Ergonomics and the Affiliated Conferences, Nice, France, 24-27 July 2024. Vol. 135 2024 / p. 139–147 : ill <https://doi.org/10.54941/ahfe1004939>

A Digital ecosystem for personal manufacturing : an architecture for cloud-based distributed manufacturing operating systems

Vedešin, Anton; Dogru, John Mehmet Ulgar; **Liiv, Innar; Draheim, Dirk; Ben Yahia, Sadok** MEDES '19 : A Digital Ecosystem for Personal Manufacturing : An Architecture for Cloud-based Distributed Manufacturing Operating Systems : proceedings 2019 / p. 224–228 : ill <https://doi.org/10.1145/3297662.3365792>

Distributed scalable association rule mining over Covid-19 data

Shahin, Mahtab; Inoubli, Wissem; Shah, Syed Attique; **Ben Yahia, Sadok; Draheim, Dirk** Future Data and Security Engineering : 8th International Conference, FDSE 2021, Virtual Event, November 24–26, 2021 : proceedings 2021 / p. 39-52
https://doi.org/10.1007/978-3-030-91387-8_3 [Conference Proceedings at Scopus](#) [Article at Scopus](#)

Does serendipity enhance recommendation quality? Measuring accuracy and beyond-accuracy objectives of serendipitous POI suggestions

Ben Sassi, Imen; Järv, Priit; Ben Yahia, Sadok 27th European Conference on Artificial Intelligence, 19-24 October 2024, Santiago de Compostela, Spain - Including 13th Conference on Prestigious Applications of Intelligent Systems (PAIS 2024) 2024 / p. 3096–3103 : ill <https://doi.org/10.3233/FAIA240852> [Conference proceedings at Scopus](#) [Article at Scopus](#)

Domain adaptation approach for Arabic sarcasm selection in hotel reviews based on hybrid learning

Ameur, Asma; Hamdi, Sana; Ben Yahia, Sadok Procedia computer science 2023 / p. 3898-3908
<https://doi.org/10.1016/j.procs.2023.10.385> [Conference proceeding at Scopus](#) [Article at Scopus](#)

EcoLight : Eco-friendly traffic signal control driven by urban noise prediction

Ounoughi, Chahinez; Touibi, Ghofrane; Ben Yahia, Sadok Database and Expert Systems Applications : 33rd International Conference, DEXA 2022, Vienna, Austria, August 22-24, 2022 : proceedings, Part I 2022 / p. 205–219 https://doi.org/10.1007/978-3-031-12423-5_16 [Conference Proceedings at Scopus](#) [Article at Scopus](#) [Conference Proceedings at WOS](#) [Article at WOS](#)

EcoLight+ : a novel multi-modal data fusion for enhanced eco-friendly traffic signal control driven by urban traffic noise prediction

Ounoughi, Chahinez; Ounoughi, Doua; Ben Yahia, Sadok Knowledge and information systems 2023 / p. 5309–5329 <https://doi.org/10.1007/s10115-023-01938-y> [Journal metrics at Scopus](#) [Article at Scopus](#) [Journal metrics at WOS](#) [Article at WOS](#)

Effective optimization of billboard ads based on CDR data leverage

Semassel, Imed Eddine; **Ben Yahia, Sadok** Journal of Telecommunications and the Digital Economy 2022 / p. 76-95 <https://doi.org/10.18080/jtde.v10n2.527> [Journal metrics at Scopus](#) [Article at Scopus](#)

An efficient authentication and key agreement scheme for secure smart grid communication services

Hammami, Hamza; Obaidat, Mohammad S.; **Ben Yahia, Sadok** International journal of communication systems 2020 / art. e4558, p. 1–13 <https://doi.org/10.1002/dac.4558> [Journal metrics at Scopus](#) [Article at Scopus](#) [Journal metrics at WOS](#) [Article at WOS](#)

An efficient roadside unit deployment method for vehicular ad-hoc networks

Ben Chaabene, Seif; Yeferny, Taoufik; **Ben Yahia, Sadok** Procedia computer science 2020 / p. 771-780 <https://doi.org/10.1016/j.procs.2020.09.072> [Conference Proceedings at Scopus](#) [Article at Scopus](#)

An embedding driven approach to automatically detect identifiers and references in document stores

Souibgui, Manel; Atigui, Faten; **Ben Yahia, Sadok**; Cherfi, Samira Si-Said Data & knowledge engineering 2022 / art. 102003 <https://doi.org/10.1016/j.datak.2022.102003> [Journal metrics at Scopus](#) [Article at Scopus](#) [Journal metrics at WOS](#) [Article at WOS](#)

Energy-aware task scheduling and offloading using deep reinforcement learning in SDN-enabled IoT network

Sellami, Bassem; Hakiri, Akram; **Ben Yahia, Sadok**; Berthou, Pascal Computer networks 2022 / art. 108957, 12 p. : ill <https://doi.org/10.1016/j.comnet.2022.108957> [Journal metrics at Scopus](#) [Article at Scopus](#) [Journal metrics at WOS](#) [Article at WOS](#)

Enhanced approach of multilabel learning for the Arabic aspect category detection of the hotel reviews

Ameur, Asma; Hamdi, Sana; **Ben Yahia, Sadok** Computational intelligence 2024 / art. e12609, 23 p. : ill <https://doi.org/10.1111/coin.12609> [Journal metrics at Scopus](#) [Article at Scopus](#) [Journal metrics at WOS](#) [Article at WOS](#)

Enhancing public employment services with AI-enabled virtual competence assistant = Avalike tööturuteenuste parendamine tehisintellektil põhineva virtuaalse kompetentsiassistendiga

Liutkevičius, Markko 2024 https://www.ester.ee/record=b5702542*est <https://digikogu.taltech.ee/et/Item/05da711f-6b9e-4942-b6f1-50465521ccbb> <https://doi.org/10.23658/taltech.51/2024>

Evaluation of deep learning-based depression detection using medical claims data

Bertl, Markus; Bignoumba, Nzamba; Ross, Peeter; **Ben Yahia, Sadok**; Draheim, Dirk Artificial intelligence in medicine 2024 / art. 102745, 16 p. : ill <https://doi.org/10.1016/j.artmed.2023.102745> [Journal metrics at Scopus](#) [Article at Scopus](#) [Journal metrics at WOS](#) [Article at WOS](#)

Evaluation of deep learning-based depression detection using medical claims data : preprint

Bertl, Markus; Bignoumba, Nzamba; Ross, Peeter; **Ben Yahia, Sadok**; Draheim, Dirk SSRN 2023 / p. 1-34 : ill <https://doi.org/10.2139/ssrn.4478987>

Event detection based on open information extraction and ontology

Sahnoun, Sihem; Elloumi, Samir; **Ben Yahia, Sadok** Computational Collective Intelligence : 11th International Conference, ICCCI 2019, Hendaye, France, September 4–6, 2019 : proceedings, part I 2019 / p. 244-255 : ill https://doi.org/10.1007/978-3-030-28377-3_20 [Conference proceeding at Scopus](#) [Article at Scopus](#) [Conference proceeding at WOS](#) [Article at WOS](#)

Event detection based on open information extraction and ontology

Sahnoun, Sihem; Elloumi, Samir; **Ben Yahia, Sadok** Journal of Information and Telecommunication 2020 / p. 383-403 <https://doi.org/10.1080/24751839.2020.1763007> [Journal metrics at Scopus](#) [Article at Scopus](#) [Journal metrics at WOS](#) [Article at WOS](#)

Expected vs. unexpected : selecting right measures of interestingness

Sharma, Rahul; Kaushik, Minakshi; Arakkal Peious, Sijo; **Ben Yahia, Sadok**; Draheim, Dirk Big Data Analytics and Knowledge Discovery : 22nd International Conference, DaWaK 2020, Bratislava, Slovakia, September 14–17, 2020 : proceedings 2020 / p. 38-47 https://doi.org/10.1007/978-3-030-59065-9_4 [Conference Proceedings at Scopus](#) [Article at Scopus](#) [Conference Proceedings at WOS](#) [Article at WOS](#)

Exploratory analysis of collective intelligence projects developed within the EU-Horizon 2020 framework

Suran, Shweta; Pattanaik, Vishwajeet; **Ben Yahia, Sadok**; Draheim, Dirk Computational Collective Intelligence 11th International Conference, ICCCI 2019, Hendaye, France, September 4–6, 2019, Proceedings, Part II 2019 / p. 285-296 <https://doi.org/10.1007/978->

Exploring EU e-delivery integration for enabling interregional innovation through the SilverHub Platform

Jackson, Eric Blake; Kivimäki, Petteri; **Pappel, Ingrid; Ben Yahia, Sadok** dg.o '23 : Proceedings of the 24th Annual International Conference on Digital Government Research : Gdansk, Poland, July 11 - 14, 2023 2023 / p. 172–179 : ill <https://doi.org/10.1145/3598469.3598488>

From near real-time urban data to an explainable city-scale model to help reduce the Urban Heat Island (UHI) effect

Eslamirad, Nasim; De Luca, Francesco; Ben Yahia, Sadok; Lylykangas, Kimmo Sakari Journal of Physics: Conference Series 2023 / art. 092012, p. 1-6 : ill <https://doi.org/10.1088/1742-6596/2600/9/092012> [Conference proceedings at Scopus](#) [Article at Scopus](#)

Gamification model for developing e-learning in Libyan higher education

Al Ghawail, Entisar Alhadi; **Ben Yahia, Sadok;** Alrzini, Joma Rajab Smart education and e-learning 2021 2022 / p. 97-110 : ill https://doi.org/10.1007/978-981-16-2834-4_9 [Conference proceeding at Scopus](#) [Article at Scopus](#)

GC and other methods for full and partial context coverage

Raun, Kristo; Torim, Ants; Ben Yahia, Sadok Procedia computer science 2021 / p. 746–755 <https://doi.org/10.1016/j.procs.2021.08.077> [Conference proceeding at Scopus](#) [Article at Scopus](#) [Journal metrics at WOS](#) [Article at WOS](#)

Geoprocess of geospatial urban data in Tallinn, Estonia

Eslamirad, Nasim; De Luca, Francesco; Lylykangas, Kimmo Sakari; Ben Yahia, Sadok Data in brief 2023 / art. 109172, 13 p. : ill <https://doi.org/10.1016/j.dib.2023.109172> [Journal metrics at Scopus](#) [Article at Scopus](#) [Journal metrics at WOS](#) [Article at WOS](#)

Grand reports : a tool for generalizing association rule mining to numeric target values

Arakkal Peious, Sijo; Sharma, Rahul; Kaushik, Minakshi; Shah, Syed Attique; Ben Yahia, Sadok Big Data Analytics and Knowledge Discovery : 22nd International Conference, DaWaK 2020, Bratislava, Slovakia, September 14-17, 2020 : proceedings 2020 / p. 28-37 https://doi.org/10.1007/978-3-030-59065-9_3 [Conference Proceedings at Scopus](#) [Article at Scopus](#) [Conference Proceedings at WOS](#) [Article at WOS](#)

High-accuracy prediction of international raw material trade flows using temporal fusion transformer

Arrar, Djihad; Ounoughi, Chahinez; Kamel, Nadjet; **Kalvet, Tarmo; Tiits, Marek; Ben Yahia, Sadok** International Journal of Data Science and Analytics 2025 / art. 100288 <https://doi.org/10.1007/s41060-025-00781-4> <https://link.springer.com/article/10.1007/s41060-025-00781-4>

How does context influence music preferences : a user-based study of the effects of contextual information on users' preferred music

Ben Sassi, Imen; Ben Yahia, Sadok Multimedia Systems 2021 / p. 143–160 <https://doi.org/10.1007/s00530-020-00717-x> [Journal metrics at Scopus](#) [Article at Scopus](#) [Journal metrics at WOS](#) [Article at WOS](#)

How to select and weight context dimensions conditions for context-aware recommendation?

Zammali, Saloua; **Ben Yahia, Sadok** Expert Systems with Applications 2021 / art. 115176 <https://doi.org/10.1016/j.eswa.2021.115176> [Journal metrics at Scopus](#) [Article at Scopus](#) [Journal metrics at WOS](#) [Article at WOS](#)

The impact of the single digital gateway regulation from the citizens' perspective

Bhattarai, Rakshya; Pappel, Ingrid; Vainsalu, Heiko; Ben Yahia, Sadok; Draheim, Dirk Procedia Computer Science 2019 / p. 159 - 167 <https://doi.org/10.1016/j.procs.2019.12.168> [Conference proceeding at Scopus](#) [Article at Scopus](#) [Article at WOS](#)

Improving Arabic text to image mapping using a robust machine learning technique

Zakraoui, Jezia; Elloumi, Samir; Alja'am, Jihad Mohamad; **Ben Yahia, Sadok** IEEE Access 2019 / p. 18772 - 18782 : ill <https://doi.org/10.1109/ACCESS.2019.2896713> [Journal metrics at Scopus](#) [Article at Scopus](#) [Journal metrics at WOS](#) [Article at WOS](#)

In pursuit of AI excellence in public employment services : identifying the requirements

Liutkevičius, Markko; Samaranayaka, Piyum; Nõmmik, Sander; Ben Yahia, Sadok; Weck, Marina TalTech journal of European studies 2024 / p. 167-189 <https://doi.org/10.2478/bjes-2024-0021> https://www.ester.ee/record=b5290032*est [Journal metrics at Scopus](#) [Article at Scopus](#) [Journal metrics at WOS](#) [Article at WOS](#)

An insight into biological datamining based on rarity and correlation as constraints

Bouasker, Souad; **Ben Yahia, Sadok;** Diallo, Gayo SAC '19 : proceedings of the 34th ACM/SIGAPP Symposium on Applied Computing 2019 / p. 3-10 : ill <https://doi.org/10.1145/3297280.3297281> [Conference proceedings at Scopus](#) [Article at Scopus](#) [Article at WOS](#)

Interpretable machine learning for heterogeneous treatment effect estimators with Double ML: a case of access to credit for SMEs

Medianovskyi, Kyrylo; Malakauskas, Aidan; Lakstutiene, Ausrine; **Ben Yahia, Sadok** Procedia computer science 2023 / p. 2163-2172 : ill <https://doi.org/10.1016/j.procs.2023.10.207> [Conference proceeding at Scopus](#) [Article at Scopus](#)

Interpretable machine learning for SME financial distress prediction

Medianovskyi, Kyrylo; Malakauskas, Aidan; Lakstutiene, Ausrine; **Ben Yahia, Sadok** 12th International Conference on Information Systems and Advanced Technologies "ICISAT 2022" : Intelligent Information, Data Science and Decision Support System 2023 / p. 454 - 464 https://doi.org/10.1007/978-3-031-25344-7_42 [Article collection metrics at Scopus](#) [Article at Scopus](#)

Leveraging data for better bike sharing : a methodology for terminal availability prediction

Manai, Meriem; **Sellami, Bassem**; **Ben Yahia, Sadok** Procedia Computer Science 2024 / p. 971 - 980
<https://doi.org/10.1016/j.procs.2024.09.516> [Conference proceedings at Scopus](#) [Article at Scopus](#)

A lightweight anonymous authentication scheme for secure cloud computing services

Hammami, Hamza; **Ben Yahia, Sadok**; Obaidat, Mohammad S. The Journal of Supercomputing 2021 / p. 1693-1713
<https://doi.org/10.1007/s11227-020-03313-y> [Journal metrics at Scopus](#) [Article at Scopus](#) [Journal metrics at WOS](#) [Article at WOS](#)

Malicious accounts detection from online social networks : a systematic review of literature

Ben Sassi, Imen; **Ben Yahia, Sadok** International Journal of General Systems 2021 / p. 741-814
<https://doi.org/10.1080/03081079.2021.1976773> [Journal metrics at Scopus](#) [Article at Scopus](#) [Journal metrics at WOS](#) [Article at WOS](#)

A Markov chain-based data dissemination protocol for vehicular ad hoc networks

Yeferny, Taoufik; **Ben Yahia, Sadok** Computer communications 2021 / p. 303-314 : ill <https://doi.org/10.1016/j.comcom.2021.10.001>
[Journal metrics at Scopus](#) [Article at Scopus](#) [Journal metrics at WOS](#) [Article at WOS](#)

Model and Data Engineering : 10th international conference, MEDI 2021, Tallinn, Estonia, June 21-23, 2021 : proceedings 2021 <https://doi.org/10.1007/978-3-030-78428-7>

MORec: At the crossroads of context-aware and multi-criteria decision making for online music recommendation

Ben Sassi, Imen; **Ben Yahia, Sadok**; Liiv, Innar Expert systems with applications 2021 / art. 115375, 20 p. : ill
<https://doi.org/10.1016/j.eswa.2021.115375>

Multi-label learning for aspect category detection of Arabic hotel reviews using AraBERT

Ameur, Asma; Hamdi, Sana; **Ben Yahia, Sadok** ICAART 2023 - Proceedings of the 15th International Conference on Agents and Artificial Intelligence. Volume 2 2023 / p. 241-250 <https://doi.org/10.5220/0011694800003393> [Conference Proceedings at Scopus](#) [Article at Scopus](#)

A new approach of morphological analysis of arabic syntagmatic units based on a linguistic ontology

El Abdi, Mariem; Ali, Boutheina Smine Ben; **Ben Yahia, Sadok** Computational Collective Intelligence : 14th International Conference, ICCCI 2022, Hammamet, Tunisia, September 28-30, 2022, Proceedings 2022 / p. 364 - 377 https://doi.org/10.1007/978-3-031-16014-1_29 [Conference Proceedings at Scopus](#) [Article at Scopus](#) [Conference Proceedings at WOS](#) [Article at WOS](#)

A new efficient ALignment-driven Neural Network for mortality prediction from irregular multivariate time series data [Formula presented]

Bignoumba, Nzamba; Mellouli, Nedra; **Ben Yahia, Sadok** Expert systems with applications 2024 / art. 122148
<https://doi.org/10.1016/j.eswa.2023.122148> [Journal metrics at Scopus](#) [Article at Scopus](#) [Journal metrics at WOS](#) [Article at WOS](#)

A new test suite reduction approach based on hypergraph minimal transversal mining

Trabelsi, Shaima; Bennani, Mohamed Taha; **Ben Yahia, Sadok** Future Data and Security Engineering : 6th International Conference, FDSE 2019, Nha Trang City, Vietnam, November 27-29, 2019, Proceedings 2019 / p. 15-30 https://doi.org/10.1007/978-3-030-35653-8_2 [Conference proceeding at Scopus](#) [Article at Scopus](#) [Conference proceeding at WOS](#) [Article at WOS](#)

A novel anonymous authentication and key agreement scheme for smart grid

Hammami, Hamza; Obaidat, Mohammad S.; **Ben Yahia, Sadok** Proceedings of the 17th International Joint Conference on e-Business and Telecommunications, ICETE 2020 - Volume 3: ICE-B, Lieusaint, Paris, France, July 8-10, 2020 2020 / p. 357-362
<https://doi.org/10.5220/0009824203570362>

A novel efficient and lightweight authentication scheme for secure smart grid communication systems

Hammami, Hamza; **Ben Yahia, Sadok**; Obaidat, Mohammad S. The Journal of Supercomputing 2023 / p. 7360 - 7376
<https://doi.org/10.1007/s11227-022-04944-z> [Journal metrics at Scopus](#) [Article at Scopus](#) [Journal metrics at WOS](#) [Article at WOS](#)

A novel framework for unification of association rule mining, online analytical processing and statistical reasoning

Sharma, Rahul; **Kaushik, Minakshi**; **Arakkal Peious, Sijo**; Bazin, Alexandre; **Shah, Syed Attique**; Istok, Fister jr.; **Ben Yahia, Sadok**; **Draheim, Dirk** IEEE Access 2022 / p. 12792-12813 <https://doi.org/10.1109/ACCESS.2022.3142537> [Journal metrics at Scopus](#) [Article at Scopus](#) [Journal metrics at WOS](#) [Article at WOS](#)

A novel imbalanced data classification approach for suicidal ideation detection on social media

Ben Hassine, Mohamed Ali; Abdellatif, Safa; **Ben Yahia, Sadok** Computing 2022 / p. 741-765 : ill <https://doi.org/10.1007/s00607-021-00984-0> [Journal metrics at Scopus](#) [Article at Scopus](#) [Journal metrics at WOS](#) [Article at WOS](#)

Novel interestingness measures for mining significant association rules from imbalanced data

Abdellatif, Safa; Ben Hassine, Mohamed Ali; **Ben Yahia, Sadok** Web, Artificial Intelligence and Network Applications :Proceedings of the Workshops of the 33rd International Conference on Advanced Information Networking and Applications (WAINA-2019) 2019 https://doi.org/10.1007/978-3-030-15035-8_16 [Conference proceedings at Scopus](#) [Article at Scopus](#)

On positive feedback loops in digital government architecture

McBride, Keegan David Braun; Kütt, Andres; Ben Yahia, Sadok; Draheim, Dirk MEDES '19 : A Digital Ecosystem for Personal Manufacturing : An Architecture for Cloud-based Distributed Manufacturing Operating Systems : proceedings 2019 / p. 174–180 : ill <https://doi.org/10.1145/3297662.3365817>

On the potential of numerical association rule mining

Kaushik, Minakshi; Sharma, Rahul; Arakkal Peious, Sijo; Shahin, Mahtab; Ben Yahia, Sadok; Draheim, Dirk Future Data and Security Engineering. Big Data, Security and Privacy, Smart City and Industry 4.0 Applications : 7th International Conference, FDSE 2020, Quy Nhon, Vietnam, November 25–27, 2020 : proceedings 2020 / p. 3-20 https://doi.org/10.1007/978-981-33-4370-2_1 [Conference proceeding at Scopus](#) [Article at Scopus](#)

An ontological approach to knowledge building by data integration

Pileggi, Salvatore Flavio; Crain, Hayden; **Ben Yahia, Sadok** Computational Science and Its Applications – ICCSA 2020 : 20th international conference, Amsterdam, The Netherlands, June 3–5, 2020, proceedings, part VII (2020) 2020 / p. 479 - 493 https://doi.org/10.1007/978-3-030-50436-6_35 [Conference Proceedings at Scopus](#) [Article at Scopus](#) [Conference Proceedings at WOS](#) [Article at Scopus](#)

Ontology integration : approaches and challenging issues

Osman, Ines; **Ben Yahia, Sadok**; Diallo, Gayo Information Fusion 2021 / p. 38-63 : ill <https://doi.org/10.1016/j.inffus.2021.01.007> [Journal metrics at Scopus](#) [Article at Scopus](#) [Journal metrics at WOS](#) [Article at WOS](#)

Outdoor thermal comfort optimization in a cold climate to mitigate the level of urban heat island in an urban area

Eslamirad, Nasim; Sepulveda Luque, Abel; De Luca, Francesco; Lylykangas, Kimmo Sakari; Ben Yahia, Sadok Energies 2023 / art. 4546, 28 p. : ill <https://doi.org/10.3390/en16124546> [Journal metrics at Scopus](#) [Article at Scopus](#) [Journal metrics at WOS](#) [Article at WOS](#)

Pattern based software architecture for predictive maintenance

Torim, Ants; Liiv, Innar; Ounoughi, Chahinez; Ben Yahia, Sadok Nordic Artificial Intelligence Research and Development : 4th Symposium of the Norwegian AI Society, NAIS 2022, Oslo, Norway, May 31 - June 1, 2022 : revised selected papers 2022 / p. 26-38 https://doi.org/10.1007/978-3-031-17030-0_3 [Conference proceedings at Scopus](#) [Article at Scopus](#)

Predictive systems using machine learning tools to forecast adverse events during medical stays = Ennustavad süsteemid, mis kasutavad masinõppe vahendeid kõrvalekallete prognoosimiseks haiglas viibimise ajal

Bignoumba, Nzamba 2024 <https://doi.org/10.23658/taltech.49/2024> https://www.eston.ee/record=b5700796*est <https://digikogu.taltech.ee/et/Item/19abb999-27b2-46a1-8fe6-1f1c43a5fe0d>

Preface

Braud, Agnès; Dolques, Xavier; Missaoui, Rokia; Baixeries, Jaume; **Ben Yahia, Sadok**; Bertet, Karell; Cellier, Peggy; Cordero, Pablo; Couceiro, Miguel; Cristea, Diana; Demko, Christophe; Eklund, Peter Analyzing Real Data with Formal Concept Analysis 2021 / p. 4 <https://ceur-ws.org/Vol-3151/xpreface.pdf> [Conference Proceedings at Scopus](#) [Article at Scopus](#)

Preface

Attiogbe, Christian; **Ben Yahia, Sadok** Model and Data Engineering : 10th International Conference, MEDI 2021, Tallinn, Estonia, June 21–23, 2021 : proceedings 2021 / p. v-vi <https://doi.org/10.1007/978-3-030-78428-7> [Conference proceeding at Scopus](#) [Article at Scopus](#)

Preface of the special issue on advances in data-driven engineering

Ben Yahia, Sadok; Attiogbé, Christian International Journal of General Systems 2023 / p. 203-205 <https://doi.org/10.1080/03081079.2023.2204251> [Journal metrics at Scopus](#) [Article at Scopus](#) [Journal metrics at WOS](#) [Article at WOS](#)

Pregnancy associated breast cancer gene expressions : new insights on their regulation based on rare correlated patterns

Bouasker, Souad; **Inoubli, Wissem; Ben Yahia, Sadok**; Diallo, Gayo IEEE/ACM transactions on computational biology and bioinformatics 2021 / p. 1035–1048 <https://doi.org/10.1109/TCBB.2020.3015236> [Journal metrics at Scopus](#) [Article at Scopus](#) [Journal metrics at WOS](#) [Article at WOS](#)

Query learning-based scheme for pertinent resource lookup in Mobile P2P network

Yeferny, Taoufik; Hamad, Sofian; **Ben Yahia, Sadok** IEEE Access 2019 / art. 6287639, p. 49059-49068 <https://doi.org/10.1109/ACCESS.2019.2910117> [Journal metrics at Scopus](#) [Article at Scopus](#) [Journal metrics at WOS](#) [Article at WOS](#)

Relatedness and Product Complexity Meet Gravity Models of International Trade

Tiits, Marek; Kalvet, Tarmo; Ounoughi, Chahinez; Ben Yahia, Sadok Journal of open innovation: technology, market, and

Research roadmap for designing a virtual competence assistant for the European labor market

Liutkevičius, Markko; Ben Yahia, Sadok *Procedia computer science* 2022 / p. 2404-2413 <https://doi.org/10.1016/j.procs.2022.09.299>
[Conference Proceedings at Scopus](#) [Article at Scopus](#)

A roadside unit deployment framework for enhancing transportation services in Maghreb cities

Chaabene, Seif Ben; Yeferny, Taoufik; Ben Yahia, Sadok *Concurrency and Computation: Practice and Experience* 2021 / art. e5611
<https://doi.org/10.1002/cpe.5611> [Journal metrics at Scopus](#) [Article at Scopus](#) [Journal metrics at WOS](#) [Article at WOS](#)

A Roadside unit placement scheme for Vehicular Ad-hoc Networks

Ben Chaabene, Seif; Yeferny, Taoufik; Ben Yahia, Sadok *Advanced Information Networking and Applications : proceedings of the 33rd International Conference on Advanced Information Networking and Applications (AINA-2019) 2020* / p. 619-630
https://doi.org/10.1007/978-3-030-15032-7_52 [Conference proceedings at Scopus](#) [Article at Scopus](#)

A robust pathological voices recognition system based on DCNN and scattering transform

Souli, Sameh; Amam, Rimah; Ben Yahia, Sadok *Applied acoustics* 2021 / art. 107854 : ill
<https://doi.org/10.1016/j.apacoust.2020.107854> [Journal metrics at Scopus](#) [Article at Scopus](#) [Journal metrics at WOS](#) [Article at WOS](#)

Scalable and efficient authentication scheme for secure smart grid communication

Hammami, Hamza; Ben Yahia, Sadok; Obaidat, Mohammad S. *IET Networks* 2020 / p. 165-169 <https://doi.org/10.1049/iet-net.2019.0225> [Journal metrics at Journal](#) [Article at Scopus](#) [Journal metrics at WOS](#) [Article at WOS](#)

A scalable knowledge graph embedding model for next point-of-interest recommendation in Tallinn city

Ounoughi, Chahinez; Mouakher, Amira; Sherzad, Muhammad Ibraheem; Ben Yahia, Sadok *Research Challenges in Information Science : 15th International Conference, RCIS 2021, Limassol, Cyprus, May 11–14, 2021 : proceedings 2021* / p. 435–451 https://doi.org/10.1007/978-3-030-75018-3_29 [Conference Proceedings at Scopus](#) [Article at Scopus](#) [Article at WOS](#)

A secure data infrastructure for personal manufacturing based on a novel key-less, byte-less encryption method

Vedešin, Anton; Dogru, John Mehmet Ulgar; Liiv, Innar; Ben Yahia, Sadok; Draheim, Dirk *IEEE Access* 2020 / p. 40039-40056 : ill <https://doi.org/10.1109/ACCESS.2019.2946730> [Journal metrics at Scopus](#) [Article at Scopus](#) [Journal metrics at WOS](#) [Article at WOS](#)

Secure, context-aware and QoS-enabled SDN architecture to improve energy efficiency in IoT-based smart buildings

Hakiri, Akram; Sallemi, Bassem; Ghandour, Fatma; Ben Yahia, Sadok *Distributed computing for emerging smart networks : Second International Workshop, DiCES-N 2020, Bizerte, Tunisia, December 18, 2020, proceedings 2020* / p. 55-74 : ill
https://doi.org/10.1007/978-3-030-65810-6_4 [Conference proceeding at Scopus](#) [Article at Scopus](#)

Selection of a green logical data warehouse schema by anti-monotonicity constraint

Ghabri, Issam; Bellatreche, Ladjel; Ben Yahia, Sadok *SOFSEM 2020: Theory and Practice of Computer Science : 46th International Conference on Current Trends in Theory and Practice of Informatics, SOFSEM 2020, Limassol, Cyprus, January 20-24, 2020 : Proceedings 2020* / p. 350-361 https://doi.org/10.1007/978-3-030-38919-2_29 [Conference proceedings at Scopus](#) [Article at Scopus](#)
[Conference proceedings at WOS](#) [Article at WOS](#)

Sentiment analysis for hotel reviews : a systematic literature review

Ameur, Asma; Hamdi, Sana; Ben Yahia, Sadok *ACM Computing Survey* 2023 / art. 51 <https://doi.org/10.1145/3605152> [Journal metrics at Scopus](#) [Article at Scopus](#) [Journal metrics at WOS](#) [Article at WOS](#)

Sequence to sequence hybrid Bi-LSTM model for traffic speed prediction

Ounoughi, Chahinez; Ben Yahia, Sadok *Expert systems with applications* 2024 / art. 121325
<https://doi.org/10.1016/j.eswa.2023.121325> [Journal metrics at Scopus](#) [Article at Scopus](#) [Journal metrics at WOS](#) [Article at WOS](#)

Smart cyber-physical system for pattern recognition of illegal 3D designs in 3D printing

Vedešin, Anton; Dogru, John Mehmet Ulgar; Liiv, Innar; Ben Yahia, Sadok; Draheim, Dirk *Smart Applications and Data Analysis : Third International Conference, SADASC 2020, Marrakesh, Morocco, June 25-26, 2020 : proceedings 2020* / p. 74-85
https://doi.org/10.1007/978-3-030-45183-7_6 [Conference proceeding at Scopus](#) [Article at Scopus](#)

A Software Prototype for Multidimensional Design of Data Warehouses Using Ontologies

Zekri, Manel; Ben Yahia, Sadok; Hilali-Jaghdam, Ines *Computational Collective Intelligence : 11th International Conference, ICCCI 2019, Hendaye, France, September 4–6, 2019 : proceedings, part II 2019* / p. 273-284 : ill https://doi.org/10.1007/978-3-030-28374-2_24
[Conference proceeding at Scopus](#) [Article at Scopus](#) [Conference proceeding at WOS](#) [Article at WOS](#)

Special issue on concept lattices and their applications (CLA 2020)

Valverde-Albacete, Francisco José; Trnecka, Martin; Ben Yahia, Sadok *International journal of approximate reasoning* 2024 / art. 109079, 3 p. <https://doi.org/10.1016/j.ijar.2023.109079> [Journal metrics at Scopus](#) [Article at Scopus](#) [Journal metrics at WOS](#) [Article at WOS](#)

Special Issue on Digital Twin for Future Networks and Emerging IoT Applications (DT4IoT)

Hakiri, Akram; **Ben Yahia, Sadok**; Gokhale, Aniruddha S.; Mellouli, Nédra Future generation computer systems 2024 / p. 81-84
<https://doi.org/10.1016/j.future.2024.06.056> [Journal metrics at Scopus](#) [Article at Scopus](#) [Journal metrics at WOS](#) [Article at WOS](#)

Specification of the data warehouse for the decision-making dimension of the bid process information system

Zekri, Manel; Zahaf, Sahbi; **Ben Yahia, Sadok** Procedia computer science 2019 / p. 756 - 763
<https://doi.org/10.1016/j.procs.2019.09.231> [Conference proceeding at Scopus](#) [Article at Scopus](#) [Article at WOS](#)

A systematic assessment of numerical association rule mining methods

Kaushik, Minakshi; Sharma, Rahul; Arakkal Peious, Sijo; Shahin, Mahtab; Ben Yahia, Sadok; Draheim, Dirk SN Computer Science 2021 / art. 348 <https://doi.org/10.1007/s42979-021-00725-2> [Journal metrics at Scopus](#) [Article at scopus](#)

ZED-TTE: Zone embedding and deep neural network based travel time estimation approach

Ounoughi, Chahinez; Yeferny, Taoufik; **Ben Yahia, Sadok** 2021 International Joint Conference on Neural Networks (IJCNN) : proceedings 2021 / 10 p <https://doi.org/10.1109/IJCNN52387.2021.9533456> [Conference Proceedings at Scopus](#) [Article at Scopus](#) [Article at WOS](#)

A theme section on the central role of modeling in designing and explaining data-driven systems and software

Attiogbe, Christian; **Ben Yahia, Sadok**; Bellatreche, Ladjel Software and Systems Modeling 2023 / p. 1945-1947
<https://doi.org/10.1007/s10270-023-01133-1> [Journal metrics at Scopus](#) [Article at Scopus](#) [Journal metrics at WOS](#) [Article at WOS](#)

Top-K formal concepts for identifying positively and negatively correlated biclusters

Houari, Amina; **Ben Yahia, Sadok** Model and Data Engineering : 10th International Conference, MEDI 2021, Tallinn, Estonia, June 21–23, 2021 : proceedings 2021 / p. 156-172 https://doi.org/10.1007/978-3-030-78428-7_13 [Conference Proceedings at Scopus](#) [Article at Scopus](#)

A Top-K formal concepts-based algorithm for mining positive and negative correlation biclusters of DNA microarray data

Houari, Amina; **Ben Yahia, Sadok** International journal of machine learning and cybernetics 2023 / p. 941–962 : ill
<https://doi.org/10.1007/s13042-023-01949-9> [Journal metrics at Scopus](#) [Article at Scopus](#) [Journal metrics at WOS](#) [Article at WOS](#)

Towards a smarter charging infrastructure : real-time availability forecasting for EVs

Manai, Meriem; **Sellami, Bassem; Ben Yahia, Sadok** Procedia Computer Science 2024 / p. 930 - 939
<https://doi.org/10.1016/j.procs.2024.09.512> [Conference proceedings at Scopus](#) [Article at Scopus](#)

Towards a smarter directional data aggregation in VANETs

Allani, Sabri; Yeferny, Taoufik; Chbeir, Richard; **Ben Yahia, Sadok** World Wide Web 2020 / p. 2303–2322 : ill
<https://doi.org/10.1007/s11280-019-00749-y> [Journal metrics at Scopus](#) [Article at Scopus](#) [Journal metrics at WOS](#) [Article at WOS](#)

Towards disaster resilient smart cities : can internet of things and big data analytics be the game changers?

Shah, Syed Attique; Seker, Dursun Zafer; Rathore, M. Mazhar; Hameed, Sufian; **Ben Yahia, Sadok; Draheim, Dirk** IEEE Access 2019 / art. 8759905, p. 91885–91903 <https://doi.org/10.1109/ACCESS.2019.2928233> [Journal metrics at Scopus](#) [Article at Scopus](#) [Journal metrics at WOS](#) [Article at WOS](#)

Twitter streaming data analytics for disaster alerts

Shah, Syed Attique; **Ben Yahia, Sadok**; McBride, Keegan David Braun; Jamil, Akhtar; **Draheim, Dirk** 2021 2nd International Informatics and Software Engineering Conference (IISEC) : proceedings 2021 / 6 p <https://doi.org/10.1109/IISEC54230.2021.9672370>

Uncertainty in automated ontology matching: lessons from an empirical evaluation

Osman, Inès; Pileggi, Salvatore Flavio; **Ben Yahia, Sadok** Applied Sciences (Switzerland) 2024 / art. 4679, 19 p. : ill
<https://doi.org/10.3390/app14114679> [Journal metrics at Scopus](#) [Article at Scopus](#) [Journal metrics at WOS](#) [Article at WOS](#)

Understanding the challenges of today's labor market service provision in the EU

Liutkevičius, Markko; Ben Yahia, Sadok; Weck, Marina Human factors, business management and society : proceedings of the 14th AHFE International Conference on Applied Human Factors and Ergonomics : San Francisco Marriott Marquis, California, USA, July 20-24, 2023. Vol. 97 2023 / p. 30–39 <https://doi.org/10.54941/ahfe1003880>

Urban traffic : data fusion and vehicle flow prediction in smart cities = Linnaliiklus : andmete ühtesulamine ja sõidukite voo prognoosimine nutikates linnades

Ounoughi, Chahinez 2024 <https://digikogu.taltech.ee/et/Item/9eeeebb0-87bf-4171-bc94-0a0dcf74e9fb>
<https://doi.org/10.23658/taltech.8/2024>

The use of artificial intelligence in job seeking and competence development

Liutkevičius, Markko; Ben Yahia, Sadok Human factors, business management and society : proceedings of the 13th AHFE International Conference on Human Factors, Business Management and Society, New York, USA, July 24-28, 2022 2022 / p. 128-136
<https://doi.org/10.54941/ahfe1002260>

Using mandatory concepts for knowledge discovery and data structuring

Elloumi, Samir; **Ben Yahia, Sadok**; Al Ja'am, Jihad Database and Expert Systems Applications : 30th International Conference, DEXA 2019, Linz, Austria, August 26–29, 2019, Proceedings, Part II 2019 / p. 362 - 375 https://doi.org/10.1007/978-3-030-27618-8_27
[Conference proceeding at Scopus](#) [Article at Scopus](#) [Conference proceeding at WOS](#) [Article at WOS](#)

Using the e-learning gamification tool Kahoot! to learn chemistry principles in the classroom

Al Ghawail, Entisar Alhadi; **Ben Yahia, Sadok** Procedia computer science 2022 / p. 2667 - 2676
<https://doi.org/10.1016/j.procs.2022.09.325> [Conference Proceedings at Scopus](#) [Article at Scopus](#)

Uued inimesed TalTechis

Ben Yahia, Sadok; Wen, Fushuan; Ainamo, Antti; Demirag, Istemihan Sefik Mente et Manu 2019 / lk. 48-51 : portr

https://www.ester.ee/record=b1242496*est <https://taltech.ee/avalehekulg/?category=128006#newsTabsMenu> https://www.ttu.ee/public/m/mente-et-manu/MM_01_2019/mobile/index.html

Uus tehisintellekt teeb vahet haige ja terve inimese häälal [Võrguväljaanne]

Harrik, Airika novaator.err.ee 2021 / fot [Uus tehisintellekt teeb vahet haige ja terve inimese häälal](#)