

**Univ.-Prof. Dr. Sepp
Hochreiter**
Institute for
Machine Learning

P +43 732 2468 4521
F +43 732 2468 4539
hochreit@ml.jku.at

Office:
Birgit Hauer
Ext. 4520
birgit.hauer@jku.at

Linz, November 20, 2020

Supervisor Review for the Bachelor Thesis:

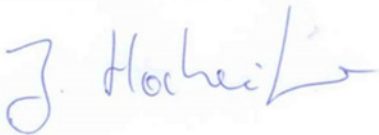
“Attention Based High Resolution Image Classification” by Dominik Heindl

It was with great pleasure to supervise the bachelor thesis of Dominik Heindl on "Attention Based High Resolution Image Classification". This is a highly relevant topic and his work contributed by investigating the applicability of different neural network architectures to process extremely high resolution images in the field of medical imaging. Specifically, Dominik worked with images of histological slides of human skin containing samples with Basal Cell Carcinoma.

Processing this kind of high resolution data is still an open research topic and therefore particularly challenging. Dominik showed remarkable initiative, perseverance and together with his ability to quickly learn new concepts and technical skills mastered this challenge. He had to acquire knowledge in both the medical domain to grasp the intricacies of the dataset as well as in the domain of machine learning in order to understand, and subsequently implement, the methods he was tasked to investigate. Under our guidance he prepared the challenging dataset and implemented several neural network architectures as baselines. He then compared his implementation of the attention based approach with these baselines and performed statistical tests to make statements regarding their predictive performance. Furthermore, he investigated multiple ways on how to encode the high resolution images for the attention based approach using different network architectures, initializations and training schemes.

**JOHANNES KEPLER
UNIVERSITY LINZ**
Altenberger Straße 69
4040 Linz, Austria
jku.at
DVR 0093696

During his work we were very impressed with Dominik as he showed great initiative, acquired necessary knowledge and skills and increased his understanding in both the medical and machine learning domains substantially. He regularly informed us about the status of his work, discussed problems and valued our feedback. His work exceeds what is commonly expected from a bachelor student and we can state with confidence that Dominik deserves the Bachelor of Science degree, given the excellent work he performed for this thesis.



Sepp Hochreiter