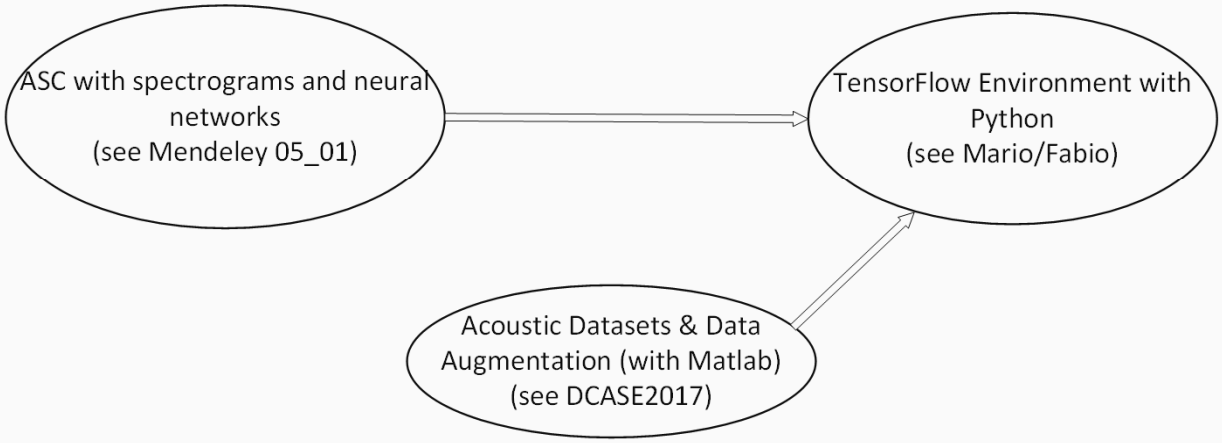
Acoustic Scene Evaluation with Neural Networks

VM1: Build-up fundamental knowhow

Literature Research	Learning Example



VM2: Dedicate to specific research area

- Get basic training data from measurements
- Label basic training data set using expert knowhow
- Augment basic training data to get full training/evaluation/ test data sets (with automatic labelling)
- Define suitable classes
- Design/find suitable network architecture for classification
- Train neural network
- Test neural network and compare with expert performance

MT: Demonstrate aquired knowhow

Aurasa

Your personal acoustic advisor

Overview/Intro ASC

Barchiesi, D., Giannoulis, D. D., Stowell, D., & Plumbley, M. D. (2015). Acoustic Scene Classification: Classifying environments from the sounds they produce. *IEEE Signal Processing Magazine*, *32*(3), 16–34. https://arxiv.org/pdf/1411.3715.pdf

Wang, D. (2017). Deep learning reinvents the hearing aid. *IEEE Spectrum*, *54*(3), 32–37. https://ieeexplore.ieee.org/document/7864754

Datasets

DCASE2017. (n.d.). Retrieved June 8, 2018, from http://www.cs.tut.fi/sgn/arg/dcase2017/index

ASC with NN

Kahl, S., Hussein, H., Fabian, E., Schloßhauer, J., Thangaraju, E., Kowerko, D., & Eibl, M. (2017). Acoustic Event Classification Using Convolutional Neural Networks. *Informatik 2017*, 2177–2188. https://doi.org/10.18420/in2017_217

Park, S., Mun, S., Lee, Y., & Ko, H. (2017). Acoustic scene classification based on convolutional neural network using double image features. In *DCASE 2017-Workshop on Detection and Classification of Acoustic Scenes and Events*. Retrieved from https://pdfs.semanticscholar.org/f0a7/1758980b22356e56d36ecbe243e8ea5ce8da.pdf

Lu, L., Yang, Y., Jiang, Y., Ai, H., & Tu, W. (2018). Shallow Convolutional Neural Networks for Acoustic Scene Classification. *Wuhan University Journal of Natural Sciences*, *23*(2), 178–184. https://doi.org/10.1007/s11859-018-1308-z

Han, Y., & Lee, K. (2016). Acoustic scene classification using convolutional neural network and multiple-width frequency-delta data augmentation. Retrieved from https://arxiv.org/abs/1607.02383

Weiping, Z., Jiantao, Y., Xiaotao, X., Xiangtao, L., & Shaohu, P. (2017). Acoustic Scene Classification Using Deep Convolutional Neural Network and Multiple Spectrograms Fusion. Retrieved November 6, 2018, from https://www.cs.tut.fi/sgn/arg/dcase2017/documents/challenge_technical_reports/DCASE2017_Xing_158.pdf

Dang, A., Vu, T. H., & Wang, J.-C. (2018). Acoustic scene classification using convolutional neural networks and multi-scale multi-feature extraction. In *2018 IEEE International Conference on Consumer Electronics (ICCE)* (pp. 1–4). IEEE. https://doi.org/10.1109/ICCE.2018.8326315

Battaglino, D. (n.d.). ACOUSTIC SCENE CLASSIFICATION USING CONVOLUTIONAL NEURAL NETWORKS. Retrieved from http://www.eurecom.fr/fr/publication/4982/download/sec-publi-4982.pdf