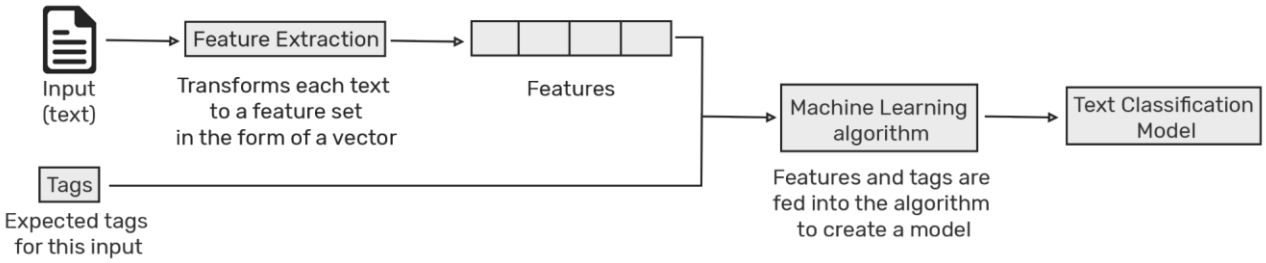
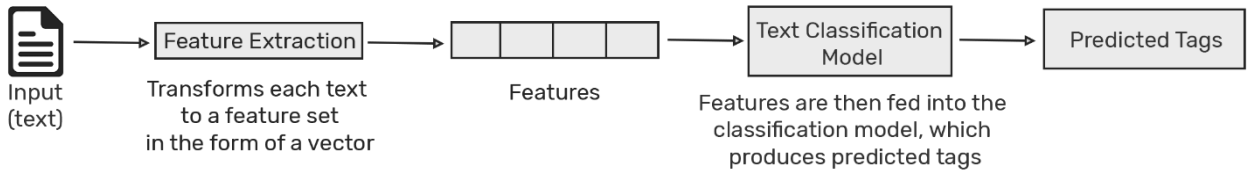


Picture 1 – Classification model

Once it's trained with enough training samples, the machine learning model can begin to make accurate predictions. The same feature extractor (picture 2) is used to transform an unseen text to feature sets, which can be fed into the classification model to get predictions on tags (e.g. sports, politics).

Text classification with machine learning is usually much more accurate than human-crafted rule systems, especially on complex classification tasks. In addition, classifiers with machine learning are easier to maintain and you can always tag new examples to learn new tasks.



Picture 2 – Feature extractor

Automated text categorization is now a major research area within the information systems discipline thanks to a number of factors:

its domain of application is numerous and important, and give the proliferation of documents in digital form they are bound to increase dramatically in both number and importance;

it is indispensable in many applications in which a number of documents are classified and fast response is required;

it has reached effectiveness levels comparable to those of trained professionals. The effectiveness of manual text categorization is not 100% anyway and more important that it is unlikely to be improved substantially by the progress of research. The levels of effectiveness of automated text categorization are growing at a steady pace and this approach will probably be higher than the effectiveness levels of manual text categorization.

References:

1. https://monkeylearn.com/text-classification/
2. http://nmis.isti.cnr.it/sebastiani/Publications/ACMCS02.pdf
3. https://towardsdatascience.com/automated-text-classification-using-machine-learning-3df4f4f9570b

MODERN APPROACH TO THE DIAGNOSIS OF NEUROLOGICAL DISEASE

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This article deals with neurological diseases as a category of diseases. The importance of timely diagnosis of neurologic diseases is also described. A modern approach to diagnosing these diseases is presented, as well as the reasons why this approach can be possible and useful.

Neurological diseases are one of the most common categories of diseases in the world. Neurological ailments can develop at any age, even in the womb. And with age, the prevalence of these diseases only increases.

The peculiarity of neurological conditions is that the entire human body is permeated with nerves, respectively, pain syndrome or dysfunction can occur absolutely anywhere. However, typical complaints in neurology can be listed:

- dizziness
- noise in ears
- headache
- general weakness and fatigue
- sleep disorders
- loss of appetite or uncontrolled gluttony
- numbness of the limbs, head, face, various skin areas
- convulsions
- pains in the neck, chest and ribs, lower back, buttocks
- tremor of various parts of the body, paresis or paralysis
- perceptual impairment
- impairment of consciousness
- impaired attention and memory
- speech disorders
- increased anxiety, obsessive thoughts
- short temper, irritability
- tearfulness and feeling of doom
- apathy and indifferent attitude

The diagnosis of diseases of the nervous system is carried out by neurologists, neurophysiologists, radiation diagnosticians, ultrasound diagnostics specialists and neuro-ophthalmologists. Usually, for classifying the patient's condition, in the doctor’s arsenal there is not only knowledge of the characteristic symptom complexes, but also a number of diagnostic tests that allow diagnosis. Diagnostic studies are carried out:

- Electroencephalography;
- EEG video monitoring;
- USDG and duplex scanning of brain and neck vessels;
- Neurosonography;
- Polysomnography;
- Electroneuromyography;
- evoked potentials;
- CT or MRI [1].

But not everyone has the opportunity to visit a specialist to diagnose a neurological disease. In this regard, it was decided to develop an algorithm that can diagnose and detect the disease at home. The easiest way to diagnose neurological diseases for which special equipment is not required is a speech signal diagnostics.

Tangible changes in speech are inherent in many neurological diseases. In particular, bulbar disorders (i.e., difficulty in swallowing and speaking) are the first symptom in approximately 30% of cases of amyotrophic lateral sclerosis (ALS) [2]. In most cases, the diagnosis of abnormalities in speech is performed by a medical professional, but this method of assessment is sensitive to various sources of error and cannot be automated. Moreover, some changes in speech, observed in ALS, are detected only with the involvement of tools [3]. Currently, there is a need to improve systems for assessing changes in speech to improve the effectiveness of early diagnosis of ALS and further therapeutic treatment [4].

Most approaches to automatic speech signal diagnostics are based on the use of a large set of features extracted from a speech signal (discrete Fourier transform, autocorrelation, jitter, shimmer, harmonic / noise ratio, etc.). Based on these data, a neural network is trained to classifies the speech signal as normal or pathological. However, this approach has two drawbacks. Firstly, there is a risk that the system will be too optimized for training data, which will limit its ability to generalize. Secondly, the data approach requires large computational resources, which does not allow its use in portable devices [5].

Therefore, it is necessary to create a system meaningfully. Do not analyze the entire signal, but take for the basis only the useful part of the signal. Studies in the diagnosis of neurological diseases using voice analysis are conducted in two directions: acoustic analysis and speech analysis [6].

Difficulties in the reliable diagnosis of ALS and other neurological diseases prompted researchers to develop decision-support tools based on algorithms that allow us to separate speech samples of

healthy people from those with a particular neurological disease. These tools do not allow for differential diagnosis (the means of differential diagnosis involves determining a specific type of neurological disease), but are an important step towards this long-term goal.

References:

1. Kumar DR Jean-Martin Charcot: The Father of Neurology / Kumar DR, Aslinia F, Yale SH, Mazza JJ // Clin Med Res, 12 November 2014, pp. 46–9
2. Fractal features for automatic detection of dysarthria / T. Spangler [et al.] // IEEE EMBS International Conference on Biomedical Health Informatics (BHI). Orlando, USA, Feb. 16–19, 2017. P. 437–440. 2.
3. Detection of bulbar ALS using a comprehensive speech assessment battery / Y. Yunusova [et al.] // 8th international workshop Models and analysis of vocal emissions for biomedical applications. Florence, Italy, 16–18 Dec. 2013. P. 217–220. 3.
4. Bulbar and speech motor assessment in ALS: challenges and future directions / J.R. Green [et al.] // Amyotrophic Lateral Sclerosis and Frontotemporal Degeneration. 2013. Vol. 14, № 7–8. P. 494–500.
5. Jonathan Driedger (2016). Memory-Restricted Multiscale Dynamic Time Warping. Proceedings of the IEEE International Conference on Acoustics, Speech, and Signal Processing (ICASSP), pp. 569-573.
6. A.D. Gvozdovich, Y.N. Rushkevich, M.I. Vashkevich. Detection of bulbar amyotrophic lateral sclerosis based on speech analysis, BGUIR, 116 (6) (2018). pp. 52-58.

BUSINESS CONFERENCE OPTIMIZATION AND IT EVENTS

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A conference is a gathering of people with a common interest or background, with the purposes of allowing them to meet one another and to learn and discuss issues, ideas and work that focuses on a topic of mutual concern.

A conference may also be held online, or something of this kind. Teleconferences bring people together giving them an opportunity to listen to presentations, discuss issues, exchange opinions, without leaving their homes or offices. Similar situations can be set up using the Internet, projectors, and web cameras and microphones.

The structure and contents of conferences can vary greatly, but a typical framework includes one or more presentations of work and/or ideas about a given topic. These presentations can have a form of lectures, slide shows or films, workshops, panel discussions, and/or interactive experiences. In addition, many conferences include posters or graphic or multimedia exhibits that participants can view independently.

When we think of a conference organizer, we typically think of the person responsible for all the conference logistics, however his role as a conference organizer extends far beyond that. A conference organizer has a lot of responsibilities a conference organizer. You need to develop a vision for your conference with realizable goals and objectives that are maintained and supported by the details of the event.

Every conference has a budget. The budget is based upon how much income is expected from all sources set against the expenses that are anticipated. In most cases you will need to be realistic about what is affordable within the limits of your budget income. You will find that some things that you want will not be affordable and must be scrapped. Always bear in mind that the price for services can almost always be negotiated. Most conference managers try to establish the minimum budget. However, your will find that your budget must be continually reviewed.

A good timeline is essential to keep you on track. A timeline can be simple or complex as you want. The key is to make sure that the timeline includes ‘hard’ deadlines, i.e. important dates for tasks that you can’t afford to over-run. The form on the next page of this workbook provides a sample timeline which will give you some idea of the types of items to include. Note that the timeline is actually shown in reverse – starting with the date of the conference. This is a good way of working out important deadlines. Your timeline provides an overview of the tasks to be completed. Assign a committee member to each task and have them sign off completed items. Each area of responsibility, such as registration, will actually be comprised of individual smaller tasks. This workbook will help you break the larger tasks into comprehensive task lists. These task lists can then be added to your timeline.

This may just be the most critical step of all. Your speakers are the stars of your conference. You want a solid lineup in order to attract attendees and guarantee professional experience.

It is important to have a certain number of attendees at any conference. You can attract people inviting a key – note speaker. It is a person who is very well-known and respected within the field. This will boost your credibility in the eyes of other potential speakers. Start looking for thoughtful leaders that focus on the same themes as your conference. Create a prioritized list of potential speakers you’d