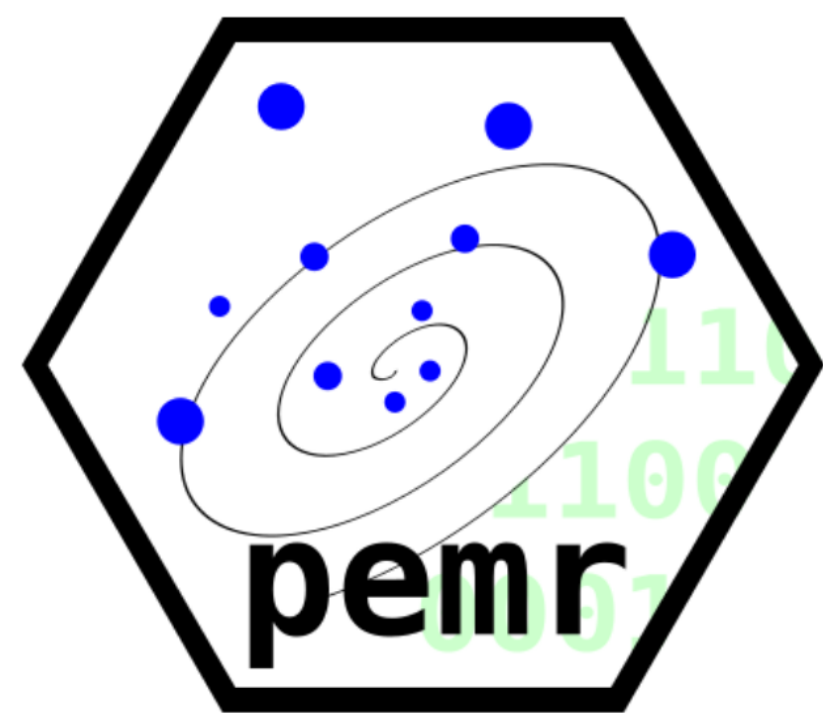


pemr: A Unified R Interface for Managing Personal Exposure Monitor Data in Air Pollution Research

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Abstract Personal air pollution monitoring relies on a variety of portable devices, each recording data from different sensors in non-standard formats and data structures, saved to local files or uploaded to web APIs. Tools are needed in R to handle these data in a device- and format-agnostic way. The `pemr` package aims to provide a unified interface to collect and handle personal air pollution monitoring data.

Data sources

Personal exposure monitors



RTI Enhanced MicroPEM (ECM)

Air pollution monitoring

- Monitor worn by person
- Standardized setup:
 - Set duration
 - Constant air flow (e.g. 1 L/min)
 - Physical separation of particles
 - Filter to capture particles
 - Counting particles in real-time

Current: Device-specific parsing

- Files collected from in-device memory
- Monitoring session metadata saved in file name
- Ad-hoc script to read the file
 - Header with settings information
 - Body with time series of collected data

Issues

- System specific settings
- Code repetition
- Reproducibility more difficult

The role of `pemr`

```
# Single function to read data
pemr::read_monitor(
  file = "your-file",
  type = "monitor-type"
)

# Handles each monitor type internally
pemr::read_em_ecm(file, skip = 24, ...)
pemr::read_em_upas(file, ...)

# And nested metadata is handled for
# for each monitor type
pemr::collect_data(
  .data = "data-column",
  type = "monitor-type"
)
```

Further development needed

- `pemr` handles 4 types
 - RTI MicroPEM
 - RTI ECM
 - PATS+
 - UPAS
- Research monitors
 - Under active development
 - Data structure changes
 - Loss of support
- Consumer monitors
 - Lower precision, but lower cost
 - Smaller and longer monitoring
 - Data web APIs

Future of `pemr`

- Plugin architecture
 - Handle web APIs
 - Users can define custom data structures

```
# json
{
  "device_profile": "RTI_MicroPEM_v1",
  "data_source_type": "file",
  "format": {
    ...
  }
}
```



Package location

<https://github.com/odeleongt/pemr>

Contact information

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