- ❏ Research field: Machine Learning, Deep Learning, Audio and Acoustic Signal Processing
- ❏ Deadline for application: November 20th, 2020
- ❏ Start date: March 2021
- ❏ Job status: Full time (40 hours per week)
- ❏ Type of contract: Temporary (2 years)
- ❏ Salary per month: 1.800.000 $CL / approximately 2.345 USD
- ❏ Contact email: enriquesuarez@uach.cl, pablo.huijse@uach.cl

Postdoctoral Fellow in Deep Learning for Environmental Sound Classification

The Universidad Austral de Chile (UACh) is seeking a **full-time postdoctoral researcher** to work on a **two-year project** using deep learning for the classification of environmental sounds from heterogeneous recording stations situated in specific points of the city of Valdivia, Chile. This is a joint project between UACh, the Chilean Ministry of Environment, Capta SA, Acústica Marina, and Gerard Ingenieria Acústica. The project aims to develop an integrated system for real-time classification of sound sources for assisting in the observance of environmental noise regulations. The project has received funding from the Chilean Government (FONDEF) in the amount of 400.000 USD. The integrated system for the analysis of environmental sound sources (FUSA system) consists of three main components: the deep learning models to classify the environmental sound sources, a scalable orchestration architecture to manage large data volumes from the recording stations and a front-end to visualize the results of the inferential models.

As a postdoc, you will be directly responsible for the first component of FUSA, i.e. you will develop novel uncertainty-aware deep learning models to extract patterns and classify the different environmental sources present in the data. The main challenges are associated with the heterogeneity of the recordings, the overlapping between sources within the recordings and the robustness to variable noise conditions. A bayesian treatment of the model is considered to estimate the uncertainty of the model and provide reliable and well-calibrated decisions. The candidate is also expected to collaborate closely with an interdisciplinary team of academics and engineers from UACh and our industrial partners for the training and deployment of the model within the FUSA architecture.

In summary, you will be expected to:

- Develop deep learning models for environmental source classification.
- Estimating the reliability of the models and resulting classifications using a Bayesian framework.
- Lead the publication of academic papers in high-impact peer-reviewed journals or conferences.
- Collaborate with other members of the team at UACh and industrial partners.

Where will you work

The research activities will normally be conducted at the Universidad Austral de Chile (UACh). UACh is located in the beautiful city of Valdivia, in the South of Chile. Due to the ongoing COVID-19 outbreak, the work tasks may be conducted remotely.

Requirements and qualifications

- A Ph.D. in Computer Science, Applied Math, Acoustical Engineering, Electrical Engineering, or a closely related field. The candidate must be within 5 years of completion of his/her Ph.D.
- Candidates should be fluent in English both oral and written with a track record of scientific publications and conference presentations.
- Strong computational science, and mathematical and statistical modelling skills.
- Strong deep learning skills and practical experience in various neural network architectures (e.g. DNN, CNN, RNN/LSTM, autoencoders).
- (Desirable) Computational experience in using high-performance parallel computing resources.

Application

To apply a candidate must send the following documentation to enriquesuarez@uach.cl and pablo.huijse@uach.cl

- CV including educational background, degree dates, experience and expertise, a list of peer-reviewed publications and conference presentations, honors/awards, and contact information of at least two references.
- A cover letter addressing your intentions and how you meet the requirements and qualifications.
- A scanned copy of his/her Ph.D. diploma.

All interested candidates irrespective of age, gender, disability, race, religion, or ethnic background are encouraged to apply.

The deadline for application is **November 20th, 2020**

References

- Boddapati, V., Petef, A., Rasmusson, J., Lundberg, L. (2017). Classifying environmental sounds using image recognition networks. Procedia Computer Science. 112: 2048-2056.
- Dai, W., Dai, C., Qu, S., Li, J. and Das, S. (2017). Very deep convolutional neural networks for raw waveforms. IEEE International Conference on Acoustics, Speech and Signal Processing (ICASSP), New Orleans, LA. 421-425.
- Oord, A. van den, Dieleman, S., Zen, H., Simonyan, K., Vinyals, O., Graves, A., Kalchbrenner, N., Senior, A. and Kavukcuoglu, K. (2016). WaveNet: A Generative Model for Raw Audio. 9th International Speech Communication Association (ISCA). Speech Synthesis Workshop.
- Salamon, J., Jacoby, C. and Bello, J. (2014). A dataset and taxonomy for urban sound research. Proceedings of the 22nd ACM international conference on Multimedia.
- Salamon, J., and Bello, J. (2017). Deep convolutional neural networks and data augmentation for environmental sound classification. IEEE Signal Processing Letters. 24(3): 279-283.
- Xia, X., Togneri, R., Sohel, F., Zhao, Y., Huang, D. (2020). Multitask learning for acoustic event detection using event and frame position information. IEEE Transactions on Multimedia. 22(3): 569-578.