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RE: Letter of recommendation for Raphael Attias

To whom it may concern,

Raphael Attias worked as an intern from February 22nd 2022 to August 5th 2022 here at NEC Laboratories America in the Machine Learning Department. During his internship, Raphael successfully explored techniques to counter overfitting of deep learning models in digital pathology. He studied published literature, implemented Python/Torch code and performed many experiments. At the end of his internship, he presented the project to the entire lab.

The main component of this project was to study ways to counter the loss of accuracy in out-of-distribution situations encountered when digital pathology models are trained with data from some medical institutions and tested on others. Initially, Raphael was tasked with establishing a baseline of data augmentation techniques using several real-world datasets from Japanese hospitals and cancer centers. On his own, he immediately setup an efficient pipeline and experimentation environment using state-of-the-art tools such as TensorBoard. Thus, with limited GPU resources, he was able to quickly elucidate which data augmentation functions were most effective in our context. He also brought in new augmentation functions based on advanced image processing such as elastic transformations. The results he gathered helped us establish the best combination of data augmentation functions for our production models. Next, we wanted to explore the use of Posterior Network model using normalizing flow for uncertainty estimation. Raphael was able to understand and implement the code from reading the paper and quickly produced results on our dataset. He was then able to efficiently integrate his code into our Python-based in-house software toolset. Finally, Raphael proposed a framework to learn a representation of a hospital, in terms of its influence on the appearance (staining, etc.) of histological tissue samples, and use this representation in the decoder path of a U-net style model for nuclei detection. He drew from past projects on x-ray radiography and proposed to adapt it to digital pathology and successfully implemented the model using PyTorch.

Raphael is a quick, independent thinker and a hard worker. He was able to understand, implement and experiment with several complex machine-learning frameworks in a short amount of time. He is proactive and doesn't hesitate to propose and explore alternative approaches, yet he is able to stay on track of what is asked of him. He is a pleasant and outgoing person who communicates very well and integrates effortlessly in teams and groups. I have no reservations in giving him my highest recommendations as a machine-learning researcher and engineer.

Sincerely,

Eric Cosatto