Use of artificial intelligence to identify nannoplankton species

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The Institute of Geology and Paleontology, Faculty of Science, Charles University, in cooperation with Cogniware, has tested a system for the automatic recognition of coccoliths using artificial intelligence technology. During the testing experiment, the goal was the unequivocal identification of the species *Cyclicargolithus floridanus* with no confusion with morphologically-similar species. With the software programme designed by Cogniware, a professional palaeontologist marks an object, and the software prepares it for so-called deep neural network training. Thanks to this software, the palaeontologist can use their knowledge without knowledge of the neural network training.

By training a deep neural network, a system is created that is able to process thousands of images over an hour, recognise specimens of certain species and record the number of this species. The training consists of selecting appropriate specimens of *C. floridanus*, marking them, preparing them for training the model (automatic adjustments, such as turning the annotated samples) and training the neural network. At least 1000 specimens of each species are necessary for creating the model. The model is then corrected and overtrained so that the results can be used for professional processing. The project is based on the assumption that the recognition rate must be over 90%. The long-run result could be a qualitative and quantitative analysis of calcareous nannoplankton assemblages on slides in only seconds.