Issue 2: Multidimensional representation of medical heterogeneous data using neural networks

contacts :

Lorraine Goeuriot (Associate Professor, Univ. Grenoble Alpes)
Didier Schwab (Associate Professor, Univ. Grenoble Alpes)
Thierry Chevalier (Clinic head, Univ. Grenoble Alpes)

SOS Médecins is a medical GP emergency service of France. Every day they conduct tens of thousands consultations. *Anosos* is an anonymous version of their consultation database which contains millions of entries including physiological data (temperature, tension,...) and raw text.

ISME is a project between the LIG (Laboratory of Informatics in Grenoble, teams GETALP and MRIM), the faculty of medicine of Grenoble and SOS medecin, which aims at exploiting *Anosos* in order to improve diagnosis and patient pathway.

The main objective of this internship is to explore embedded models allowing to represent patients medical trajectory. These trajectories include multidimensional and heterogeneous data including: physiological data, demographics, textual reports and their evolution over time. Going beyond bag-of-words and vectorial representations, document embeddings allow a semantic representation of the data at a document level. The purpose of this internship is to consider patient embeddings, leveraging on existing document embedding models, and propose a representation allowing to include temporal and multimodal information characterizing patient's trajectories. Ultimately, such models will be used to conduct prediction over trajectories and cohorts of patients.

Task :
- a state-of-the-art of deep neural network approaches to build document embeddings
- implementation of the main methods using an appropriate framework
- evaluation and comparison of the models on a prediction medical use case

Publication of results in major conferences/journals will be strongly encouraged.

ISME : IA straitening medical experience
GETALP : Study Group for Machine Translation and Automated Processing of Languages and Speech
MRIM : Multimedia Information Modeling and Retrieval

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