José Ricardo Santos Andrade

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Porto • Portugal

Experience

INESC TEC - Institute for Systems and Computer Engineering, Technology and Science

Center of Power and Energy Systems (CPES)

- Research Assistant @ Energy Analytics and Forecasting Unit **July 2016 – July 2018**
- Researcher @ Energy Analytics and Forecasting Unit **July 2018 – Present**

Projects:

- ***InteGrid*** - *Demonstration of INTElligent grid technologies for renewables INTEgration and INTEractive consumer participation enabling INTEroperable market solutions and INTErconnected stakeholders*

  Task(s):

  – Conceptualization, implementation, integration and coordination of project forecasting system(s) for Medium Voltage and Low Voltage network resources

  Contribution(s):

  – Exploration and exploitation of multiple algorithms for short-term (up to 48 hours ahead) forecasting of load and renewable energy (wind/solar) medium voltage resources, and Iberian Electricity Market (MIBEL) energy prices
  – Conceptualization and implementation forecasting system(s) centralized database and REST APIs for high-volume data ingestion and retrieval
  – Participation in the development of weather data acquisition (measurements and numerical weather predictions) software, from multiple weather providers
  – Deployment and monitoring of the forecasting system(s) in real operational environment
  – Paper publication(s) in international peer-reviewed journal

- ***LPVAnalytics***

  Task(s):

  – Conceptualization, implementation and integration of an end-to-end forecasting platform for load and solar energy resources supported by an REST API and an graphical user interface

  Contribution(s):

  – Exploration and exploitation of multiple algorithms combined with proper feature engineering for short-term (up to 96 hours ahead) forecasting of load and solar energy
  – Participation in the development of numerical weather predictions data acquisition software
  – Participation in the development of databases (Timescale), REST API (Django REST-Framework) and graphical user interface (Vue.js)
  – Deployment and monitoring of the forecasting system(s) in real operational environment

Projects:

- ***SOLAR4DR***

  Task(s):

  – Conceptualization, implementation and integration of an end-to-end forecasting service for solar energy resources supported by an REST API

  Contribution(s):

  – Development of short-term (up to 96 hours ahead) forecasting models for solar energy forecast
  – Participation in the development of numerical weather predictions data acquisition software
  – Participation in the development of an REST API for client communication
  – Deployment and monitoring of the forecasting system(s) in real operational environment

- ***CORAL*** - *Sustainable Ocean Exploitation: Tools and Sensors*

  Task(s):

  – Fundamental research with regard to innovative feature engineering techniques applied to renewable energy sources forecasting
  – State of art research with regard to offshore energy conversion technologies and future hybrid systems opportunities

  Contribution(s):

  – Design and implementation of a multi-temporal energy management tool - formulated as a mixed-integer linear programming (MILP) problem - supported by forecasting algorithms and capable of defining the best operational strategy for the energy storage/consumption of envisioned maritime exploratory processes
  – Paper publication in international peer-reviewed journal

Education

FEUP - Faculdade de Engenharia da Universidade do Porto **2010–2016**

M.Sc. Degree in Electrical and Computer Science Engineering
Specialization in Renewable Energy

- Dissertation - Previsão de Variabilidade de Produção em Centrais Fotovoltáicas [1]
  – Classification: 19 (in a scale of 1 to 20)

Academia de Música de São João da Madeira **1998–2010**

Beginner - Advanced Musical Education & Piano Classes

[1] https://repositorio-aberto.up.pt/handle/10216/82786

Awards and Honors

EEM2016 - COMPLATT - Energy Price Forecast Competition **April 2017**

International competition[2] with the demanding exercise of forecasting the Iberian Electricity Market (MIBEL) hourly spot energy price up to 120 hours ahead. In a rolling basis fashion, forecasts were submitted over a period of 14 days. A weighted mean absolute error metric was used to evaluate the forecasts of each participant.

- Final Classification: 4^{th} place (44 participants at final stage)

INESC TEC BIP - "Fora de Série" / Limelight **May 2017**

Monthly award that honors collaborators for an exceptional contribution in his/her area of activity. More information available at BIP Bulletin INESC TEC [3].

Key Skills

- **Natural Languages**: Portuguese and English proficient.
- **Programming Languages**: Python (advanced); LaTeX(intermediate); JavaScript, GoLang (home projects); R, MATLAB, C, C++ (academic)
  - **Daily drivers**: pandas, numpy, scipy, scikit-learn, statsmodels, keras, seaborn, dash & plotly, sphinx
- **Databases**: PostgreSQL (+TimescaleDB), Apache Cassandra, SQLite
- **Version control**: Git, GitHub/GitLab
- **App/Web Servers/Message Brokers**: NGINX, Apache, Flask, Django-REST Framework, RabbitMQ
- **Virtualization**: Docker (containerization), Oracle VM VirtualBox
- **IDEs**: JetBrains PyCharm/WebStorm, Visual Studio Code, RStudio, pgAdmin, DataStax Devcenter, Texmaker/TeXStudio
- **Platforms**: Linux, Windows
- **General Software**: Microsoft Office Suite, Mendeley, FileZilla, Terminus, Putty, Panoply

Publications

1. Andrade, J.; Bessa, R. (2017). Improving renewable energy forecasting with a grid of numerical weather predictions. IEEE Trans. Sustain. Energy 2017, 8, 1571–1580.
2. Andrade, J.; Filipe, J.; Reis, M.; and Bessa, R. (2017). Probabilistic Price Forecasting for Day-Ahead and Intraday Markets: Beyond the Statistical Model. Sustainability, vol. 9, no. 11, p. 1990, Oct. 2017.
3. R.J. Bessa, D. Rua, C. Abreu, P. Machado, J.R. Andrade, R. Pinto, C. Gonçalves, and M. Reis, "Data economy for prosumers in a smart grid ecosystem," in Proc. of the e-Energy '18: The Nineth International Conference on Future Energy Systems, June 12–15, 2018, Karlsruhe, Germany.
4. A. Coronati, J.R. Andrade , R.J. Bessa, "A deep learning method for forecasting residual market curves," Working Paper, 2019.

[2] http://complatt.smartwatt.net/
[3] http://bip.inesctec.pt/en/184/fora-de-serie.html