José Ricardo Santos Andrade

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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, development and integration of a forecasting platform for medium and low voltage distribution networks resources

  Contribution(s):

  – Development of data-cleansing algorithms
  – Development of short-term (up to 48 hours ahead) forecasting models for load and renewable energy (i.e. wind, solar) resources from medium voltage distribution networks
  – Development of forecasting models for daily and intraday Iberian Electricity Market (MIBEL) energy prices
  – Development of system database supported by REST APIs for data ingestion, storage and extraction
  – Participation in the development of data acquisition software (i.e. numerical weather predictions)
  – Deployment and monitoring in real operational environment
  – Paper publication(s) in international peer-reviewed journal(s)

- ***LPVAnalytics***

  Task(s):

  – Conceptualization, development and integration of an end-to-end forecasting platform for Elergone Energias (electricity market agent) load and solar resources

  Contribution(s):

  – Development of short-term (up to 96 hours ahead) forecast for load and solar energy resources
  – Participation in the development of data acquisition software (i.e. numerical weather predictions)
  – Participation in the development of databases (Timescale), REST API (Django REST-Framework) and a graphical user interface (Vue.js)
  – Deployment and monitoring in real operational environment

- ***SOLAR4DR***

  Task(s):

  - Conceptualization, implementation and integration of an end-to-end forecasting service for solar energy resources

  Contribution(s):

  - Development of short-term (up to 96 hours ahead) forecast for solar energy resources
  - Participation in the development of numerical weather predictions data acquisition software
  - Participation in the development of REST APIs for client communication
  - Deployment and monitoring 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 2016**

International forecasting competition[2]. Objective: predict the Iberian Electricity Market (MIBEL) hourly spot energy price up to 120 hours ahead. Daily submissions over a period of 14 days.

- Best model: Ensemble of feed-forward neural networks combined with feature engineering techniques
- 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, scikit-learn, tensorflow, 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
- **Platforms**: Linux, Windows

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-archive.inesctec.pt/182/fora-de-serie.html