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Smart biometric recording system for real-time evaluation of motility on organism with knee pathology

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Lab rats and rabbits are irrepleceable models for study of the ortopedic pathologies. Traditional analysis of these pathologies is based on postmortem histological analysis or X-ray or invasive sampling, however modern monitoring of orthopedic pathology and regeneration needs the smart and noninvasive methods for quantification of the motility of the limbs and organism. Advances in imaging technologies have enhanced our posibilities to quantify the typical movement of the organism.

Lab animals were hold in typical lab cage. We developed an autonomous optical setup which recorded animal position and displayed the trajectory and typical characteristic of the movement (speed, acceleration, shading of the walls of cage, rocognition of biorhytmic period).

The system was based on the HD 10 fps camera. Export of the frames was commited to OpenCV and mathematical conversion of motion to x-y coodinates was curbed by set of Python utlilities.

Comparison of animals with deffects and healthy animals gives basic criterion for automatic recognition of patholgical state and basic criterion for evaluation of regeneration process. Upgrade of these biometric system should be used also for clinical and home rehabilitation in the future.

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