PD173 Semi-Automation Of Systematic Literature Review Title And Abstract Screening Using Text Mining And Classification Techniques

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Introduction: Researchers are increasingly faced with the challenge of producing a robust systematic literature review (SLR) within the confines of time and budget. Semi-automating the title and abstract screening phase has been proposed to reduce the workload burden of SLRs. This research aimed to evaluate the efficacy of text mining and machine learning techniques in the semi-automation of the title and abstract screening phase of SLRs.
Methods: Two SLRs that had been manually screened by one screener (manual SLRs) were examined. The titles and abstracts of these SLRs were tokenized and the datasets were split into training and test sets. Support vector machines (SVM), Naïve Bayes (NB), and k-nearest neighbors (k-NN) classification machine learning models were used to predict whether documents in the test set were classed as relevant during the manual SLR. Diagnostic evaluation was carried out using Shapley Additive explanations and local interpretable model-agnostic explanations to explain the predictions of the optimal model.
Results: SVM achieved a sensitivity of one for both SLRs, successfully identifying all documents classed as relevant in the manual SLR. For one SLR, diagnostic evaluation indicated that the model used relevant features to generate its predictions. For the second SLR, the model had the tendency to predict using less relevant or misinterpreted variables. This may be because certain features (i.e., words) the model was trained on had different meanings depending on the clinical context and were present in both relevant and irrelevant citations. This demonstrates the inability of such models to extract semantic meaning from text.
Conclusions: For the second SLR, domain expertise was required to evaluate the features driving the SVM model predictions. This highlights the importance of using discretion when determining the trustworthiness of results generated by such models. This is important to researchers, who need assurance that the use of such techniques will not compromise the validity of their results.

PD174 The Emerging Role Of National Health Service England In The UK – An Access Enabler Or Barrier For Innovations?

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Introduction: Since April 2017, National Health Service England (NHSE) has been granted new powers to negotiate directly with pharmaceutical companies offering innovative, high value medicines. This research systematically evaluated all innovative therapies that have undergone commercial discussions with NHSE.
Methods: NHSE press releases for the period from 1 April 2017 to 10 November 2023 were screened for drug reimbursement decisions and the corresponding National Institute for Health and Care Excellence (NICE) assessments were identified. Key information was extracted, including reimbursement decision, date of decision, and type of commercial deal.
Results: NHSE announced the conclusion of commercial discussions for 36 therapies (four in 2017, three in 2018, nine in 2019, two in 2020, nine in 2021, seven in 2022, and two in 2023). Of these, 27 NHSE commercial discussions were associated with positive NICE guidance; 12 of the 27 preceded the NICE final appraisal determination. In addition, three of the 36 therapies were associated with negative NICE appraisals (not recommended or non-submissions), one had an ongoing NICE assessment, and five did not go through NICE (subject to clinical commissioning policies). The specific type of agreement was not typically stated, but two were outcomes-based agreements, three were budget neutral, one was a portfolio-wide agreement, and one was a population health agreement.
Conclusions: NHSE is becoming an increasingly active and important stakeholder in medicines access. The UK may become an increasingly important early launch market for certain therapies, as evidence by the Medicines and Healthcare products Regulatory Agency joining Project Orbis and the Access Consortium and Casgevy (the first CRISPR-based gene therapy) receiving its first global marketing authorization in the UK.

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