Benchmarking of GHI Gap-Filling Methods

Task 16: Solar resource for High Penetration and Large Scale Applications

June 2023

Benchmarking of GHI gap-filling methods

- No measurements without errors or gaps
- To make e.g. hourly, daily or monthly averages gaps need to be filled
- **First simple comparison of how to fill Global Horizontal Irradiance gaps optimally**
  - Depending on duration of gaps
- Methods
  - Nearest neighbour (GF0)
  - Linear Interpolation (GF1)
  - Machine Learning (GF2 and 3)
  - Use other data sources: satellite data (GF 4)
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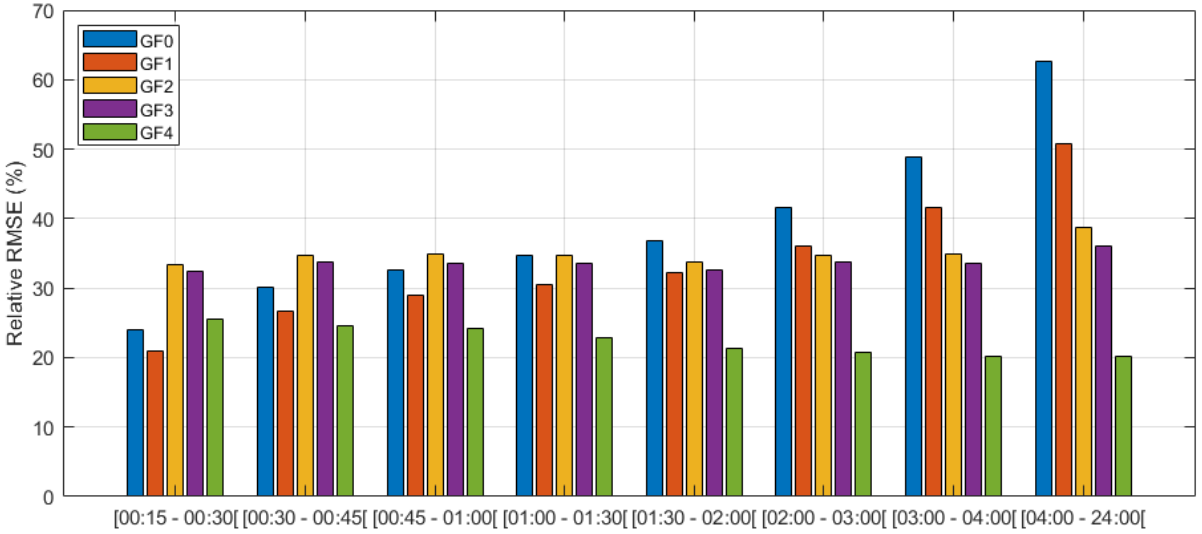
Benchmarking of GHI gap-filling methods

- GF0: Assuming the **nearest** available clearness index within the day
- GF1: **Linear interpolation** of available clearness index within the day
- GF2: **k-Nearest Neighbor-based** approach (simple ML)
- GF3: **Kernel regression** (ML)
- GF4: Assuming concomitant **satellite-based GHI** estimation



Relative RMSE for the different Gap filling methods for the different bins of gap time horizons

Result

Short gaps: Use linear Interpolation
Long gaps: Use satellite data

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