



WASP Project Course 2021

Data driven decision support with multi-characteristic analysis for location scouting

Background

AI-driven location scouting consists in ranking sites within a bounded geography, based on a user-provided set of characteristics. The project aims to develop a decision-support system for this task where the primary input source is video, for example, footage collected by a drone. To validate the general applicability of the solution, it is validated in two intentionally disparate scenarios:

- 1 Search and rescue. Search the terrain for a suitable site to dock a boat and monitor on-site activities over time.
- 2 Movie production. Identify a suitable location for filming a particular scene, and track changes in the location over time to ensure coherent footage.

The task includes the following boundary conditions such as: The proof-of-concept solution should support a distributed team of experts. The data collection should be non-invasive (i.e., do not attract unnecessary attention or disturb the environment). The project will be assigned a fixed budget.

The project can if so desired be given in the form of a challenge, where teams of students compete against each other. This would have the upside of pursuing different solution approaches and adds flexibility as to the total number of students hosted.

Participants

Industrial partner: Combitech/Saab, Codemill - accurate.video

Industrial supervisor: Jesper Tordenlid and [Johanna Björklund](#)

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Keywords

Data driven decision support, multi-characteristic analysis, location scouting, computer vision, change detection

Challenges to investigate

Main tasks

The project offers several inter-linked challenges and the focus can be adjusted to reflect the participants' specific research interests. As of now, the main activities are divided into:

- Data management, e.g., collection, curation, and quality control of training data
- Automatic indexing of geographic data, e.g., tagging data with descriptors such as woodland, creek, path, etc

- Application of multi-characteristic search methods to indexed data, to support queries like “open pine forest with no buildings in site” or “open area of sufficient site for a helicopter to land”. The students will have access to data about an area in the Swedish archipelago, including topography, land classification, weather data, satellite image data, as well as photos and images collected over several years. The data can be complemented by drone video.
- Development of change and anomaly detection to highlight how a site has changed over a period of time, or detect unexpected features. Change detection is valuable to recognise and compensate for drift in the backdrop of a movie recording. Some of these can be seasonal and desired, but it can also be the appearance of a new building, which breaks continuity in the collected footage. Anomaly detection is used to find unexpected changes compared to a statistical baseline, such as several cars parked along a forestry maintenance road, or a floating rescue device at sea.

Resources

Codemill’s distributed video platform *accurate.video*

Lidar data

Satellite images, Weather data

Drones (flying and boats) for additional data collection

Various geographical datasets

References

Domova, V., Gärtner, E., Prántare, F., Pallin, M., Källström, J., Korzhitskii, N., (2020), Improving Usability of Search and Rescue Decision Support Systems: WARA-PS Case Study, In proceedings of the 2020 25th IEEE International Conference on Emerging Technologies and Factory Automation (ETFA), , 1251-1254. <https://ieeexplore.ieee.org/document/9211980>

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