

# WP 6 – Climate Action: Making Data Widely Available

## Who are we?

- Tomas Gustafsson @ AFRY ([tomas.c.gustafsson@afry.com](mailto:tomas.c.gustafsson@afry.com))
  - Areas of expertise: New innovation, radio communications, UAV, defence and security
- Maria Erman @ AFRY ([maria.erman@afry.com](mailto:maria.erman@afry.com))
  - Areas of expertise: Machine learning and artificial intelligence, signal processing, telecommunications,
- Markus Skogsmo @ AFRY ([markus.skogsmo@afry.com](mailto:markus.skogsmo@afry.com))
  - Areas of expertise: Data science and engineering, software development, telecommunication and signal processing
- Carl Sundström @ AFRY ([carl.sundstrom@afry.com](mailto: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

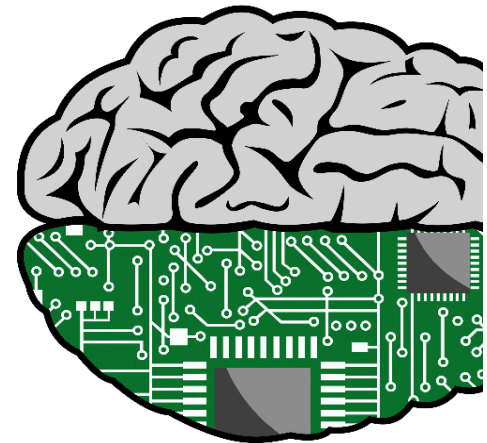
- Increase awareness of Machine Learning and Artificial Intelligence and how to use the technology
- Pre-study on inquiries and needs from research stations, to identify datasets and questions to be answered
- Exploring possible applications of machine learning, focusing on topics related to land use, 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)



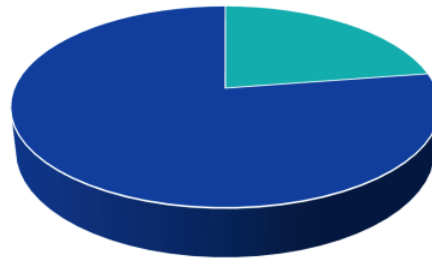
(Source: <https://pngflow.com>)

## 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.

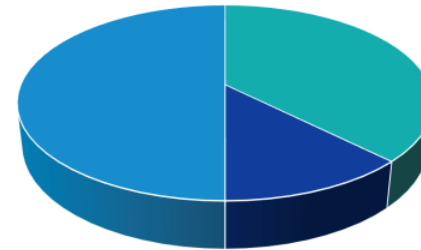
# Results given the responses from Pre-study D6.1

Do you currently use AI?



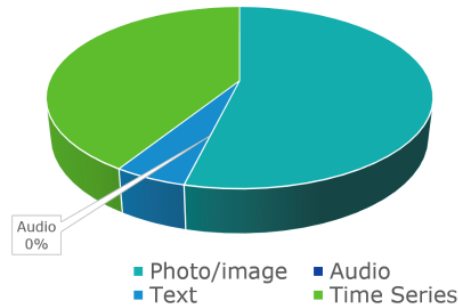
■ Yes ■ No

Do you plan to use AI in the future?



■ Yes ■ No ■ Maybe

Type of data accessible from stations

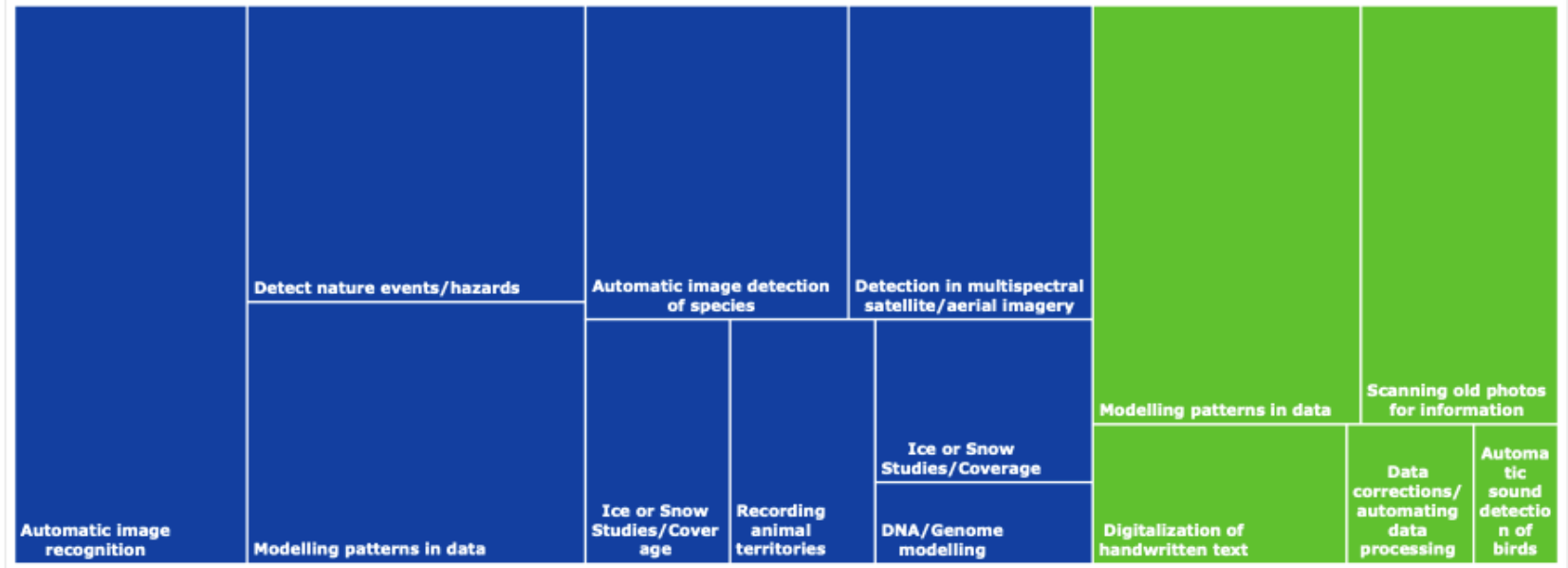


\*Statistics collected from survey and interviews



# Results given the responses from Pre-study D6.1

■ Interesting project applications? ■ How can AI help you?



\*Statistics collected from survey and interviews



# 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

