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## Abstract

In the article for the solution of the classification process automation problem and interpretation of ovoscopying eggs visualization results at an incubation, the intellectual identification method of chicken embryos development state based on deep neural networks is offered. The created generalized LeNet 2D model has the following advantages—the input image is not square that expands a scope; the input image contracts previously, and the new size is defined empirically and depends on the initial size of the image that increases the training speed of model and identification accuracy of the model; the number of couples “a convolution layer—the down sampling layer” is defined empirically and depends on the image size that increases identification accuracy on the model; full-connected layers are absent that increases the speed of model training; the quantity of layers planes is defined automatically that accelerates determination of model structure. The created one-block ViT model has the following advantages—the input image is not square that expands a scope; the image contracts previously, and the new size is defined empirically and depends on the initial size of the image that increases the model training speed and identification accuracy of the model; the size of a patch is defined empirically and depends on the image size that increases identification accuracy on the model; there is only one block that increases the speed of training of model and accelerates determination of model structure. The offered method of intellectual identification of chicken embryos development state based on deep neural networks can be used in various intellectual systems of visualization results identification of egg ovoscopying at an incubation on industrial production of poultry.

## Keywords

- Ovoscopying
- Intellectual identification of eggs development state
- Deep neural networks
- Convolution neural network
- Transformer

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