Crayfish on guard

Development status

Phase 4

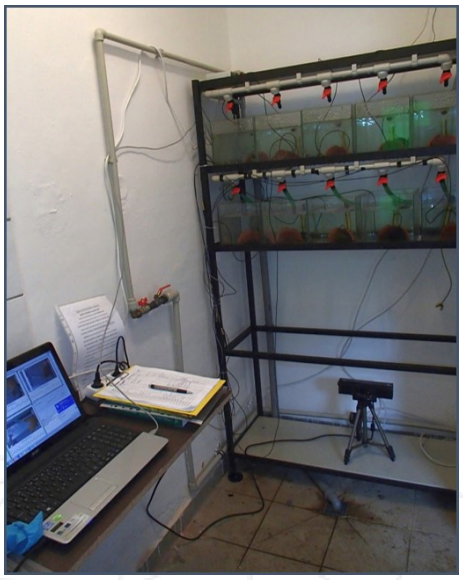
The transition from the prototype to the final and fully functional form. At this stage, the prototype is already fully tested, or the technology is certified and ready for mass deployment.

IP protection status

European Patent EP3339856A1

Partnering strategy

Co-development



Institution

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University of South Bohemia in

Challenge

The use of bio-indicators of environmental quality is one of the available methods of detecting changes caused by various pollutants, which are currently among the main eco-biological research. The main advantage of using organisms as bio-indicators is the possibility of rapid detection of even low concentrations of pollutant in the environment. These organisms are able to react with a high degree of sensitivity and in a short reaction time (in a matter of seconds).

Description

The developed system allows contactless measurement of crayfish heart activity together with its trajectory and subsequent analysis to determine physiological status and changes in water quality. The output of the system is information about the heart rate of crayfish and the trajectory of crayfish during measurement. Heart rate and crayfish movement information is further analyzed and used to detect changes in water quality or the presence of a chemical. The system is suitable for automatic detection of water pollution and for conducting ethological experiments. The system is able to monitor the cardiac activity of crayfish/crayfish in an aquarium/tank with water from a distance of tens of centimeters. The system can be placed above or below water according to measurement needs. Using reflective film, the system is able to locate crayfish, determine the heart area and measure heart rate. The trajectory of crayfish is evaluated by video camera. The patterns of behavior of the organism are continuously monitored and subsequently recorded. In this way, it is possible to detect the reactions of the monitored organism to pollution of its environment. The taxon (a group of organisms with common characteristics) of crustaceans, especially crayfish, the monitoring of which has yielded particularly good results, seems to be a set of the best organisms for monitoring pollution of the aquatic environment. The advantage of crustaceans is their great biodiversity, which means that a suitable species can be found for each environment. Crayfish has a simple cardiovascular system, easily traceable transmissions in the nervous system and can be easily bred in laboratory conditions.

České Budějovice

Commercial opportunity

The solution is suitable for automatic analysis of water quality (presence of chemical) at water treatment plants or facility with the need for detection of foreign substances. Likewise, the solution is suitable for scientific experimental work in the field of ethological studies of crayfish.