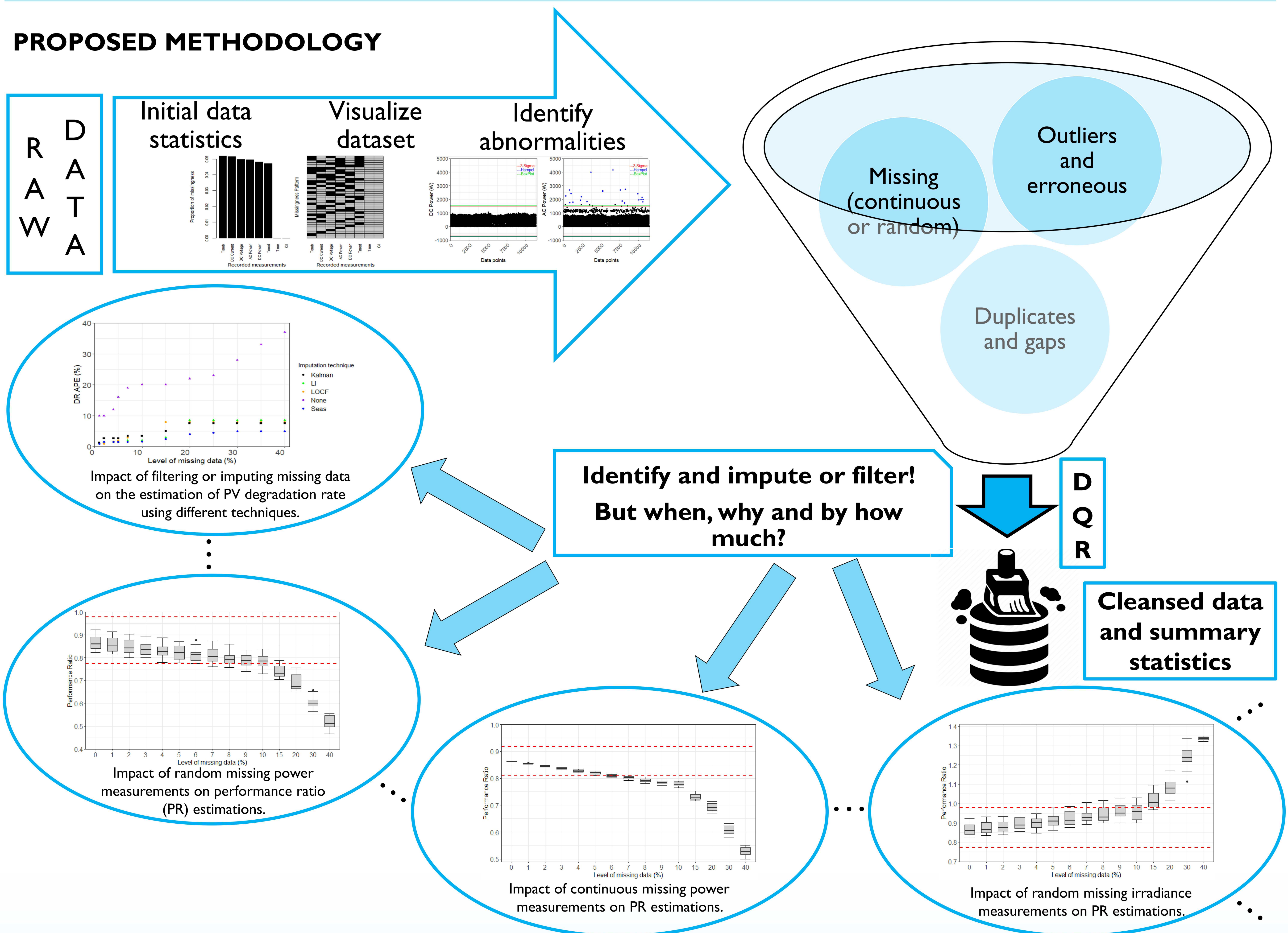SAND2020-2215C

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Guidelines for ensuring data quality for photovoltaic system performance assessment and monitoring

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INTRODUCTION

- Invalid data (i.e. missing, erroneous and outlying values) caused by power outages or component failures are common problems exhibited in photovoltaic (PV) monitoring systems
- The way to handle such data can introduce bias in PV performance, reliability and degradation analyses
- A complete methodology of data quality routines (DQR) is being developed for data processing and quality checks
- Builds on IEC 61724 and other reports that provide justifiable and quantifiable criteria (mainly filtering, uncertainty, sampling) and also provides initial and summary data statistics
- Each step/decision is described in a quantitative manner based on detailed analyses and not arbitrary assumptions
- Potential of creating an open-source library for PV performance analysts and researchers

PROPOSED METHODOLOGY

Impact of filtering or imputing missing data on the estimation of PV degradation rate using different techniques.

Impact of random missing power measurements on performance ratio (PR) estimations.

Identify and impute or filter! But when, why and by how much?

Impact of continuous missing power measurements on PR estimations.

Impact of random missing irradiance measurements on PR estimations.

Cleansed data and summary statistics

GENERAL SUMMARY AND CONCLUSIONS

- DQRs are being developed to ensure data sanity and validity for PV reliability, monitoring and performance analyses
- Algorithms are used for identifying, imputing and/or filtering abnormal data (missing, erroneous, duplicate, etc.)
- It was verified that PV performance analysis is sensitive to the amount and location of abnormal data within a dataset
- Treating data using k-NN and seasonal decomposition proved to be effective
- A manuscript will be submitted soon and the complete procedure will be coded and published on GitHub

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