Ricardo Andrade

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Porto • Portugal

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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 (grant) @ Energy Analytics and Forecasting Unit **July 2016 – July 2018**
- Contracted Researcher @ Energy Analytics and Forecasting Unit **July 2018 – Present**

Key Skills

- **Natural Languages**: Portuguese and English proficient
- **Programming Languages**:
  - **Advanced:** Python (scikit-learn, pandas, numpy, statsmodels, tensorflow, seaborn, dash & plotly, Pulp, Sphinx, Docker SDK, Flask, Django-REST Framework, Celery, pytest, loguru)
  - **Intermediate:** JavaScript (VueJS), Tex (LaTeX)
  - **Basic:** GoLang, R, MATLAB, C, C++
- **Databases**: PostgreSQL (+TimescaleDB), Apache Cassandra, SQLite
- **Version control**: Git, GitHub/GitLab (CI/CD)
- **Web Servers**: NGINX, Apache HTTP Webserver
- **Message Brokers/Event Streaming**: RabbitMQ, Apache Kafka
- **Virtualization**: Docker (containerization), Oracle VM VirtualBox
- **OS**: macOS, Linux, Windows

Awards and Honors

EEM2016 - COMPLATT - Energy Price Forecast Competition **April 2016**

International forecasting competition[1]. 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 [2].

[1] http://complatt.smartwatt.net/

[2] http://bip-archive.inesctec.pt/182/fora-de-serie.html

Publications

Journals

1. Andrade et al., "Data-driven anomaly detection and event log profiling of SCADA alarms,", under review, IEEE Transactions on Power Systems.
2. Andrade, J.; Bessa, R. (2017). Improving renewable energy forecasting with a grid of numerical weather predictions. IEEE Trans. Sustain. Energy 2017, 8, 1571–1580.
3. 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.
4. A. Coronati, J.R. Andrade, R.J. Bessa, "A deep learning method for forecasting residual market curves," Electric Power Systems Research, vol. 190, pp. 106756, Jan. 2021.

International Conferences

1. B. Almeida, R.J. Santos, M. Louro, P.M. Santos, A.F. Ribeiro, R.J. Bessa, C. Gouveia, J.R. Andrade, R.E. Silva, C.N. Rocha, J.P. Viana, "Innovative applications of artificial intelligence on SCADA data," 26th International Conference & Exhibition on Electricity Distribution (CIRED 2021), 20-23 September 2021.
2. 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.
3. A. Coronati, J.R. Andrade, R.J. Bessa, "A deep learning method for forecasting residual market curves," in Proc. of the 21st Power Systems Computation Conference (PSCC 2020), 29 June-3 July 2020.
4. S. Reyes, R.J. Bessa, J.R. Andrade, "Pronóstico de flujo de energía de olas," VI Congreso Nacional de Estudiantes de Energías Renovables (CNEER), Temixco, Mexico, 11-13 September 2018.
5. C. Gonçalves, J.R. Andrade, R.J. Bessa, "Feature extraction techniques that improve wind power probabilistic forecasting," Wind Energy Science Conference 2017, Mini Symposia "Wind Power Forecasting", Technical University of Denmark, 26-29 June 2017.

Projects

- ***AI4Substation (R&D Contract)*** - E-REDES
  - **Task:** Conceptualization and development of data-driven decision support applications for E-REDES dispatch centre operators, based on SCADA eventlog data;
  - **Technologies:** Python, PostgreSQL, Flask, VueJS, Docker

- ***GPDER - Grid Predictive Management Considering Distributed Energy Resources***
  - **Task:** Development of a forecasting platform for MV and LV distribution networks loads;
  - **Technologies:** Python, Apache Cassandra, NGINX, Flask, Apache Kafka, Docker

- ***TSOLoadForecasting (R&D Contract)*** - Austrian Power Grid
  - **Task:** Research of statistical learning algorithms for load forecasting with application on APG transmission system operator assets.
  - **Technologies:** Python

- ***InteGrid (EU H2020)*** - *INTElligent grid technologies for renewables INTEgration and INTEractive consumer participation enabling INTEroperable market solutions and INTErconnected stakeholders*
  - **Task:** Development and integration of a forecasting platform for MV and LV distribution networks loads and MIBEL spot electricity prices;
  - **Technologies:** Python, Apache Cassandra, RabbitMQ, Celery, NGINX, Docker

- ***LPVAnalytics (R&D Contract)*** - Elergone Energias, Lda.
  - **Task:** Conceptualization, development and integration of an end-to-end forecasting platform for load and solar resources of Elergone Energias. System to be used by the market agent to define market offers on MIBEL.
  - **Technologies:** Python, VueJS, PostgreSQL(+TimescaleDB), NGINX, Docker

- ***FEEdBACk (EU H2020)*** - *Fostering Energy Efficiency and BehAvioural Change through ICT*
  - **Task:** Conceptualization and development of an end-to-end forecasting service for photovoltaic energy generation resources
  - **Technologies:** Python, Flask, NGINX, Docker

- ***SOLAR4DR (R&D Contract)*** - *EFACEC*
  - **Task:** Development of an end-to-end forecasting service for solar energy generation
  - **Technologies:** Python, Flask, Apache HTTP Server, Docker

- ***CORAL (N2020)*** - *Sustainable Ocean Exploitation: Tools and Sensors*
  - **Task:** State of art research with regard to offshore energy conversion technologies and future hybrid systems opportunities. Development of a multi-temporal energy management tool (mixed-integer linear programming) - supported by forecasting models capable to define the best operational strategy for the energy storage/consumption of envisioned maritime exploratory processes
  - **Technologies:** Python, Flask

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 [3]
  - 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

Interests

- **Entertainment**: Football, Formula 1, Music, Movies, Games
- **Technology**: Cryptocurrency, Distributed Ledger Technologies, FOSS

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