Virtual Prototyping and Validation of a System for Flood and Fire Risk Mitigation in Wetlands ★

Eduard C. Popovici[1], Laurentiu Boicescu [1], Alexandru Vulpe [1], Dinu Țurcanu[2]
[1] Electronics, Telecommunications and Information Technology Faculty, National University of Science and Technology POLITEHNICA Bucharest, Romania, eduard.popovici@upb.ro, laurentiu.boicescu@upb.ro, alex.vulpe@radio.pub.ro, ORCID: 0000-0003-2639-8048, 0000-0002-1631-3226, 0000-0003-1970-1117
[2] Faculty of Electronics and Telecommunications and National Institute of Innovations in Cybersecurity "CYBERCOR", Technical University of Moldova, MD-2004 Chisinău, Moldova, dinu.turcanu@adm.utm.md, ORCID: 0000-0001-5540-4246

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Abstract. Our paper presents the virtual prototyping, and the experimental validation of a hardware and software system aimed to use two novel fire and flood sensors based on miniature sensing technology, to process the real-time acquired data using business intelligence tools to provide input for detection of sudden increase in temperature and water level, to generate visual alerts to wetland administering authorities for better crisis assessment and early response to wetland threats. At the end of the project, which was successful from the point of view of the KPIs too, we prepared the system so that potential users could find it on the hosting platform, test and hopefully want to use our solution, docker based and including all the components developed in virtual machines. The simulator was adapted to better match the real sensors.

In this context, a pilot project [1], FF-RIWER (*Flood and Fire Risk Mitigation in Wetlands Using MicroWire Sensing*), was implemented to build and validate a TRL4 prototype of our future *Delta ProEco* platform, through an "experiment" specified and executed [1,2]. The paper describes the FF-RIWER pilot project, where a model of miniature sensors that we needed to monitor temperature and humidity in the Danube Delta was integrated with a software solution.

FF-RIWER had two phases, one to prepare and the second to realize and validate the “experiment”. In the second phase, we did the overal evaluation after the integration with the real sensors. We also prepared the system so that other SMEs could find it on a virtual collaboration (HUBCAP) platform [2,3], test and hopefully want to use our solution, as a dockerized version including all the components developed in the first stage in virtual machines. The experiment carried out was virtualized, with the aim that potential users can download our work and, in a guided way, be able to redo it (as presented in [1]).

At the end, we have a virtualized version of the modular solution, in a docker, the visualizations of the execution results of the dockerized virtual machines that includes all the virtual machines mentioned in [1], and KPIs fulfilled 100% (information published in [1]). We look forward to developing more modules monitoring and eco actions in the Danube Delta, targeting other threats like fish and bird populations dangers, vegetation issues, pollution sources.

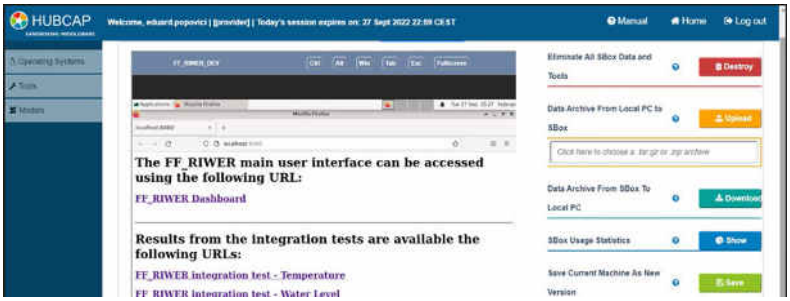

Fig.1. FF_RIWER experiment in the virtual collaboration platform [3]

References

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