



## MSQRD founders make Diagnocat AI service for dental image recognition

The founders of the startup MSQRD, Evgeny Nevgen and Sergey Gonchar, together with the founder of the Fantasy group of companies, Vladimir Alexandrovsky, are working on the service Diagnocat. The artificial intelligence platform will diagnose dental conditions and help dentists accurately make diagnoses and find tooth damage, according to Vademecum.

A database of more than 20,000 depersonalized investigations was used in the development of Diagnocat. Such a volume of images enables the use of not only machine learning methods, but also deep learning (ultra-precise neural networks). Diagnocat identifies and segments the main anatomical regions (jaw, teeth, periapical space). It diagnoses various conditions and pathologies based on 122 attributes (norm, filling, crown, implant, periodontitis, etc.) and generates an X-ray description for each image, listing all the findings.

A doctor needs more than 40 minutes to fully analyze the results of computed tomography «manually». In real life, the dentist has only a few minutes during the appointment to interpret the images. As a result, the area of interest is limited to a few teeth, and most of the remaining conditions remain undescribed.

CBCT imaging programs are quite complex and differ from one manufacturer to the next. Many dentists have difficulties in recognizing conditions and reflecting them correctly in the medical record.

Diagnocat helps make an accurate diagnosis and monitor treatment plans at all stages. The history of changes is easily recorded in the medical records. The service helps the dentist substantiate the treatment plan, and the patient receives objective data on how successfully his treatment was carried out («before/after» images).

The developers have been working on the project for a year and a half. «It was all decided quite quickly; I told my future partners the idea of a program that would analyze medical images from a CT scanner for dentistry and determine the condition and pathology of the teeth», says Aleksandrovsky. «They liked the idea, and they agreed to invest in the project with me.»

The team has already developed a prototype that makes it possible to recognize a tooth, determine its structure and diagnose pathologies based on X-ray images. «In practice, it looks like this: the dentist uploads an image through his personal account on the Diagnocat website, and the program immediately shows him the condition of the patient's teeth. Currently we can identify 42 pathologies and conditions, including caries, periodontitis, fillings, crowns and implants. In addition, we can automatically make slices required for subsequent endodontic treatment or implantation», says Vladimir.

Diagnocat's founders note that in dentistry, the specialty of a radiologist is not as common as in general medicine, and working with images requires separate skills and practice that not all specialists have.

«In our internal experiments, we asked several different radiologists to make diagnoses from images, and the level of agreement on diagnoses didn't exceed 50%. The level of agreement among dentists is even lower; it's about 30%. There are situations when, due to misinterpretation of X-ray images, one dentist says that a tooth needs to be treated, and another that it needs to be extracted. Our mission is to make diagnostics in dentistry error-free.»

In spring 2019, the team will present its solution at the International Dental Show in Cologne. Currently the guys are looking for investors in the USA. Over the course of a year and a half of work, Nevgen, Gonchar and Aleksandrov have invested several hundred thousand dollars of their own funds in the project.