



Big data and machine learning in the bioeconomy sector: preliminary results from the Norwegian case

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A recent report written on behalf of the Norwegian government highlights the potential societal benefits for Norway in using big data. In particular, it shows that benefits can be represented by the improvement of the efficiency of decision-making processes and of the quality and timeliness of decisions and by giving actors the opportunity to react more quickly to deviations from normal situations. The handling of environmental disasters, planning of transport, security of society and increased business development and innovation are mentioned as concrete examples.

Within this context, a key role in Norway is played by NIBIO, the Norwegian Institute of Bioeconomy Research, working closely with Norwegian ministries. NIBIO is a research-based knowledge institution that utilizes its expertise and professional breadth for the development of the bioeconomy in Norway. Its social mission entails a national responsibility in the bioeconomy sector, focusing on several societal challenges including: i) Climate (emission reductions, carbon uptake and climate adaptation); ii) Sustainability (environment, resource management and production within nature and society's tolerance limits); iii) Transformation (circular economy, resource efficient production systems, innovation and technology development); iv) Food; and v) Economy.

In 2018 a large project on big data has been started in order to increase the competence within NIBIO and take the benefits deriving from the application of new methods, such as machine learning, in the daily activity of the institute. The project is organized in three Work Packages (WPs):

- WP1: Alliance and networking;
- WP2: Machine learning and remote sensing for automatic map changes;
- WP3: Technology and platforms for convenient big data with geographic data.

The presentation will present the preliminary results of the project and will focus on the outcomes of the WP 2, which has the main goal of obtaining the necessary data infrastructure and expertise to effectively utilize new technology for automatic map updates. Particular attention is put on the collection and management of remote sensing data and the implementation of a method for detecting land cover changes and the need for updates in of datasets through machine learning (Deep learning) and remote sensing. The data used to apply this method is the AR5, a detailed, nationally comprehensive data set representing the best source of information on the country's land resources. The data set divides the land area by area type, forest quality, wood species and soil conditions and is widely used for environmental analysis within and outside the institute.