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Innovation in Medical and Legal Education: Artificial Intelligence in lawsuits against Health Plans

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Abstract

The *Sistema Único de Saúde* (SUS - Unified Health System) should provide universal access to health throughout Brazil, however it has been suffering from problems of insufficient funding. Thus, many citizens seek additional assistance through private health plans. These are supervised by a regulatory agency but, when necessary, there is legal action by law firms. This research presents a descriptive exploratory cross-sectional study carried out by academics and professors from the Medicine, Law and Information Technology courses, which aims to demonstrate the inclusion of the highlighted universe, with the results of the application of Artificial Intelligence (AI), during Medical and Legal education, in the legal analysis of clients in the private health area against their respective health plans. Data were collected on 126 lawsuits against health plans. Then, standardization and data analysis for the application of AI techniques for pattern recognition, and finally, a critical evaluation of the strategies that could be carried out by the legal department, via AI, in addition to the students' evaluation of the experience. AI techniques were applied to evaluate processes in terms of Provenance, Disapplicability and Partial Provenance. AI algorithms were used to predict the outcome of an action, reaching a maximum accuracy of 71%. There was an interdisciplinary integration of professors, with assessments from each area. Despite the low accuracy of the AI solution, due

to the insufficient number of samples, the experiment brought an integration of knowledge from Medicine, Law and Technology, in addition to Scientific concepts, where the greatest contribution was in the teaching methodology.

Keywords: Teaching, Artificial intelligence, Health insurance, Innovation, Law.

1. Introduction

The creation of the Brazilian Sistema Único de Saúde (SUS), by the Federal Constitution of 1988, aimed at reorganizing the Brazilian health system in order to guarantee access to the right to health through a compulsory free public service (Brazil 1988, Brazil 1990.a, Brazil 1990.b). There are countless reflections on the dismantling that the SUS has suffered since its creation, which lies in the perennial process of underfunding that marks its institutionalization (Souza 2020; Mendes, 2013).

Despite the level of contempt, it has suffered, the SUS is considered one of the best public health systems in the world, according to the positive evaluation incorporated by specialized institutions that articulate international economic interests, such as the World Bank (Lindelow, 2013; Coalisão Saúde, 2017). Given the existence of the aforementioned underfunding, there is evidence of an increase in the participation of the private sector in the SUS8. However, despite investment initiatives in the SUS by the private sector, to date it appears that a significant part of the population seeks health care through "complementary health", i.e., "health plans", which provide health services to the population through specialized legal persons known as "health plan operators" (Marinho et al., 2020).

Thus, the health insurance market can be characterized by the performance of health care institutions that act as "third payers," i.e., they sell prepayment plans that mediate the financing of access to private health care services and protect policyholders from the risk associated with the cost of illness (Ocké-Reis, 2006). This market is distinguished from others by specific economic characteristics: demand inelasticity, asymmetric information and mechanism failures (Cutler & Zeckhauser, 2000).

The National Agency for Supplementary Health (ANS) is the body in charge of regulating and supervising the activities of health plans, with the aim of minimizing violations of consumer rights, since health plans can refuse to provide services to users. The resolution of this type of conflict becomes impossible at the administrative level, therefore, the interested parties seek the judicial sector to obtain the services denied to them, such as the supply of medicines or treatments, a theme called "judicialization of health", which has become increasingly common in Brazil (Ziroldo et al., 2013; ANS, 2018; Silva, 2013).

As for the legal action in matters of complementary health, it is believed that the use, when possible, of numerical configurations capable of sustaining and giving greater agility and

accuracy to legal analyses, as for example in those lawsuits of "massified" nature, where there is not so much demand for spending more time on procedural strategies by acting attorneys. In this sense, Artificial Intelligence (AI) can greatly contribute to the practice of public and private law, aiming at reducing uncertainties and identifying patterns of behavior. Currently, it is already known in the legal community that AI can be used in both quantitative and qualitative analysis, since its basic idea is to find patterns and define the safest path for lawyers and clients (Andrade et al., 2020).

Jurimetry, which consists in applying analyses based on data science in the field of law, provides a systematic perspective on the factors that influence or play a role in the judge's decision, as it helps define legal behavior patterns supported by quantitative elements (Ramírez et al, 2016; Hildebrandt, 2018; Andrade, 2018). Through it, it is possible to establish innumerable legal events, including the probability of reaching agreement between procedural parties (Andrade et al., 2020; Visser, 2006).

The use of specific software that facilitates or automates the work of legal professionals is already present in many offices (Andrade, 2018; Maia, 2021). Among these technologies used in the practice of law, the use of Natural Language Processing (NLP) stands out, which involves the ability of a computer to process the language used by humans in everyday life (José, 2015; Ramírez et al., 2016; Araújo et al., 2021). The NLP works together with pattern recognition algorithms that, based on a database, end up classifying them according to identified patterns. From this perspective, medical and legal education must follow such trends in the consultation of technological resources, since these tools are increasingly established, where professionals can focus on action strategies, while the machine performs procedural analyses in an automated way.

The object of study of this article was born through the initiative of the *Centro Universitário de Belo Horizonte* (UniBH), idealized by professors and students, called Health Lab 4.0. The goal of this initiative is to bring academic knowledge about the labor market, technology, law and health management, with the support of partner institutions, to an integrated group of academics from different fields of knowledge and enable learning exchanges with a focus on the Judicialization of Health. A highlight factor, besides the innovation in the medical and legal teaching process in its format, is the partnership provided with companies, such as the law firms Décio Freire Advogados Associados and Ferreira & Chagas Advogados, and Hop Digital (for technological solutions), where cases were treated with tools and strategic guidance with real marketing applications.

This article, therefore, in addition to contributing to the intellectual development of scientific research by the participating students, aims to contribute to the excellence of the legal activity of offices that work in the field of judicialization of health, resorting to the creation of a text classifier structured in Python, which uses NLP techniques associated with pattern recognition

algorithms to predict: Subject and prevalence of valid and unfounded judgments, facts that predict subject, full text that predicts subject and prevalence of valid and unfounded judgments, and a concatenation that provides the prevalence of valid and unfounded judgments for judgments of lawsuits against health plans.

2. Methodology

The present work proposed a descriptive exploratory, cross-sectional study with a quantitative and qualitative approach. Analyses of judgments were carried out with reference to processes that deal with consumer matters of Supplementary Health, with the aim of contributing to the legal performance of law firms, both in favor of the consumer and the health plans, through the prediction of judgments of validity or rejection of future lawsuits. For this purpose, data were obtained, free of charge, from the web platform of the Minas Gerais Court of Justice (TJMG – *Tribunal de Justiça de Minas Gerais*), in the lower court, which included information on Number of cases in the lower court; distribution dates; jurisdictions; judicial bodies; names of judges; authors; defendants; facts; matters; objectives of the main demands and orders; urgent guardianships; relevant legal terms; relevant medical terms; normative diplomas; jurisprudence; integral texts and identification of the parties; origins and rejections; values of moral damages and interpretations.

In this study, a text processor has been generated using NLP techniques combined with pattern recognition algorithms (such as Naive Bayes, Neural Networks, SVM – Support Vector Machines, Random Forest, SGD Classifier - Stochastic Gradient Descent) implemented in Python, which receives the object of the claim and predicts the subject. The study contributes to the excellence of the legal activity of law firms that work in the field of health judicialization, both in the defense of the consumer of health plans and in the defense of complementary health companies and/or health plans, using a way of predicting the success or otherwise of the actions that may come into existence regarding this matter, taking advantage, for this purpose, of the application of development technology and analysis of pattern recognition in two simultaneous areas.

Initially, the process of collecting information was done through a manual search on the TJMG web portal platform, in processes that deal with the consumerist nature between "Health Plans" and the end consumer. The data was then entered and systematized in an Excel spreadsheet. There was a choice of data set from a considerable number of 126 (one hundred and twenty-six) cases, which constituted an experimental structure, dispensing with robust computational resources for the use of data recognition. In this way, it was possible to reach the conclusion of the merits or rejection of the requests made by the author of the lawsuit (thus, in a law firm, for example, the tool would give the user the option of adding a minimum number of data to be monitored for the success of the action), such as Jurisdiction (cities in the State of Minas Gerais,

where the cases were distributed), Judging Body (Civil Courts of Common Justice of the TJMG), Name of Magistrates judging the actions, Full text of the judgments, Relevant legal and medical terms, Normative Diplomas / Articles of Law, Jurisprudence that could "Approval / Dismissal". In addition, the incidence rate of data previously normalized and already used in the literature would also be part of the data set.

The experimental methodology was not limited to the proposed base and can be applied to any dataset that meets the scenario (number of samples and words). For the training of classified information in the present study, a real dataset was generated between April and May 2021, obtained through the TJMG web platform.

The creation of a classifier that aims to receive the object of the demand and predict the subject, was developed by the IT (Information Technology) students with the objective of a synthetic analysis and data collection. Functioning as an information aggregator, the tracker has the resource of indexing all data (or processes) related to a research factor, which in the present project was based on lawsuits filed by citizens of Minas Gerais against some health plans due to denials of service and coverage of the plan with health operators. After creating the text classifier, the researchers defined the following steps for analysis and experimentation: preliminary experiments with NLP, identification of metrics for classification to be used by pattern recognition algorithms and previous experiments (called Sprint 1). At the end of these steps, evaluations were performed with pattern recognition algorithms, with their respective analyses. Finally, the contribution of the project to the knowledge and training of the academics involved was duly demonstrated in a joint analysis between the students and the researchers responsible for this study.

2.1 Preliminary Assessment via NLP

The experimental framework consisted of algorithms for collecting and manipulating data to better adapt a sentence in natural language for computational processing. NLP focuses on the automatic understanding of human language by computers. The search engines of these techniques use several metrics to define the relevance of a text based on a set of keywords, such as the frequency of words, the position of the word in the document, the distance between words and also the number of pages that refer to the page. The latter technique was first used by today's most important search engine, Google®.

Text classification is an automated process through NLP, where pre-defined categories can be classified, for example, procedural sentences in different areas, and works together with several classification algorithms, where after the text is processed, it is classified. Editing the data consists of the following steps:

- Normalization: Includes operations such as tokenization, removal of special characters, and others. The process separates words or sentences into units. Lexical tokenization marks each word in the text as a token, identifying it even when it is touched by punctuation. An example of lexically tokenized text would be This is a sentence. [“this”, "is", "a", "sentence", "."].
- Remove stop words: Consists of removing words such as "the", "of", "the", "that", etc., as they do not reveal any relevant information for the construction of the model.
- Eliminate numbers: Numbers do not add relevant information because they carry no semantic load. The accompanying symbols such as "R$", "kg", etc. must also be removed.
- Orthographic correction: Corrections are very common when dealing with a dataset that contains typos, abbreviations, and informal vocabulary. These errors are harmful because they create new useless tokens.
- Stemization: consists of reducing a word to its root. The word "sentence" would be reduced to "sentence". In the case of verbs, the lemma is the verb in the infinitive. The advantage of stemming is vocabulary reduction and meaning abstraction.

Figure 1 shows an example of the evaluation of the collected data submitted for processing, where it can be seen that the NLP treatment was able to estimate the question of "Coverage Denial" – *Negativa de Cobertura* and "Procedure Denial"-*Negativa de Procedimento*. The "Treatment Negative"-*Negativa de Tratamento* data did not reach a sufficient quantity to generate significant results.

Figure 1: Colected data.

```
NEGATIVA DE COBERTURA       70
NEGATIVA DE PROCEDIMENTO    48
NEGATIVA DE TRATAMENTO      12
Name: Assunto, dtype: int64
```

Source: (Authors, 2023)

2.2 Evaluation Metrics by Classifiers

The applied NLP processing methodology focused on the design of experiments with classifiers in order to carry out the prediction process of the processed text. First, the "subject" field was outlined, which was translated into the terms "denial of coverage" or "denial of procedure", which were found in the sentences of the processes used as a database and which determined the focal content of the sentence.

The training stages were developed (which passed the input data and expected outputs), as well as the test (which passed only the input data, and the model made the prediction, and then the

prediction was compared with the expected result - the model did not recognize the expected result).

The metrics used were: Confusion Matrix and Precision/Recall, as shown in Figure 2. The goal is that false positives correspond to precision, false negatives correspond to recall, and F1 score corresponds to the harmonic mean between precision and recall.

Figure 2: Confusion Matrix

		Predicted	
		Negative	**Positive**
Actual	**Negative**	True Negative	False Positive
	Positive	False Negative	True Positive

Source: (Authors, 2023)

Once the metric standards were defined, the parameter to be used as the metric was evaluated: Discussion of the metric to be used: o Client: Health plans or law firms retained by them; High probability of origin ⇒ Proposal and feasibility of settlement; High probability of dismissal ⇒ Assignment of a team to prepare the defense; Cost of false positive: High, since a settlement may be reached in a lawsuit that could result in the claim being denied; Cost of false negative: Low; Metric: Precision, F1 (Client: Law firm hired by consumer.); High probability of origin ⇒ lawsuit distribution; High probability of dismissal ⇒ possibility of dismissal with cause to be pleaded or adjustment in hiring format; False Positive Cost: High; False Negative Cost: Low; Metric: Precision, F1. The classification experiments were conducted in Sprint 1 under the above premises.

2.3 Experimenting with Pattern Recognition Algorithms

The NLP was applied to the text and the samples were submitted to the classification process of pattern recognition algorithms, namely, SGD Classifier, Random Forest, SVM and DNN - Deep Neural Network analysis. After collecting the data (legal cases), two types of classifiers implemented in Python were developed: the first classifier, called Subject Classifier, with the objective of predicting whether a given legal case will receive Denial of Coverage, Denial of Procedure or Denial of Treatment. The second classifier, called Origin Classifier/Partial Validity/Dismissal, aims to predict whether a given case will be considered valid, dismissed or partially valid.

The results obtained in each technique were evaluated by a weighted average of the averages obtained in "Precision" and "F1-Score". The database used contained 126 records, 39% with negative coverage and 26.7% with negative procedure.

3 Experimental Results

3.1 Experimenting with Pattern Recognition Algorithms

Since the NLP does not recover or predict a result, algorithms were used to classify the processed texts. In the present study, first of all, analyses were carried out with the Subject Classifier, using respectively the "Object from the Demand", "Facts" and "Full Text Report" columns of the database. In the first one, the best result was obtained by the RandomForest technique, where an average of 0.71 (from 0 to 1) was obtained to predict the denial of coverage, negative of procedure or negative of treatment. In the second, the best result came from the DNN analysis, using 1000 neurons and 500 iterations, where a weighted average precision of 0.41 was obtained. In the third analysis, the best weighted average was 0.44, in the SVM technique, as can be seen in Table 1.

Subsequently, the analyses were performed with the classifier of origin, partial origin and dismissal, using the column "Report of the full text", the concatenation of the columns "Jurisdiction, Judging Body, Magistrate's Name, Full Text, Relevant Legal Terms, Relevant Legal Terms, Normative Statute / Law Articles, Jurisprudence" and finally the concatenation of the columns "Jurisdiction, Judging Body, Magistrate's Name, Full Text, Relevant Legal Terms, Relevant Legal Terms, Normative Statute / Law Articles, Jurisprudence", the concatenation of the columns "Jurisdiction, court, name of the judge, full text, relevant legal terms, relevant medical terms, normative statute / article of the law, case law, subject of the claim / main order".

In the first analysis, the best average was in DNN (1000 neurons and 500 iterations) with 0.38. In the second, the best result came from the weighted average in RandomForest and DNN, with an accuracy of 0.35, in the weighted average of both. In the third analysis, an equal result was obtained in the DNN and RandomForest techniques, with an accuracy of 0.35 in the weighted average.

Table 1: Results obtained with the subject classifier

Products	Columns Used	Techniques	Classes	Precision	F1 Score	Average Precision	Average F1-Score	Average weight
Subject Classifier	**Object from the demand**	SGDClassifier	NEG COBERT	0.56	0.64	0.65	0.60	0.62
			NEG PROCED	0.71	0.59			
			NEG TRAT	0.67	0.57			
		RandomForrest	**NEG COBERT**	**0.59**	**0.69**	**0.77**	**0.65**	**0.71**
			NEG PROCED	**0.71**	**0.59**			
			NEG TRAT	**1.00**	**0.67**			

		SVM	NEG COBERT	0.56	0.64	0.73	0.62	0.68
			NEG PROCED	0.62	0.56			
			NEG TRAT	1.00	0.67			
		DNN(1000/500)	NEG COBERT	0.53	0.59	0.70	0.60	0.65
			NEG PROCED	0.56	0.53			
			NEG TRAT	1.00	0.67			
	Facts	SGDClassifier	NEG COBERT	0.53	0.65	0.37	0.37	0.37
			NEG PROCED	0.57	0.47			
			NEG TRAT	0.00	0.00			
		RandomForrest	NEG COBERT	0.47	0.58	0.30	0.31	0.31
			NEG PROCED	0.43	0.35			
			NEG TRAT	0.00	0.00			
		SVM	NEG COBERT	0.50	0.62	0.39	0.37	0.38
			NEG PROCED	0.67	0.50			
			NEG TRAT	0.00	0.00			
		DNN(1000/500)	**NEG COBERT**	**0.83**	**0.56**	**0.43**	**0.39**	**0.41**
			NEG PROCED	**0.45**	**0.60**			
			NEG TRAT	**0.00**	**0.00**			
	Report text full	SGDClassifier	NEG COBERT	0.53	0.65	0.41	0.41	0.41
			NEG PROCED	0.71	0.59			
			NEG TRAT	0.00	0.00			
		RandomForrest	NEG COBERT	0.53	0.62	0.40	0.42	0.41
			NEG PROCED	0.67	0.63			
			NEG TRAT	0.00	0.00			
		SVM	**NEG COBERT**	**0.56**	**0.67**	**0.44**	**0.45**	**0.44**
			NEG PROCED	**0.75**	**0.67**			
			NEG TRAT	**0.00**	**0.00**			

		DNN(800/500)	NEG COBERT	0.48	0.65	0.49	0.28	0.39
			NEG PROCED	1.00	0.18			
			NEG TRAT	0.00	0.00			

Source: (Authors. 2023)

Table 2: Results obtained with the Origin/Partial Origin/Non-Foundation classifier.

Products	Columns Used	Techniques	Classes	Precision	F1 Score	Average Precision	Average F1-Score	Average weight
Origin/ Origin/ Partial/ Dismissal Classifier	**Full Text Report**	SGDClassifier	Dismissal	0.00	0.00	0.34	0.34	0.34
			Proced Parcial	0.73	0.62			
			Origin	0.29	0.40			
		RandomForrest	Dismissal	0.00	0.00	0.30	0.30	0.30
			Proced Parcial	0.67	0.59			
			Origin	0.23	0.32			
		SVM	Dismissal	0.00	0.00	0.34	0.34	0.34
			Proced Parcial	0.73	0.62			
			Origin	0.29	0.40			
		DNN(1000/500)	**Dismissal**	**0.00**	**0.00**	**0.38**	**0.39**	**0.38**
			Proced Parcial	**0.83**	**0.74**			
			Origin	**0.31**	**0.42**			
	Jurisdiction. Judging Body. Magistrate's name. Full Text. Relevant Legal Terms. Relevant Medical Terms. Normative Diplomas/ Articles of law. Jurisprudence	SGDClassifier	Dismissal	0.00	0.00	0.31	0.31	0.31
			Proced Parcial	0.64	0.54			
			Origin	0.29	0.40			
		RandomForrest	**Dismissal**	**0.00**	**0.00**	**0.34**	**0.36**	**0.35**
			Proced Parcial	**0.69**	**0.64**			
			Origin	**0.33**	**0.44**			
		SVM	Dismissal	0.00	0.00	0.31	0.31	0.31
			Proced Parcial	0.64	0.54			
			Origin	0.29	0.40			
		DNN(1000/500)	**Dismissal**	**0.00**	**0.00**	**0.36**	**0.34**	**0.35**
			Proced Parcial	**0.80**	**0.64**			
			Origin	**0.27**	**0.38**			
	Jurisdiction. Judging Body. Magistrate's name. Full Text. Relevant	SGDClassifier	Dismissal	0.00	0.00	0.31	0.31	0.31
			Proced Parcial	0.64	0.54			
			Origin	0.29	0.40			
		RandomForrest	**Dismissal**	**0.00**	**0.00**	**0.34**	**0.36**	**0.35**
			Proced Parcial	**0.69**	**0.64**			
			Origin	**0.33**	**0.44**			
		SVM	Dismissal	0.00	0.00	0.31	0.31	0.31

	Legal Terms. We have Relevant Doctors. Normative Diplomas/ Articles of law. Jurisprudence		Proced Parcial	0.64	0.54			
			Origin	0.29	0.40			

Source: (Authors. 2023)

3.2 Discussion

Finally, the profound impact that the project had on the learning of Law, Medicine and Information Technology students should be highlighted. It was possible to collect the following testimonials:

"Being part of this project is an incredible experience with a touch of reality of how the work of technology combined with law and medicine walks together on this journey of the Health Lab 4.0 project, automating work through artificial intelligence. grateful to participate in the project to automate work on the part of law and medical team so that they can accumulate time to work on aspects of their work that were never explored, bringing an unprecedented immersion of analysis to the project and speed that could never be achieved 10 years ago, which makes TI proud to provide this experience to all its users. But not that the project is easy, working with neural networks is very close to how the human brain works today, and that caused a great effort between TI students using Natural Language Processing (NLP) with the dataset provided by law and medicine students to arrive at the current result." (IT STUDENT, 2021)

"Participating in a project that combines law with the field of artificial intelligence to solve legal problems related to the health sector has allowed us to realize that the work routine of the legal professional can be streamlined, especially when one considers that it is possible to build models computational systems that can help in tasks such as predicting decisions and formulating arguments. In the same way that neural networks work in the body by transmitting information, a new network appears here, and with it new opportunities and possibilities. It took dedication and effort to understand the realities and challenges of each party involved in the project. An effort that values each field and the certainty that interdisciplinarity brings excellent results. The project has demonstrated the indispensability of the multidisciplinary interaction between law and other fields of knowledge, which is not sufficient to concentrate on the isolated study of positivized law. Bringing the law to interested people and learning from them the love that each one has for his or her field is rewarding". (LAW STUDENT, 2021)

"In this project, we have been able to face the complexity of the legal and IT fields, in addition to verifying how much these two fields have a significant impact on the healthcare sector. There is still a lot of innovation that can be implemented in the healthcare sector, with benefits that can be passed on to the patients who need it most. It was certainly an unforgettable experience that will remind us of the infinite possibilities that data can contribute to health, just as the law is capable of ensuring justice in the treatment of patients." (MEDICAL STUDENTS, 2021)

Such reflections by students and co-authors of the article show their perception of the proposed challenge, even in a pandemic scenario with content of relevant complexity.

4 Conclusion

In the present research, there was a significant complexity in carrying out the automatic collection of information made available on the TJMG web portal platform, since each sentence has a specific grammatical arrangement. Due to this variety of structures, it was necessary to perform the process manually so that the information collectors could work continuously.

Currently, the way in which judicial decisions reach the TJMG web portal platform is increasingly fast and constant. In this way, the availability of a tool that facilitates and makes as efficient as possible the legal action of the prosecutors of the parties to the proceedings is extremely relevant.

It should be noted that the low precision of the weighted average of the analyses carried out in the tool developed for the present study is due to the limited number of lawsuits included in its database. Nevertheless, the results obtained were satisfactory and the AI implementation process proved to be effective and fulfilled the initial objectives of the project. The foundations are complete and can be developed and expanded as needed, and as the expansions are made, the model training will become more precise and the analyses will be more accurate.

It is concluded that although the methodology developed in the study object of this article still needs to be incremented with more data, so that it can consequently obtain better practical results, the fact that students from such different areas have reached this conclusion, even more, in such a tuned way with regard to working as a team and exploring the means to achieve a certainly more robust goal, it has become the greatest merit of this project.

References

Andrade MD, Rosa BC, Pinto ERGC. (2020) Legal tech: analytics, inteligência artificial e as novas perspectivas para a prática da advocacia privada [*Legal tech: analytics, artificial intelligence and new perspectives for the practice of private law*]. **Revista Direito GV**, v. 16.

Andrade, MD. (2018) Utilização do sistema R-studio e da jurimetria como ferramentas complementares à pesquisa jurídica [*Use of the R-studio system and jurimetry as complementary tools to legal research*], **Revista Quaestio Iuris**, Rio de Janeiro, v. 11, n. 2, p. 680-692.

ANS [Agência Nacional de Saúde Suplementar - *National Supplementary Health Agency*] (2018). ANS 18 anos [*ANS 18 years old*]. Available from: http://www.ans.gov.br/

Araujo, I. B.; Rodrigues, D. S. E. S. ; Souza, F. H. B. ; Carvalho, L. M. ; ; Mustifaga, Y. R. (2021) Structure and Experiments to Recognition and Classification of Fake News about Citizens in Brazilian Government Positions. Proceedings of The 11th International Conference on Research in Engineering, Science & Technology, v. 1. p. 15-28.

Brasil (1988). Senado Federal [*Federal Senate*]. Constituição da República Federativa do Brasil [*Constitution of the Federative Republic of Brazil*]. Brasília: Senado Federal. Available in: https://www2.senado.leg.br/bdsf/bitstream/handle/id/518231/CF88_Livro_EC91_2016.pdf

Brasil (1990.a) Ministério da Saúde [Ministry of Health]. Lei nº 8.080, de 19 de setembro de.. Diário Oficial da União, Brasília. Available in: http://conselho.saude.gov.br/legislacao/lei8080_190990.htm

Brasil (1990.b) Governo Federal [*Federal Government*]. Casa Civil. Lei nº. 8142, de 28 de dezembro de 1990 [*Law no. 8142, of December 28, 1990*]. Diário Oficial da União [*Official Diary of the Union*]. Available in: http://www.planalto.gov.br/ccivil_03/leis/L8142.htm

Brasil (2001). Medida Provisória nº. 2.177-44, de 24 de agosto de 2001 [*Provisional Measure no. 2,177-44, of August 24, 2001*]. Diário Oficial da União, Brasília, 2001. Available in: http://www.planalto.gov.br/ccivil_03/MPV/2177-44.htm

Coalizão Saúde (2017). Coalizão Saúde Brasil: uma agenda para transformar o sistema de saúde [*Coalição Saúde Brasil: an agenda to transform the health system*]. Available in: http://icos.org.br/wp-content/uploads/2017/04/Relato%CC%81rioNet.pdf

Cutler, D., Zeckhauser, R. (2000) The anatomy of health insurance. In: Handbook of health economics. **Elsevier**, p. 563-643.

Hamamoto, PT; Caramori, JT. (2017) Perfil dos principais autores da Revista Brasileira de Educação Médica entre 2006 e 2015: perspectivas para um novo futuro?.[*Profile of the main authors of the Brazilian Journal of Medical Education between 2006 and 2015: prospects for a new future?*]. **Revista Brasileira de Educação Médica**, v. 41, p. 442-448.

Hildebrandt, M.(2018) Law as computation in the era of artificial legal intelligence: Speaking law to the power of statistics. **University of Toronto Law Journal**, v. 68, n. 1, p. 12-35.

José M, Finatto B, Lopes L, Ciulla A. (2015) Processamento de Linguagem Natural, Linguística de Corpus e Estudos Linguísticos: uma parceria bem-sucedida Natural Language Processing, Corpus Linguistics and Linguistics: a successful partnership. 2015.

Lindelow M.(2013) A marca do SUS [*The SUS Mark*] Available in: http://www.worldbank.org/pt/news/opinion/2013/12/20/brazil-sus-unifiedpublic-healthcare-systemnew-study

Maia A.J. S.(2021) A Tecnologia Da Informação Nos Escritórios De Advocacia [*Information Technology in Law Firms*]. **Recima21 - Rev Científica Multidiscip** - ISSN 2675-6218.

Marinho CR, Rosa SZ, Marinho CM, Ortiz SMC, Campos FH, De Pessanha OF.(2020) Judicialização da saúde decorrente dos planos de pré-pagamento e o direito sanitário: revisão integrativa [*Judicialization of health resulting from prepayment plans and health law: integrative review*]. **Revista Brasileira de Enfermagem**, v. 73, 2020.

Mendes, A.(2013) A longa batalha pelo financiamento do SUS [*The long battle for SUS funding*]. **Saúde e Sociedade**, v. 22, n. 4, p. 987-993, 2013.

Ocké-Reis CO, De Andreazzi MFS, Silveira, FG.(2006) O mercado de planos de saúde no Brasil: uma criação do estado?[*The health plan market in Brazil: a creation of the state?*] **Revista de Economia Contemporânea**, v. 10, p. 157-185.

Ramírez RA, Díaz YV, Fernández, YA. (2016) Jurimetría: una opción para la sociedad. **Serie Científica de la Universidad de las Ciencias Informáticas**, v. 9, n. 4, p. 1-10.

Silva LC. Judicialização da saúde: em busca de uma contenção saudável [*Judicialization of health: in search of a healthy containment*] **Âmbito Jurídico**, v. 16, n. 112, p. 1-7, 2013.

Souza DO. O subfinanciamento do Sistema Único de Saúde e seus rebatimentos no enfrentamento da Covid-19 [*The underfunding of the Unified Health System and its repercussions in the face of Covid-19*]. **Physis: Revista de Saúde Coletiva**, v. 30, 2020.

Schulze, CJ (2019) Números de 2019 da judicialização da saúde no Brasil [*2019 numbers of the judicialization of health in Brazil*] Empório do Direito. Available in: https://emporiododireito.com.br/leitura/numeros-de-2019-da-judicializacao-da-saudeno-brasil

Visser J (2006) Jurimetrics, safety and security. **International Review of Law, Computers and Technology**, vol. 20, n. 1/2, p. 123-145.

Ziroldo, RR; Gimenes, RO; Castelo Júnior, C (2013) A importância da Saúde Suplementar na demanda da prestação dos serviços assistenciais no Brasil [*The importance of Supplementary Health in the demand for the provision of assistance services in Brazil*] **O mundo da saúde**, São Paulo, v. 37, n. 21, p. 216-221, 2013.