IDCC | *Lightning Talk*

FAIR4Health FAIRification Tools

Celia Alvarez-Romero
Group of Research and Innovation in Biomedical Informatics, Biomedical Engineering and Health Economy, Institute of Biomedicine of Seville, IBIS / Virgen del Rocío University Hospital / CSISC / University of Seville, Seville, Spain

Alicia Martinez-Garcia
Group of Research and Innovation in Biomedical Informatics, Biomedical Engineering and Health Economy, Institute of Biomedicine of Seville, IBIS / Virgen del Rocío University Hospital / CSISC / University of Seville, Seville, Spain

Mert Gencturk
SRDC Software Research & Development and Consultancy Corp., Ankara, Turkey

A. Anil Sinaci
SRDC Software Research & Development and Consultancy Corp., Ankara, Turkey

Carlos Luis Parra-Calderon
Group of Research and Innovation in Biomedical Informatics, Biomedical Engineering and Health Economy, Institute of Biomedicine of Seville, IBIS / Virgen del Rocío University Hospital / CSISC / University of Seville, Seville, Spain

Abstract

FAIR4Health[1], which has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement No 824666, promotes the application of FAIR Principles[2] to health research data and then performs data mining algorithms on these FAIRified datasets of different health research organizations.

FAIR4Health has designed a workflow[3] based on the FAIRification process of GO FAIR[4], but addressing the ethical, legal and technical aspects that health data includes due to its nature.

[1] FAIR4Health Project Website: https://www.fair4health.eu/
[2] Wilkinson MD, Dumontier M, Aalbersberg IjJ, et al. The FAIR Guiding Principles for scientific data management and stewardship. Scientific Data. 2016;3:160018. https://doi.org/10.1038/sdata.2016.18.
[3] Sinaci AA, Núñez-Benjumea FJ, Gencturk M, Jauer ML, Deserno T, Chronaki C, Cangioli G, Cavero-Barca C, Rodríguez-Pérez JM, Pérez-Pérez MM, Erturkmen GB. From Raw Data to FAIR Data: The FAIRification Workflow for Health Research. Methods of Information in Medicine. 2020 Jun;59(S 01):e21-32.
[4] GO FAIR FAIRification Process: https://www.go-fair.org/fair-principles/fairification-process/

Submitted 18 January 2021

Correspondence should be addressed to Celia Alvarez-Romero, Avda. Manuel Siurot s/n - 41013 Sevilla (Spain). Email: celia.alvarez@juntadeandalucia.es

The 16th International Digital Curation Conference takes place on 19 April 2021, Edinburgh, Scotland

URL: http://www.dcc.ac.uk/events/idcc2021

These aspects have been analysed for sensitive data and FAIRification tools, based on the use of the HL7 FHIR[5] standard, have been developed to obtain FAIR data from data resulting from biomedical research.

Data Curation Tool is one of the software components and is a highly specialized Extract-Transform-Load tool which can extract data from relational databases and spreadsheets, applies user-defined transformations and then loads the transformed resources into an HL7 FHIR repository.

Data Privacy Tool is responsible for handling the privacy challenges on sensitive health data by applying several data de-identification and anonymization techniques. After the curation process is finished, the Data Manager uses the Data Privacy Tool to de-identify data before making it available to other systems/components as FAIR data. This tool reads and writes de-identified and anonymized resources back to the HL7 FHIR repository.

On top of these, FAIR4Health has implemented a privacy-preserving distributed data mining (PPDDM) framework enabling health research organizations to perform joint data mining operations without exposing any sensitive patient information to the outside world.

FAIR4Health FAIRification tools are being applied and validated with these two pathfinder case studies based on sharing and reuse of FAIRifed data through the PDDDM framework: 1) Identification of multimorbidity patterns and polypharmacy correlation on the risk of mortality in elderly; and 2) Early prediction service for 30-days readmission risk in patients with Chronic Obstructive Pulmonary Disease.

[5] HL7 FHIR: http://hl7.org/fhir/