

Log data digestion and analysis

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Project goal

The goal of the project was to parse, structure and analyze log data from li-ion battery packs primarily used in forklifts. The battery packs were manufactured by the Gothenburg-based company Alelion.

Alelion requested the following:

- Automatic creation of a relational database for storing the ingested data
- Automatic ingestion and parsing of existing and future log files
- A utility for extracting interesting information and metrics from the database
- An intuitive and useful representation of the extracted information

Method

There were three different types of log files to parse, each with a different structure. Python was selected as language for the project, as the Python ecosystem offers useful utilities such as

- Pandas
- Numpy
- Matplotlib
- Integration with databases such as SQL and MariaDB

Results

The project resulted in two pieces of software: *Parser* and *ReportGen*. *Parser*, as the name suggests, parses log files. Given a single file or a directory containing multiple files. It can also run in monitoring mode, continuously checking a directory for new files and automatically processing them. *ReportGen* is able to extract useful information from the database and creating reports. Reports can be created either for a single battery pack or for a group of units that satisfy certain criteria. Using the included GUI, the user can specify the criteria used for selecting units to include in the report.

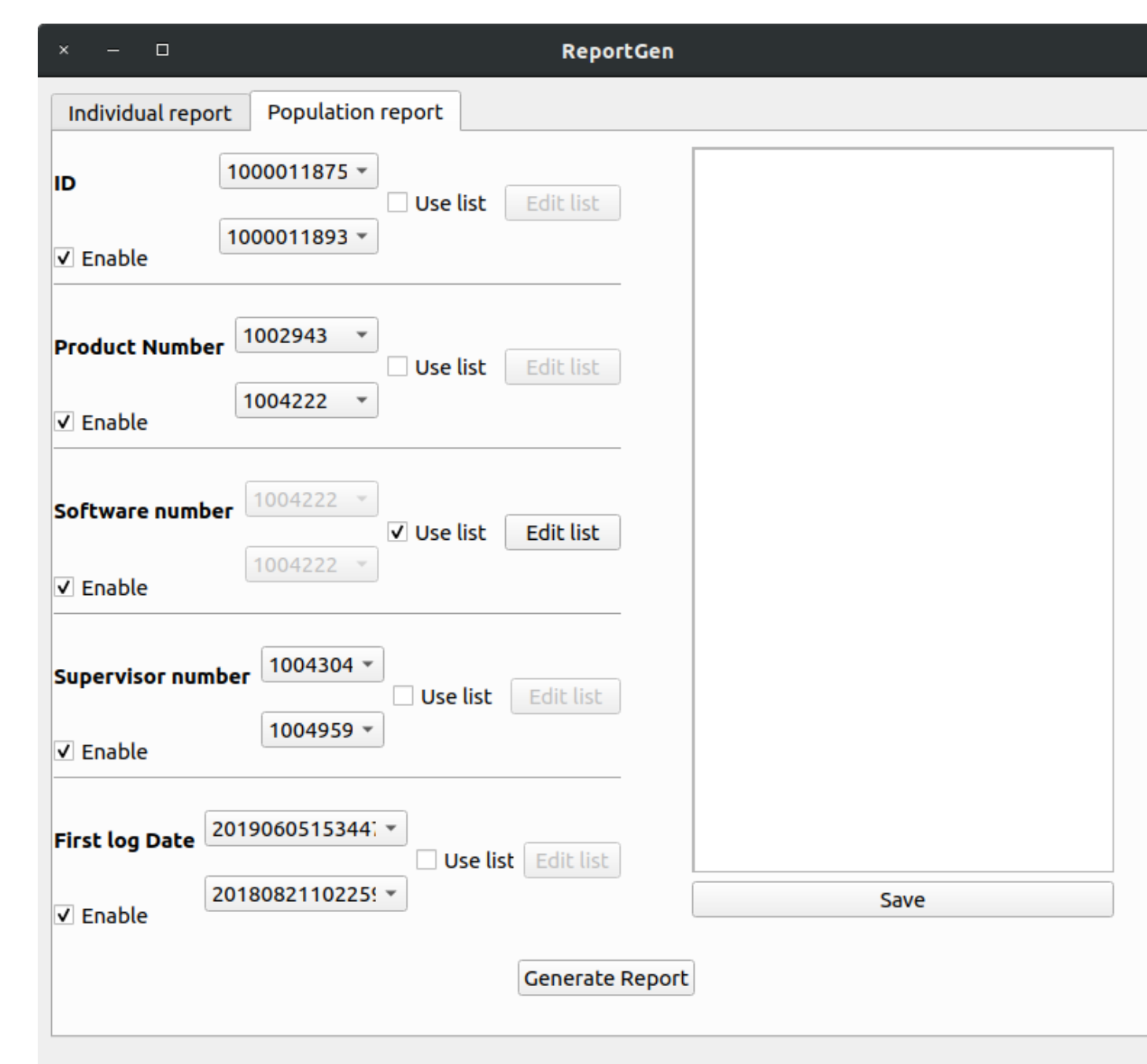


Figure 1: The GUI interface to select search criteria.

The reports contain information such as:

- Distribution of reported error codes
- Charge wear distribution
- Mean values and variances for cell voltages, temperatures and state of charge.

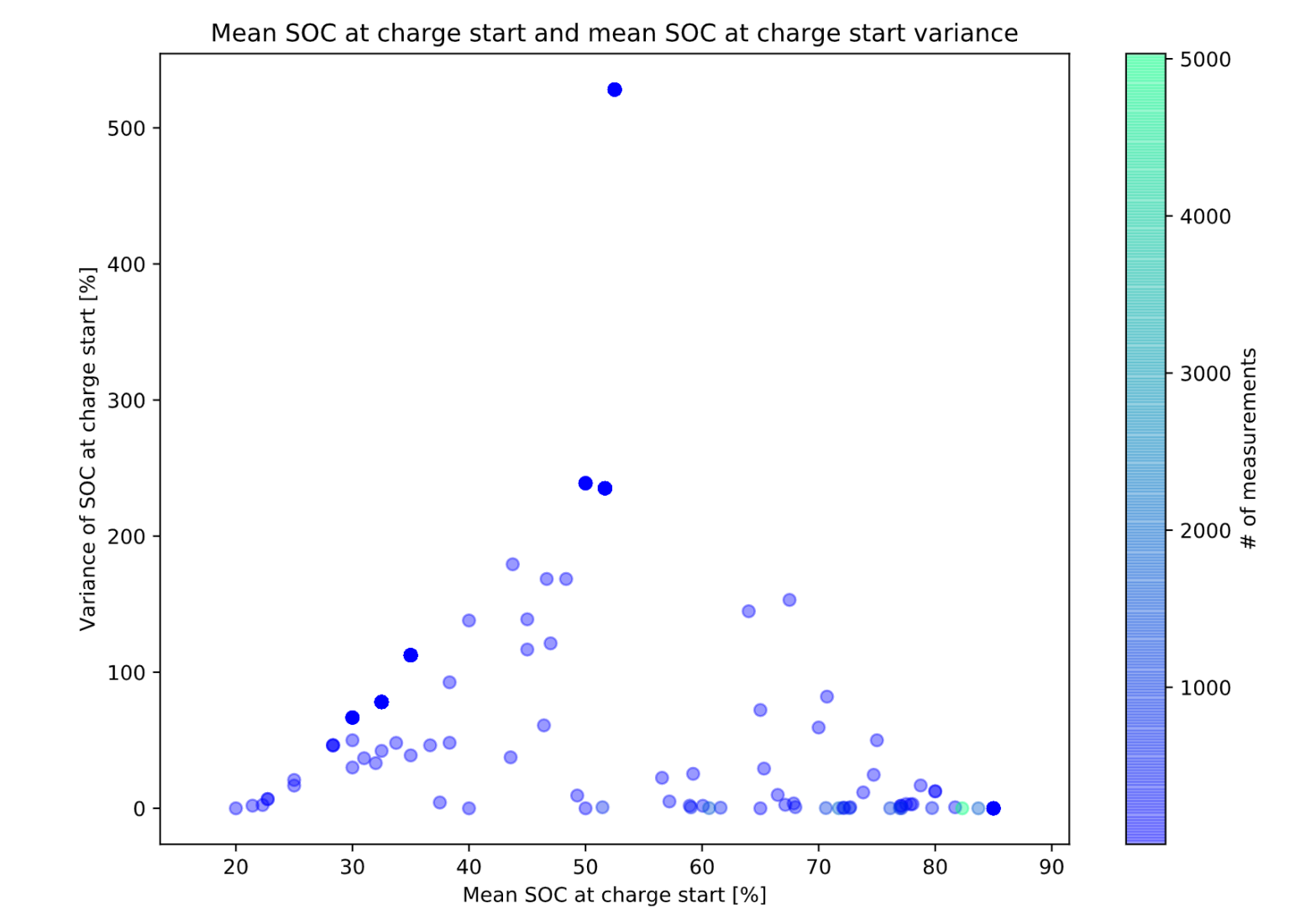


Figure 2: Mean SOC voltage and mean SOC voltage variance for multiple battery packs, generated with *ReportGen*

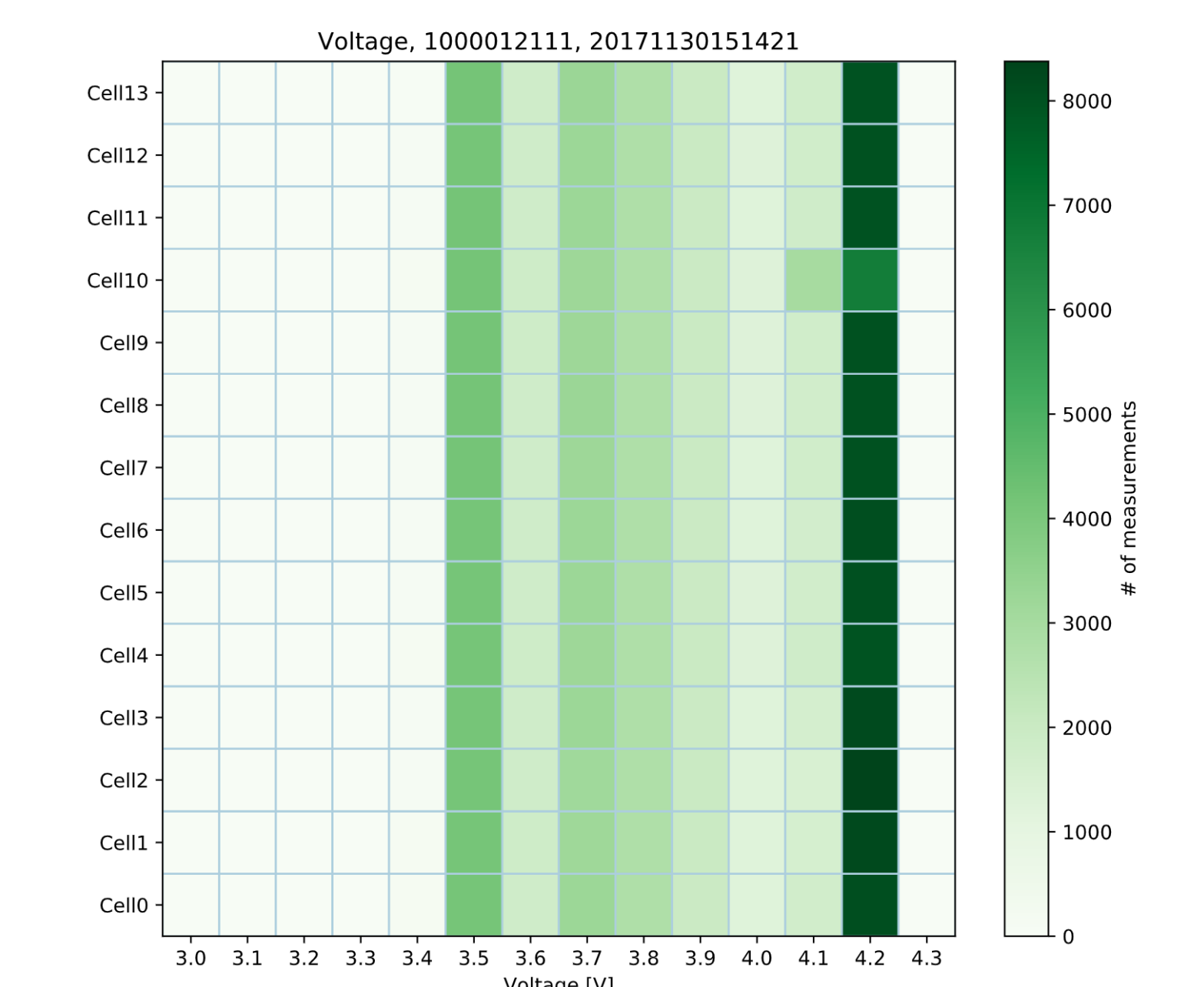


Figure 3: Voltage measurements for one battery pack, generated with *ReportGen*

Acknowledgements

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