Intelligence Detection and Prediction of Energy at the Device Level

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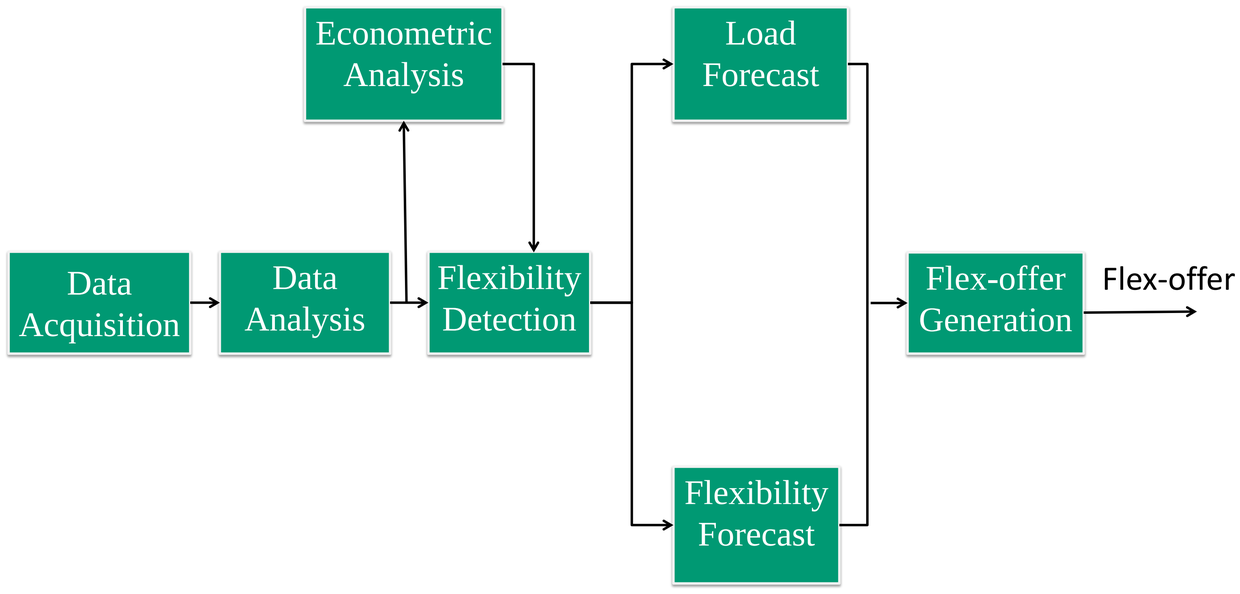
What is My Research About

Focus Area



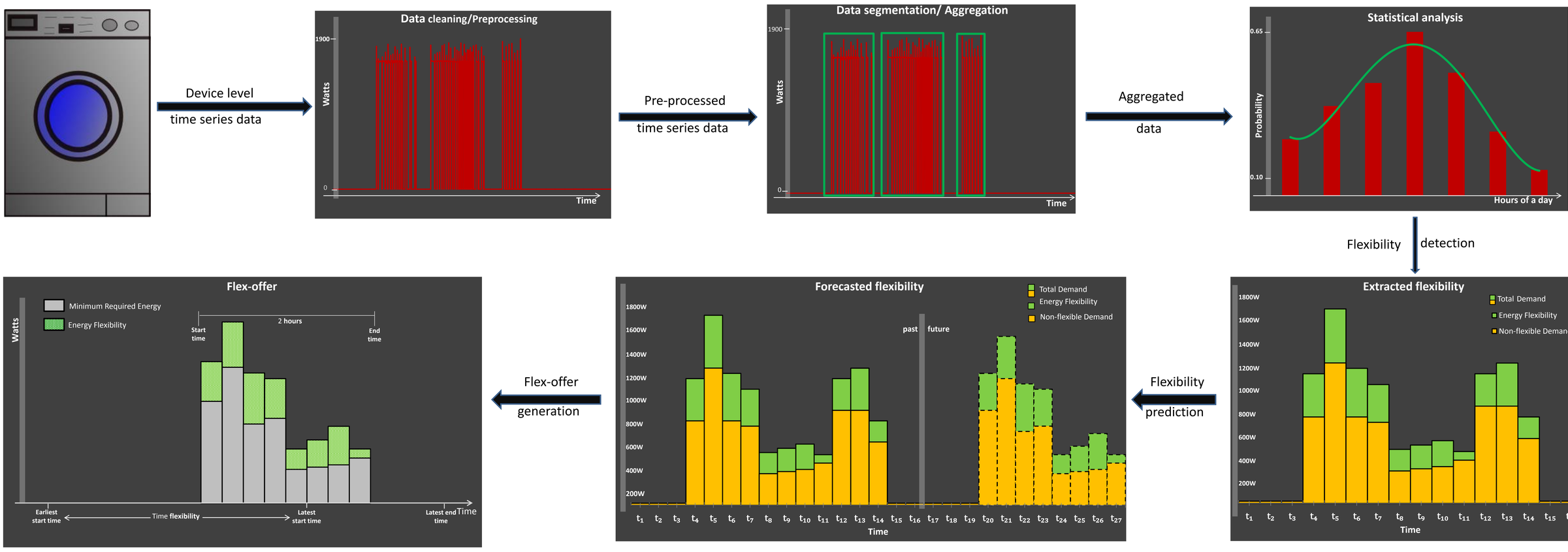
Project Background

- Renewable energy sources (RES) will become a major component in the future power grids.
- Danish national power goals: 50% of electricity consumption being supplied by wind power (2020).
- Higher dependence of RES on weather conditions, such as wind and sunshine, creates huge challenges in physical integration of RES in to grid and demand management.
- The TotalFlex[1] project aims to address the challenges of demand management by introducing the dynamic energy market, utilizing the novel concept of flex-offer[2].

Objective

- State-of-the-art analysis on device level energy consumption patterns and periodicity.
- Flex-detection[3] in the energy demand/ production at the device level.
- Machine learning models for load-forecast[4] and flex-forecast [5] at the device level.
- Experimental analyses on the financial gain in the energy market, that can be obtained by utilizing the flexibility (flex-offer) in device operations.
- Automated creation of flex-offer for flexible part of energy demand and production

Flex-offer Generation System



Results

- On average 50% of the energy demand from households can be considered for flexibility analysis.
- There exist repeating inter-day and intra-day, house-specific or general patterns for energy distribution and device operation across individual houses.
- There is a potential of extracting time and energy flexibility in the device operation.

References

[1]Totalflex Project, www.totalflex.dk/Forside/
[2]Proposed in MIRABEL Project, http://www.mirabel-project.eu/
[3]Detection of flexibility in energy consumption and production
[4]Forecast/prediction of energy consumption and production
[5]Forecast/prediction of flexibility in energy consumption and production

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