WP 6 – Climate Action: Making Data Widely Available

Who are we?

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  • Areas of expertise: New innovation, radio communications, UAV, defence and security

• Maria Erman @ AFRY (maria.erman@afry.com)
  • Areas of expertise: Machine learning and artificial intelligence, signal processing, telecommunications,

• Markus Skogsmo @ AFRY (markus.skogsmo@afry.com)
  • Areas of expertise: Data science and engineering, software development, telecommunication and signal processing

• Carl Sundström @ AFRY (carl.sundstrom@afry.com)
  • Areas of expertise: Engineering, scientific computing, numerical models, simulations and optimization

• Master thesis students:
  • Fredrik Örn, Maja Linderholm
  • Shuzhi Dong, Tim Melcherson, Karolin Gjöthlén
Aim/Tasks and Deliverables of WP 6

• Increase awareness of Machine Learning and Artificial Intelligence and how to use the technology

• Pre-study on inquiries and needs from research stations, to identify datasets and questions to be answered

• Exploring possible applications of machine learning, focusing on topics related to land use, icescapes, landscapes and ecosystems

• Using Machine Learning on example data to make specific algorithms and methods available and demonstrate the outcome

• Ensure open data access

(Credit: Mikko Jokinen)
Progress

- **Deliverable 6.1 reached**
  - Pre-study on inquiries and needs from identified station managers and researchers, to identify possible datasets and type of questions to be answered (Month 14)

- **Deliverable 6.2 reached**
  - Workshop with demonstration on technology available today and expected in the future in the areas of ML and AI technology. Workshop was held in September 2020. (Month 14)

- **Deliverable 6.3 (work in progress)**
  - Exploring possible applications of machine learning, focusing on topics related to land use, icescapes, landscapes and ecosystems (Month 26)

(Source: https://pngflow.com)
Results from the Pre-study D6.1

• Questions investigated:
  • What inquiries and needs do researchers and station managers have?
  • What research is conducted?
  • What data are collected?
  • What obstacles are encountered by the researchers?

• Qualitative study
  • 14 interviews, response frequency of 78%

• Quantitative study
  • 30 respondents (some answers extrapolated from interviews)

• Conclusions: WP6 to employ AI/ML techniques by helping to reduce manual work for researchers.
  • Simplifying application of ML by providing “ML as a service”, i.e., providing a simple method for accessing, using and managing ML functionality, perhaps as a cloud enabled service.
  • Providing support to researchers in applying ML to their data.
Results given the responses from Pre-study D6.1

*Statistics collected from survey and interviews*
## Results given the responses from Pre-study D6.1

*Statistics collected from survey and interviews*

<table>
<thead>
<tr>
<th>Automatic image recognition</th>
<th>Modelling patterns in data</th>
<th>Detect nature events/hazards</th>
<th>Automatic image detection of species</th>
<th>Detection in multispectral satellite/aerial imagery</th>
<th>Scanning old photos for information</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ice or Snow Studies/Coverage</td>
<td>Recording animal territories</td>
<td>DNA/Genome modelling</td>
<td>Ice or Snow Studies/Coverage</td>
<td>Modelling patterns in data</td>
<td>Data corrections/automating data processing</td>
</tr>
</tbody>
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**INTERACT**
Current Work and Ways Forward – Foundations of D6.3 and D6.4

• Time series and anomaly detection:
  • Carl Sundström working with timeseries from Svartberget datasets.
  
  • Master thesis student, Fredrik Örn in collaboration with The Cairngorm Station, with Jan Dick and Christopher Andrews:
    • Computer vision project. Detection and classification of animals.
  
  • Master thesis student, Maja Linderholm on cutting edge natural language processing on archived logbooks from the Tarfala Station. Access to OpenAI's (Elon Musk) GPT-3!

• Finished Master Theses:
  • ”Deep Learning for Iceberg Detection in Satellite Images” by Shuzhi Dong
  
  • Working title: ”Image Augmentation to Create Lower Quality Images for Training a YOLOv4 Object Detection Model” by Tim Melcherson
  
  • ”Searching and Recommending Texts Related to Climate Change” by Karolin Gjöthlén
Requirements from Others

- No requirements at the moment
- Everything progressing smoothly
- Archived data for digitalization is of interest.
- For discussions on anything AI/ML related, you are welcome to contact either of us:
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