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MECHANISM OF METHODS USED WHEN WORKING WITH DOCUMENTS AND PROCESSING DOCUMENTS USING ARTIFICIAL INTELLIGENCE

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Abstract. Automation of the processes of analysis, processing and transmission of information in the development of information systems reduces the complexity of implementation, time and material costs, frees up the resources of developers to solve more complex and creative tasks. The transition of document management now to electronic document management technologies not only dramatically accelerates the speed of business processes of companies, but also provides cost savings when abandoning paper media, to minimize most operations when processing electronic documents, the use of artificial intelligence technologies is considered effective. In the article I will consider the possibilities of artificial intelligence technologies used in the process of enterprises, in converting documents into electronic and in the exchange of electronic documents.

Depending on the structure of the text, the review of the applied methods of artificial intelligence, neural networks and the analysis of their work processes is carried out. Depending on the structure of the document, neural networks are used. Various recognition methods can be used for image recognition according to the characteristics of the recognized characters. The article describes the mechanism of image recognition, the document processing process, the operation of NLP algorithms. Processing documents of a professional organization with the help of artificial intelligence used in it improves the quality of the document flow of the enterprise, leads to time savings and cost reduction.

Key words: artificial intelligence, electronic document, neural network, recursive networks, NLP.

Introduction

Artificial intelligence should be able to do something that can be used in everyday or professional human activities, such as reading from an image or collection of images, inscriptions, and image information. It is difficult to analyze texts using artificial intelligence: the multi-meaningfulness of one word and the use of different languages make it difficult to process them automatically. If we take the phrase "they must be in the warehouse", you will not be able to understand with 100% accuracy, that is, we are talking about people in the warehouse or things that are stored in the warehouse? A broader context is needed to address this.

Artificial intelligence, which processes documents, turns scanned paper into structured information in the form of an electronic document. Let's focus on two different components: computer vision and word processing. Computer vision allows you to edit PDF, scanned images, and images in text format. However, first you need to do a structural analysis of documents: find where text blocks, images, and tables are located, and then find out how they interact with each other. At the same time, images or documents can come in different situations because they are an existing substance. For example, there may be streaks left after the printer, photos taken of the wrong quality, documents with coffee stains. All this needs to be resolved in some way in order to obtain the correct information.

Main part

Image recognition Working Mechanism:

- Images are extracted and processed.
- Documents are aligned and adjusted.
- Then the surface structure is analyzed and block types are determined.
- Once blocks are defined, rows and columns are defined.

- You can divide lines by words into words by symbols

1. Getting and editing images;
2. Analysis of facial structure;
3. Text recognition;
4. Synthesis and storage of recognized fragments of documents in the required format;

When recognizing documents using artificial intelligence, as I mentioned earlier, it is necessary to recognize documents by dividing them into pages, pages into blocks, blocks into rows and columns, rows and columns into words, words into symbols. After that, we collect the recognized characters by combining words into words, words into lines, lines into blocks, blocks into pages, and pages into documents. In the recognition of documents plays an important role in its structure.

Document types:

- Multi-texture: business cards, checks, invoices
- Less structured: articles, magazines, etc.

If the document type is fixed, it differs slightly from the multi-structured document type and from each other in terms of document structure, you can use methods that learn how to directly extract the necessary attributes from a text document using text and graphic designations. For example, you can extract elements from network textures using repetitive neural networks. Invoices are documents containing the names of goods and a description of the methods of payment for these goods.

Figure – 1. Invoices and receipts. Multi-structured documents

For example: if we receive checks, you can issue a check number, date, valid account through neural networks. Convolutional neural networks are good for single attributes that have a certain position, and recurrent neural networks are good for repeating elements. The convolutional layer

is the basic unit of a neural network. And when recognizing a convolutional layer, the number of parameters is relatively small. On (figure 2) shows the transformation of a convolutional neural layer in several output channels. For the original image (Figure 2), it has a size of 28x28 pixels, which means 2352 input neurons.

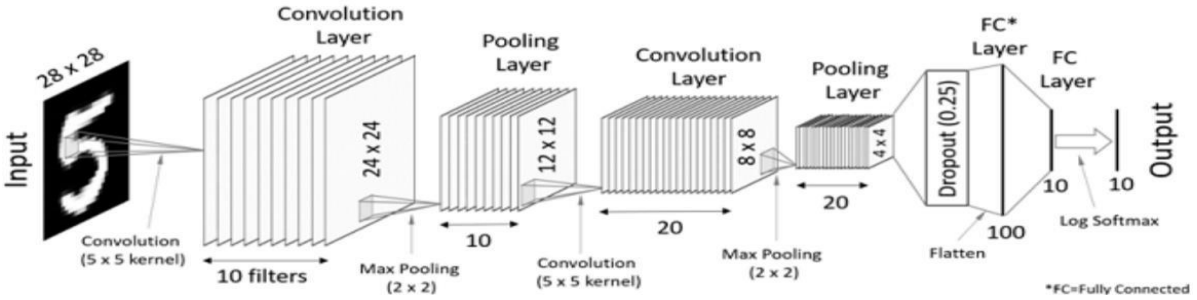

Figure – 2. Transformation of the convolutional neural layer in several output channels

If the document is less structured, NLP machine learning is used in text processing. This can be difficult due to the fact that multi-valued words are often used here. For example: the word address can mean the address of the company, or it can mean the obligation of the client to solve some problems.

Vendor's address is ...

Vendor will have to address the problem ...

From uploading a document to extracting the required fields, processing will be conceptually as follows:

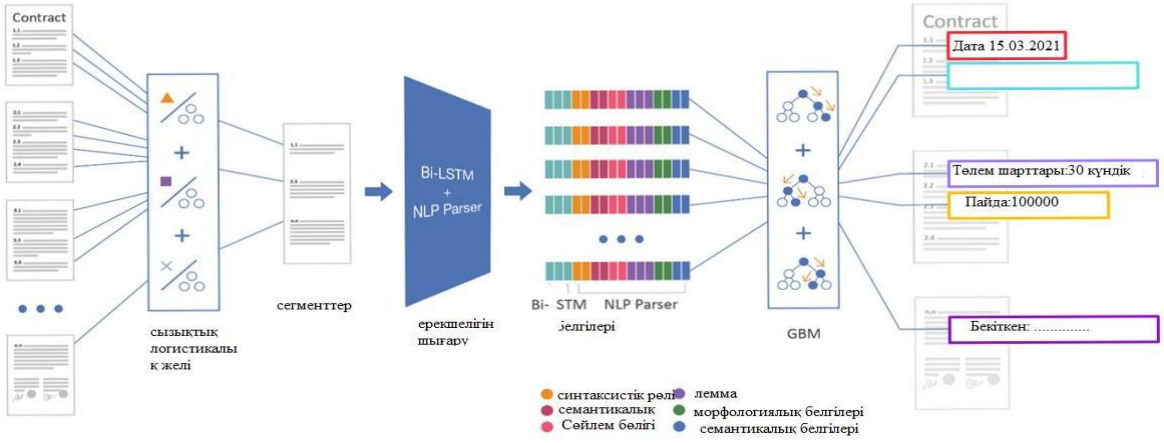

Figure – 3. Document processing process

When segmenting documents, that is, narrowing the information search area, we process not all 50 pages, but only 5 segments by paragraph, which may contain the date we need. This greatly simplifies the operation of algorithms, as well as distinguishes the desired date from other information. In Figure 2, all the steps to the right of segmentation describe the operation of NLP algorithms - a detailed study, reading, and understanding of the text. These processes take 10-20 times longer than classification and segmentation, so it is not correct to use them in a multi-page document, they are easier to use in small texts. NLP parser + Bi - LSTM-with their help, exceptions are obtained from each sentence in the text.

The engine reads the text in detail and deduces many generalizations from it. He understands not only what is specifically formulated in this sentence, but also the meaning - what it really means. The next stage is considered to be the output of symbols by text. There are also top-level labels. The classic and simplest machine learning method, GBM, is used to produce top-level tokens. As you can see in Figure 2, an ensemble of trees that show the overall result on the resulting fields. GBM-it is important to have a sufficient number of documents in order to learn quickly and effectively extract information.

If their number is small, then the quality of obtaining information may decrease. This is due to the fact that the core of cases becomes smaller and, accordingly, it becomes worse to distinguish machine - isolated cases from more common cases.

Many people rent a lot of land for construction and offices. And such documents need to be processed automatically: they need to be extracted from them by the start and end dates, so that they can track whether payments are missed later, when the lease expires, where the contract is automatically renewed, and how much it all costs.

In such a contract, information is generated using NLP, and tabular data is generated using FlexiLayout, and all other fields are generated using segmentation. The advantage of NLP technologies is that it is another mechanism that can handle more types of fields and documents.

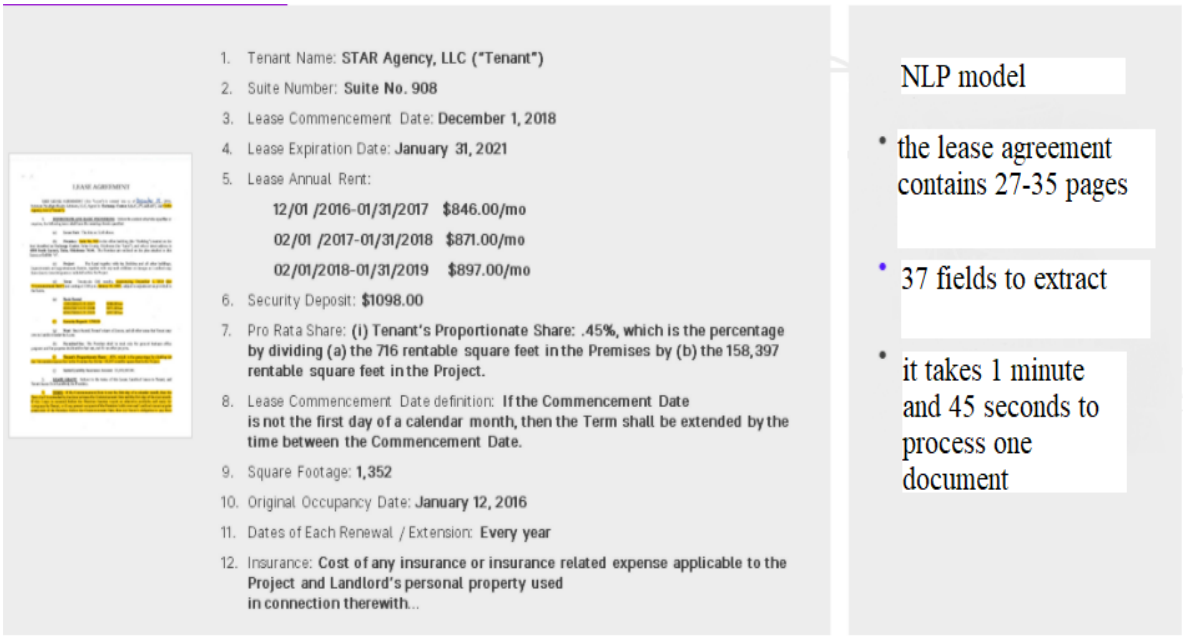

Figure – 4. «Contract», NLP model efficiency

Conclusion

Using these examples, you can see how artificial intelligence technology– which helps to save time-can be used. In English, this scheme is called "win-win": robots perform repetitive tasks, saving time for employees to engage in more intelligent and interesting projects. Companies that work with artificial intelligence, rather than everyday specialists, create interaction with customers more efficiently, avoid errors when processing certain documents, and increase profitability faster.

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Жасанды интеллект көмегі арқылы құжаттармен жұмыс жасау жәнеқұжатты өңдеу кезінде қолданылатын әдістер механизмі

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Аңдатпа. Ақпараттық жүйелерді әзірлеу кезінде ақпаратты талдау, өңдеу және беру процестерін автоматтандыру іске асырудың күрделілігін, уақыт пен материалдық шығындарды азайтады, әзірлеушілердің ресурстарын неғұрлым күрделі және шығармашылық міндеттерді шешуге босатады. Құжат айналымының қазір электронды құжат айналым технологияларға көшу компаниялардың бизнес-процестерінің жылдамдығын түбегейлі жеделдетіп қана қоймай, қағаз тасымалдаушылардан бас тартқан кезде қаражатты үнемдеуді қамтамасыз етеді,электрондық құжаттарды өңдеудегі көп операцияларды барынша азайту үшін жасанды интеллект технологияларын қолдану тиімді болып саналады. Мақалада кәсіпорындардың жұмыс процес кезінде қолданылатын құжаттарын электронды түрге өзгертуде және электронды құжат алмасуда қолданылатын жасанды интеллект технологияларының мүмкіндіктерін қарастыратын боламын.

Мәтін құрылымына қарай қолданылатын жасанды интеллект әдістерін, нейрондық желілерін қарастыру және олардың жұмыс процестеріне талдау жасалынады. Құжат құрылымына қарай бөлініп, құрылымдары бойынша нейрондық желілер қолданылады. Суреттерді тану үшін таңбалардың сипаттамаларына сәйкес танудың әртүрлі әдістерін қолдануға болады. Мақалада суреттерді тану жұмыс механизмі, құжаттарды өңдеу процессі, NLP алгоритмдерінің жұмысын сипаттайды. Кәсіптік ұйым құжаттарын өңдеу, онда қолданылатын жасанды интеллект көмегімен кәсіпорын құжат айналым сапасын көтеріп, уақыт үнемділігі мен шығындарды азайтуға алып келеді.

Кілттік сөздер: жасанды интеллект, электронды құжат, нейрондық желі, рекурренттік желілер, NLP.

Механизм методов, используемых при работе с документами и обработке документов с помощью искусственного интеллекта

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Аннотация. Автоматизация процессов анализа, обработки и передачи информации при разработке информационных систем снижает сложность реализации, временные и материальные затраты, освобождает ресурсы разработчиков для решения более сложных и творческих задач. Переход документооборота сейчас на технологии электронного документооборота не только кардинально ускоряет скорость бизнес-процессов компаний, но и обеспечивает экономию средств при отказе от бумажных носителей, для минимизации большинства операций при обработке электронных документов эффективным считается использование технологий искусственного интеллекта. В статье я рассмотрю возможности технологий искусственного интеллекта, используемых в процессе работы предприятий, в преобразовании документов в электронные и в обмене электронными документами.

В зависимости от структуры текста проводится рассмотрение применяемых методов искусственного интеллекта, нейронных сетей и анализ их рабочих процессов. В зависимости от структуры документа используются нейронные сети. Для распознавания изображения могут использоваться различные методы распознавания в соответствии с характеристиками распознаваемых символов. В статье описывается механизм работы распознавания изображений, процесс обработки документов, работа алгоритмов NLP. Обработка документов профессиональной организации с помощью искусственного интеллекта, применяемого в ней, повышает качество документооборота предприятия, приводит к экономии времени и снижению затрат.

Ключевые слова: искусственный интеллект, электронный документ, нейронная сеть,

рекуррентные сети, NLP.

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