Decision support system

- Hospital frailty risk score in predicting outcomes after simultaneous colon and liver resection for colorectal cancer liver metastasis in older adults: Evidence from the Nationwide Inpatient Sample 2015-2018
- Clinical feasibility of AI Doctors: Evaluating the replacement potential of large language models in outpatient settings for central nervous system tumors
- Knowledge Graph-Enhanced Deep Learning Model (H-SYSTEM) for Hypertensive Intracerebral Hemorrhage: Model Development and Validation
- Minimizing human-induced variability in quantitative angiography for a robust and explainable AI-based occlusion prediction in flow diverter-treated aneurysms
- Combining Computed Tomography Perfusion and Baseline National Institutes of Health Stroke Scale to Assess the Clinical Penumbra in Ischemic Stroke
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- Smart Wearable Technologies for Balance Rehabilitation in Older Adults at Risk of Falls: Scoping Review and Comparative Analysis
- Pineal cyst apoplexy in a pregnant female: case report and review of literature

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A Decision Support System (DSS) is a computer-based information system that supports business or organizational decision-making activities. It provides interactive tools and analytical capabilities to help users make informed decisions. A DSS typically integrates data from various sources, processes it, and presents the information in a format that decision-makers can use.

Key components of a Decision Support System include:

Database Management System (DBMS): DSS relies on a robust DBMS to store and manage large volumes of data from different sources.

Model Base: DSS often includes models or algorithms that help in analyzing data and predicting outcomes. These models can be statistical, financial, mathematical, or simulation-based.

User Interface: The user interface is designed to be interactive and user-friendly, allowing decision-makers to input data, manipulate variables, and visualize results.

Query and Reporting Tools: DSS enables users to query databases and generate reports based on specific criteria. This helps in extracting relevant information for decision-making.

Data Analysis Tools: DSS incorporates tools for analyzing data, such as trend analysis, forecasting, and various statistical methods. These tools assist in understanding patterns and making predictions.

What-If Analysis: Decision-makers can explore various scenarios and assess the potential impact of different decisions through what-if analysis. This allows for a better understanding of possible outcomes.

Decision Support Software: Specialized software applications are often part of a DSS, providing decision-makers with tools tailored to their specific needs and industry requirements.

Knowledge Base: Some DSS systems include a knowledge base that captures and organizes the

expertise and knowledge of individuals within an organization. This can be used to enhance decision-making processes.

Communication Facilities: DSS often includes features for communication and collaboration, facilitating information sharing and discussions among team members involved in the decision-making process.

Security and Privacy Features: Given the sensitive nature of the information involved, DSS systems typically incorporate robust security measures to protect data and ensure privacy.

Decision Support Systems can be applied in various fields, including finance, healthcare, manufacturing, marketing, and more. They are designed to assist decision-makers at different levels of an organization in making well-informed and timely decisions.

Decision support systems (DSSs) for suggesting optimal low back pain treatment (LBP) are currently insufficiently accurate for clinical application. Most of the input provided to train these systems is based on patient-reported outcome measures. However, with the appearance of electronic health records (EHRs), additional qualitative data on reasons for referrals and patients' goals become available for DSSs. Currently, no decision support tools cover a wide range of biopsychosocial factors, including referral letter information to help clinicians triage patients to the optimal LBP treatment.

The objective of the study was to investigate the added value of including qualitative data from EHRs and referral letters to the accuracy of a quantitative DSS for patients with LBP.

A retrospective study was conducted in a clinical cohort of Dutch patients with LBP. Patients filled out a baseline questionnaire about demographics, pain, disability, work status, quality of life, medication, psychosocial functioning, comorbidity, history, and duration of pain. Referral reasons and patient requests for help (patient goals) were extracted via natural language processing (NLP) and enriched in the data set. For decision support, these data were considered independent factors for triage to neurosurgery, anesthesiology, rehabilitation, or minimal intervention. Support vector machine, k-nearest neighbor, and multilayer perceptron models were trained for 2 conditions: with and without consideration of the referral letter content. The models' accuracies were evaluated via F1-scores, and confusion matrices were used to predict the treatment path (out of 4 paths) with and without additional referral parameters.

Results: Data from 1608 patients were evaluated. The evaluation indicated that 2 referral reasons from the referral letters (for anesthesiology and rehabilitation intervention) increased the F1-score accuracy by up to 19.5% for triaging. The confusion matrices confirmed the results.

This study indicates that data enriching by adding NLP-based extraction of the content of referral letters increases the model accuracy of DSSs in suggesting optimal treatments for individual patients with LBP. Overall model accuracies were considered low and insufficient for clinical application [1)].

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Fudickar S, Bantel C, Spieker J, Töpfer H, Stegeman P, Schiphorst Preuper HR, Reneman MF, Wolff AP, Soer R. Natural Language Processing of Referral Letters for Machine Learning-Based Triaging of Patients With Low Back Pain to the Most Appropriate Intervention: Retrospective Study. J Med Internet Res. 2024 Jan 30;26:e46857. doi: 10.2196/46857. PMID: 38289669.