

Announcement of a BACHELOR'S Thesis / a Study Project

on the topic

Smart Pebbles – Investigation of hydro-engineering applications for a novel sensor system

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Objective and topic

Sensors ("Smart Pebbles") are currently being developed for river morphological problems. They move with the current like bed load and record data such as pressures in the vicinity of the stone or accelerations during their transportation.

An international group of researchers recently developed the KIVI, a sensor system integrated into a spherical or ovoid housing. They resemble medium-sized pebbles with a diameter of approx. 55 mm (sphere) and approx. 80 / 55 mm (ovoid). Their density also corresponds to that of pebbles. The unique feature of KIVI is the integration of two pressure sensors, as well as an inertial sensor and an accelerometer, enabling a comprehensive and accurate measurement and analysis of sediment behavior.

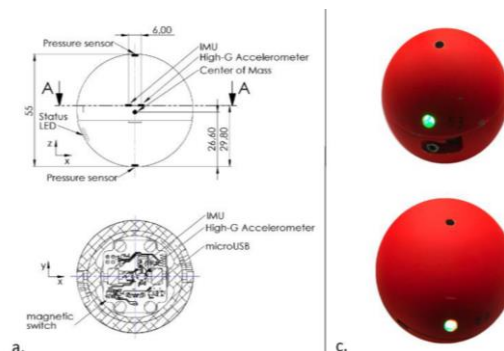


Figure 1: KIVI sensor (Maniatis, G. et. al. 2023)

The IWG has been provided with two of these sensors for test purposes. Various experiments should be conducted with the sensors, and the accuracy of the system should be verified based on standardized tests with known results as part of the thesis. In a further step, potential applications for the sensor beyond river morphology should be identified, and the suitability of the sensor should be investigated.

Work steps to be performed

- Study of literature and familiarization with the topics of "river morphological sensors", "measuring technology" and "in-depth evaluation of sensor data".
- Planning, execution, and evaluation of measurements in the laboratory.
- Verification of the accuracy of the sensor in various benchmark tests.
- Identification of new applications; planning and execution of experiments on these topics.
- Discussion of the results, definition of the application limits, synthesis of the results and derivation of new applications.
- Composition of the written bachelor's thesis or a study project.

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