

Special Issue on
Sensors for Agriculture/Forestry Research and Applications

CALL FOR PAPERS

Challenges imposed by climate change have pushed forward significant interests and investments by different countries into research areas around smart digital agriculture and forestry. This has been especially triggered by an impending population increase to 9.2 billion in 2050. This single pressure will require doubling the global food production in half of the arable land left due to resource depletion, which will impact directly agricultural practices and forestry resources and management.

In order to be successful in overcoming the effects of climate change and to remain competitive and sustainable as a country in the agricultural and forestry sectors, there is a need to acknowledge the challenges and support research and application on the development of new and emerging sensor technologies and their applications. The development of new and emerging technologies applied to sensor networks will help to overcome these issues by basing decision-making on more accurate, meaningful decisions and with high spatial and temporal resolution.

Sensor technology and sensor networks using telemetry systems and the Internet of Things (IoT) are becoming important for research areas that can be applied to digital agriculture and forestry. The key challenge in the production of accurate agricultural and forestry models relies critically on timely provision of high quality geospatially distributed data. This requires the development of complex workflows of real-time sensor calibration, data transfer, and image processing and interpretation, integrated in the optimal and high-performing computational nodes and networks. An example is imaging sensor data where image sensors need to be radiometrically and geometrically calibrated so that each pixel value can be reliably converted into an at-surface reflectance value. Conventional sensing systems deploy time-consuming postprocessing, which depends on specialized skills and specific software, which significantly delays the delivery of the final information to users. The aim of this particular call for papers is focused on systems that provide automated integrated set of tools that can standardize the key components of aerial and ground sensor data processing for empowering industry and academics to focus on innovation. The proposed system will enable near-real-time distribution of monitored aspects of soil—plants and atmospheric factors that allow data mapping and delivery via mobile devices.

The technology proposed can include also a cloud computing framework for sensor calibration, processing, fusion, and classification to reduce the complexity and time required to develop workflows.

Papers submitted based on the following aspects will be highly considered: (i) papers based on the framework to process and fuse ground based sensor networks and metrological information with remotely sensed data from satellites and UAVs to rapidly produce high quality geospatial products that help visualize our environment in extreme detail; (ii) research papers that have used cloud computing on High-Performance Computing (HPC) platforms that enables rapid and automated processing of aerial imagery and ground based sensor network data, streamlining the process from data acquisition to data analysis; and (iii) papers showing the shared knowledge and experience gained through collaboration between industry and academics will centralize development efforts for sensor data processing and visualization algorithms leading to higher quality of geospatial products which will be also considered.

Potential topics include but are not limited to the following:

- ▶ New sensor development and application for agriculture and forestry trials
- ▶ Sensor network development, data transmission, self-healing, and redundancy considerations
- ▶ Remote sensing using satellite, airborne, and unmanned aerial vehicles (UAV) integrated with sensor network technology
- ▶ Visualization systems and software platforms developed to integrate sensor networks for decision making processes
- ▶ Smart sensors of low costs applicable to agriculture and forestry
- ▶ Development of integrated models with sensor networks and applications to smart irrigation for agriculture and forestry environments

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