literature methods, respectively can be observed. Moreover, compared to SF, NNC worsens BGRI only in a small portion of subjects.
Conclusion: This preliminary work suggests that, when CGM is used, the proposed NNC method can improve the SF for insulin dosing. Future work will involve investigations on NNC architecture to improve its safety and effectiveness and to assess its capabilities on more challenging scenarios designed to incorporate all of the sources of error and perturbations that occur in a real-life setting.

Contribution ID: 1251
3. Information Technology in Healthcare
03.04. Artificial intelligence

Dealing with temporal dependencies in computer assisted sleep stagings

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Although there are strong temporal dependencies in data from sleep polysomnography, many pattern classification approaches incorrectly ignore them and classify each signal segment regardless to the context of the previous or future behavior. This paper proposes and compares three approaches to classify data segments that consider the temporal context by taking into account the classification of their adjacent segments.
The first approach is based on the contextual expansion, where labels of previously classified segments are added to model inputs. The other two algorithms are based on transition probabilities – probabilities of transitions between sleep stages that can be estimated from training data or given by physicians. The second approach injects the temporal context through context dependent class priors that are computed from probabilities of transitions between different sleep stages. The third approach is based on iterative repair of the predicted hypnogram using simple local operations that maximize consistence of the hypnogram behavior with predefined transition probabilities.
This paper discusses three mentioned approaches in order to determine which one is more suitable for this type of task and how the performance of the classifier is improved when the adjacence od segments is taken into consideration. By the comparison with standard methods which do not consider the temporal context, the correct classification, when these approaches are utilized, is increased by 15 %.

Contribution ID: 1289
3. Information Technology in Healthcare
03.04. Artificial intelligence

Medical reasoning oriented orthesis to ease clinical practice and record keeping

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Praxis is a one of a kind Electronic Medical Records (EMR) software with no “a priori” variables templates that follows the physician´s reasoning when following the Subjective-Objective-Assessment-Plan (SOAP) paradigm. Behaving like a perfect and memorious assistant Praxis suggests “thought-units“ and “conceptual elements” once the physician either adopts or creates a new “case type” for the patient under examination. The feedback provided by Praxis is the result of the physician´s own experience, recorded as previous “case types”, “conceptual elements” and “thought unit”, organized in an arborescent knowledge structure.

By using previous experience as an implicit context sensitive check list, solving patients becomes a lot quicker, safer and to the point, avoiding lengthy questionnaires, typical of classical Medical Informatics EMR templates.
This artificial intelligence behavior mimics the individual physician´s practice who is faced daily with statistical distributions of rare-to-common cases. When uncommon cases are treated, ruling out normal values smoothly leads to such cases, while confirmation of common symptoms gives quick confidence to diagnostic and treatment decisions naturally suggested.
By accepting or refusing suggested text fragments shown by Praxis, and entering values also suggested by the texts, the physician quickly and effortless creates a clinical note. This is the EMR fragment. But it also creates structured data for interoperable access by other applications.
As the usual medical informatics systems grow in complexity and overlapping modules, the simple, specific approach of Praxis, based on artificial intelligence to compile knowledge is bound to have an ever increasing share of the clinicians´preference.
Future work consists in adapting the too to a variety of Health Systems, languages and reimbursing modalities and to interface Praxis with existing EMR environments complying with international standards.

Contribution ID: 1895
3. Information Technology in Healthcare
03.06. Big data challenges and applications in healthcare

The Repertoire of Mutational Signatures in Human Cancer

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Cancer is the most common human genetic disease. All cancers are caused by somatic mutations. These mutations may be the consequence of the intrinsic slight infidelity of the DNA replication machinery, exogenous or endogenous mutagen exposures, enzymatic modification of DNA, or defective DNA repair. In some cancer types, a substantial proportion of somatic mutations are known to be generated by exogenous carcinogens, for example, tobacco smoking in lung cancers and ultraviolet light in skin cancers, or by abnormalities of DNA maintenance, for example, defective DNA mismatch repair in some colorectal cancers.
Each biological process causing mutations leaves a characteristic imprint on the genome of a cancer cell, termed, mutational signature. In this talk, I will present mutational signatures analyses encompassing 23,517 cancer genomes across 40 distinct types of human cancer revealing more than 60 different signatures of mutational processes. Some signatures are present in many cancer types, notably a signature attributed to the APOBEC family of cytidine deaminases, whereas others are confined to a single cancer class. Certain signatures are associated with age of the patient at cancer diagnosis, known mutagenic exposures or defects in DNA maintenance, but many are of cryptic origin. The results reveal the diversity of mutational processes underlying the development of cancer, with potential implications for understanding of cancer etiology, prevention and therapy.

Contribution ID: 33
3. Information Technology in Healthcare
03.07. Decision support systems, and tools in healthcare

¬Developing an Automated Clinical Trending Tool for the Neonatal Intensive Care Unit (NICU)

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