

VICTOR KULIKOV

Curriculum Vitae

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Present location: Russia, Novosibirsk

Relocation: ready for relocation



Personal data:

Date of birth: 17/March/1986

Citizenship: Russian Federation

EDUCATION/APPOINTMENTS

- **2011: PhD degree in technical sciences** at The Institute of Automation and Electrometry, Siberian Branch of the Russian Academy of Sciences. **Thesis** “Automation of parameters measurement of the animal behavior in ethological tests using image sequences”.
 - **2007-2010: PhD study** at the Institute of Automation and Electrometry, Siberian Branch of the Russian Academy of Sciences, **Novosibirsk, Russia**
 - **2002-2007: BSc degree at Novosibirsk State University**, Department of information technologies, **diploma** at the Institute of Automation and Electrometry (**BS student in the Laboratory of Digital Image Processing**)
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RESEARCH INTERESTS

Computer vision
Machine learning
Image feature detection

Multiview vision
Image processing
Software architecture

Artificial neural networks
Biology
Animal physiology

RESEARCH EXPERIENCE

My research experience includes various techniques of digital image processing and machine learning in application to real-world problems. The main goal of my research was to create an automatic system for animal behavior estimation. The main challenge was to integrate different sensors with different data into a single system, providing simultaneous data acquisition and processing in realtime. The latest version of the EthoStudio software uses RGBD information from MS Kinect sensor for animal detection, tracking and spatiotemporal feature extraction. These features were classified using supervised learning with SVM with RBF Kernel. Working on EthoStudio has required special skills from me, such as CAD design and device manufacturing.

The xScan project is aimed at digital processing and suspicious object detection on an X-ray image of the human body from the low-dose X-ray apparatus “SibScan” developed at the Institute of Nuclear Physics. These devices are used for security scanning in airports.

WORK EXPERIENCE

2017-P.T. Research scientist. Skoltech (Skolkovo Institute of Science and Technology) Center for Computational and Data-Intensive Science and Engineering. Computer vision group.

Projects

1. A toolbox for semantic segmentation and analysis of cell images

2010-2017 Research scientist. Institute of Automation and Electrometry, Siberian Branch of the Russian Academy of Sciences (SB RAS).

Projects

Executive in charge of several research projects in collaboration with the Budker Institute of Nuclear Physics SB RAS, the Institute of Cytology and Genetics SB RAS, and the Limnological Institute SB RAS:

1. The hardware-software complex for automatic measurement of cognitive and behavioral functions of biological objects, based on active stereovision
2. Behavior patterns of Baikal omul and hydroacoustic assessment of the dynamics of its populations as a key commercial species
3. The study of the genetic and neurophysiological mechanisms of action of brain-derived neurotrophic factor and its synthetic agonists

2013-P.T. Ltd AiSoftPro technical director, co-founder (www.aisoftpro.com)

Projects

1. XScan (www.aisoftpro.com/projects/xscan). A desktop application for processing, visualization and storage of X-ray images received from the System of Radiographic Control “SibScan” used in Tolmachevo airport; developed in collaboration with the Budker Institute of Nuclear Physics SB RAS (<http://www.inp.nsk.su/products/src/index.ru.shtml>).
2. EthoStudio (www.ethostudio.com). A desktop system designed for automatic measurement of animal behavior in pharmacological tests using computer vision algorithms.

2005-2010. Engineer developer (Software developer). Institute of Automation and Electrometry, Siberian Branch of the Russian Academy of Sciences.

SKILLS AND COMPETENCIES

Languages	C++, Matlab, Python, Java, PHP, C#	Software libraries	Qt, OpenCV, PCL, OpenNI, OpenMVG, FreeImage
Databases	SQLite, MySQL, PostGreSQL	CADs	SolidWorks

PATENTS

1. Kulikov V.A. Patent № 13374 RU. Device for laboratory animals tracking. Published October 27, **2013**. Vol № 30.
2. Kulikov V.A., Kulikov A.V., Patent № 70105 RU. Device for laboratory animals tracking. Published **2008**, Vol № 2 p. 965.

TEACHING AND MENTORING

Supervising

- Supervised 3 BS diploma students, who have successfully defended their diploma theses
 - 2 BS diploma students currently under advising
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Teaching: Novosibirsk State University, Russia (www.nsu.ru)

- 2011-2012 Introduction to digital image processing.
 - 2013-P.T. Application of digital image processing algorithms.
 - 2015-P.T. Digital processing of multiview and multispectral images.
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INTERNATIONAL SCHOOLS:

1. International computer vision summer school (ICVSS 2010, Italy, Sicily)
 2. Microsoft computer vision school (MCVS 2011, Russia, Moscow)
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PUBLICATIONS IN JOURNALS INDEXED BY SCOPUS/WOS

1. Fursenko, D.V., Khotskin, N.V., Kulikov, V.A., Kulikov, A.V. Behavioral phenotyping of mice deficient in the tumor necrosis factor // *Russian Journal of Genetics: Applied Research* 6 (4), **2016**, pp. 400-404
2. Khotskin, N.V., Kulikov, V.A., Zavyalov, E.L., Fursenko, D.V., Kulikov, A.V. Conducting and automating Morris water maze test under SPF conditions // *Russian Journal of Genetics: Applied Research* 6 (4), **2016**, pp. 394-399
3. Algorithm of tracking of intersecting objects based on a sequence of depth images // V. A. Kulikov, *Optoelectronics, Instrumentation and Data Processing*, **2016**, 37-42.
4. Application of 3-D imaging sensor for tracking minipigs in the open field test // V. A. Kulikov, N. V. Khotskin, S. V. Nikitin, V. S. Lankin, A. V. Kulikov and O. V. Trapezov, *Journal of neuroscience methods*, **2014**, 219-225.
5. Spatial learning in the Morris water maze in mice genetically different in the predisposition to catalepsy: The effect of intraventricular treatment with brain-derived neurotrophic factor // A. V. Kulikov, D. V. Fursenko, N. V. Khotskin, D. V. Bazovkina, V. A. Kulikov, V. S. Naumenko, E. Y. Bazhenova and N. K. Popova, *Pharmacology Biochemistry and Behavior*, **2014**, 266-272.
6. Method of abandoned object detection based on a sequence of depth images // V. Kulikov and E. Ivanova, *Optoelectronics, Instrumentation and Data Processing*, **2012**, 559-564.
7. Effects of LPS and serotonergic drugs on hygienic behavior in mice // M. A. Tikhonova, V. A. Kulikov and A. V. Kulikov, *Pharmacology Biochemistry and Behavior*, **2011**, 392-397.
8. Association between tryptophan hydroxylase-2 genotype and the antidepressant effect of citalopram and paroxetine on immobility time in the forced swim test in mice // A. V. Kulikov, M. A. Tikhonova, D. V. Osipova, V. A. Kulikov and N. K. Popova, *Pharmacology Biochemistry and Behavior*, **2011**, 683-687.
9. Fast algorithm of detection of boundary points in images // V. Kirichuk and V. Kulikov, *Optoelectronics, Instrumentation and Data Processing*, **2011**, 220-225.
10. Modeling and analysis of motion of biological objects on the basis of a sequence of images obtained in studying the motion activity // V. Kulikov, V. Ivanov and V. Kirichuk, *Optoelectronics, Instrumentation and Data Processing*, **2010**, 64-69.
11. Novel approach to the study of fur cleaning in inbred mice: effects of genotype, stress, and lipopolysaccharide // A. V. Kulikov, M. A. Tikhonova, E. A. Kulikova, V. A. Kulikov and N. K. Popova, *ILAR Journal*, **2010**, E11-E16.
12. Automated analysis of antidepressants' effect in the forced swim test // A. V. Kulikov, M. V. Morozova, V. A. Kulikov, V. S. Kirichuk and N. K. Popova, *Journal of neuroscience methods*, **2010**, 26-31.
13. Estimate of the effect of antidepressants in the forced swimming test // V. Kulikov, A. Kulikov, M. Tikhonova and V. Kirichuk, *Optoelectronics, Instrumentation and Data Processing*, **2009**, 526-530.
14. Effect of genotype and emotional stress on hygienic grooming in inbred mice // A. Kulikov, M. Tikhonova, E. Kulikova, V. Kulikov and N. Popova, *Zhurnal vysshei nervnoi deiatelnosti imeni IP Pavlova*, **2009**, 632-637.
15. Automated measurement of spatial preference in the open field test with transmitted lighting // A. V. Kulikov, M. A. Tikhonova and V. A. Kulikov, *Journal of neuroscience methods*, **2008**, 345-351.

16. The use of probability density for automating the spatial preference assay in ethological experiments // V. Kulikov, V. Kirichuk, M. Tikhonova and A. Kulikov, *Doklady Biological Sciences*, **2007**, 442-445.
17. Digital registration and analysis of visual information in behavioral experiment // A. Kulikov, V. Kulikov and D. Bazovkina, *Zhurnal vysshei nervnoi deiatelnosti imeni IP Pavlova*, **2004**, 126-132.

CONFERENCES

1. 9th International Conference on Pattern Recognition and Image Analysis: New Information Technologies (*Nizhny Novgorod*), **2008**, Modeling and analysis of biological object velocity using image sequence from ethological test on motion activity // V. Kulikov, p. 372-374.
2. Automation, Control, and Information Technology (ACIT 2010) (*Novosibirsk*), **2010**, Registration and analysis of X-ray images received from the system of radiographic control (src) "Sibscan" // V. Kulikov, S. Popov and V. Kirichuk, p. 56-61.
3. Registration and analysis of x-ray images received from the system of radiographic control (SRC) "Sibscan" // V. Kulikov, S. Popov and V. Kirichuk, *Proceedings of the IASTED International Conference on Automation, Control, and Information Technology - Information and Communication Technology, ACIT-ICT 2010*, **2010**.