COMPUTER TRAINER

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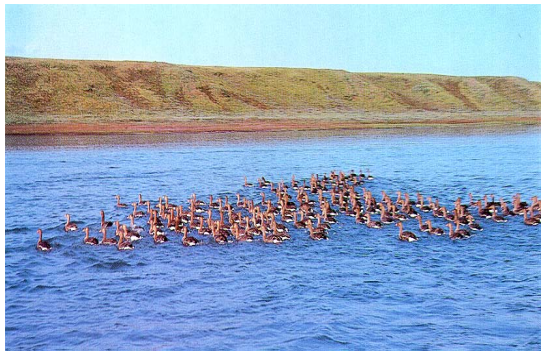

Computer trainer

Nowadays for counting of objects on Earth surface they use aero or space survey systems along with automated recognition systems. However visual observation performed by humans is still in use as an auxiliary or, in some cases, the only possible way to get the information required. Accuracy of visual estimations depends on experience, skill and personal features of the counter. When there is not enough time to count every object (animal) in the group (herd) the amount is estimated using an appropriate visual stereotype. A visual stereotype is a steady mental association between the amount of animals in the herd and the visual image of the herd which works irrespective of the shape, scale of, and the animals density in the herd. A visual stereotype can be formed by the multiple repetition of the following cycle: observation of the herd, estimation of the amount of animals, comparison of the estimated amount with the real amount of animals, adjustment of the stereotype.

We should note that forming of the stereotype usually is performed using heuristic "author's" methods. As a rule in a process of training of counters of reindeers they use real photos of herds. However there is not enough suitable photos and they contain arbitrary amounts of animals, which hinders forming of the stereotypes.

We developed "Deer Counter" — a computer program working as a trainer for counters. In the program are implemented the following modes.

1. Forming of visual stereotype.

The user (student) chooses some fixed number of animals in the herd. Automatically generated images of herds having exactly this amount of reindeers are showed to him in sequence.

2. Self test.

Generated images of herds having arbitrary amounts of reindeers are being shown to the student in sequence. Each image is being shown some fixed time (5—10 seconds, which corresponds to the real time of observation of single herd during the flight). Then the student makes his guess about the amount of reindeers. After that the real amount of reindeers is reported to the student.

3. Test.

The program behavior is the same that one in the self test mode except that the real amount of reindeers is not disclosed. After all the sequence is shown and all answers collected the following statistics is calculated:

- the total number of reindeers shown and the total estimation of the student;
- the mean of errors (signed number);
- the square root from the mean of squares of errors (unsigned number).

A computer trainer has the following advantages comparing with the traditional methods of counter teaching:

1) it is possible to use unlimited number of generated images of herds;

2) it is possible to have images of herds with the same amount of animals, but different shapes, scale, and density of animals.

The current version of software has serious limitations: the amount of reindeers in generated images is small (less than 200), and the animals are distributed uniformly over the picture. To overcome these limitations we will have to analyze typical shapes of big herds, devise and implement algorithms of generation of the corresponding figures, and discover the laws of distribution of animals within the herd. Also we will have to make a set of illustrations of heuristic tricks used by experienced counters for the estimation of amount of animals in big herds.