Ricardo 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 (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**: 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
- **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`

Projects

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

  Task:

  - Conceptualization, development and integration of the forecasting platform for medium and low voltage distribution networks resources (loads and renewable energy based generation sources). Development of forecasting models for daily and intraday Iberian Electricity Market (MIBEL) electricity prices.

  Accomplishments:

  - State-of-the-art deep-learning algorithms for short-term (up to 48 hours ahead) forecasting
  - Highly scalable forecasting platform, supported by RabbitMQ + Celery for distributed processing and data-cleansing algorithms
  - External data acquisition software (i.e. numerical weather predictions)
  - Multi-node Cassandra cluster as core database, supported by REST APIs for data ingestion, acquisition and extraction
  - Multi-service Docker container orchestration for software deployment
  - Publications in international conference and peer-reviewed journal

- ***LPVAnalytics*** - Elergone Energias, Lda

  Task:

  - Conceptualization, development and integration of an end-to-end forecasting platform for load and solar resources

  Accomplishments:

  - State-of-the-art supervised learning algorithms for short-term (up to 96 hours ahead) forecasting, with an improvement of 50% (MAE) compared to the existing forecasting methodology
  - Development of external data acquisition software
  - Development of REST APIs and graphical user interfaces for client interaction

- ***SOLAR4DR***

  Task:

  - Development of an end-to-end forecasting service for solar energy based generation sources in buildings

  Accomplishments:

  - State-of-the-art supervised learning algorithms for short-term (up to 96 hours ahead) forecasting
  - Development of external data acquisition software (i.e. numerical weather predictions)
  - Development of REST APIs for client communication

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

  Task:

  - Fundamental research with regard to innovative feature engineering techniques combined with state-of-art ML supervised learning algorithms applied to solar and wind energy forecast
  - State of art research with regard to offshore energy conversion technologies and future hybrid systems opportunities

  Accomplishments:

  - Multi-temporal energy management tool (mixed-integer linear programming) - supported by forecasting algorithms capable to define the best operational strategy for the energy storage/consumption of envisioned maritime exploratory processes
  - 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 [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

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.

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