VRVis K1/INFUTURA
VRVis Zentrum für Virtual Reality und Visualisierung Forschungs-GmbH

Programme: COMET – Competence Centers for Excellent Technologies

Programm line: COMET-Zentrum (K1)

COMET Project, Integrative Visual Computing for Future Radiology, 01/2017 – 12/2020, Multi-Firm

ARTIFICIAL INTELLIGENCE FOR RADIOLOGY
DEEP LEARNING ALGORITHMS ACCELERATE RADIOLOGICAL PROCESSES WORLD-WIDE.

VRVis can look back on many years of experience and expertise in the field of machine and deep learning, which it makes available as a technology supplier to domestic and international companies. From AI-supported production management to the automation of quality control and assurance of glass articles to the acceleration of medical processes in radiology worldwide, many different industries and use cases are represented.

Key Technology Artificial Intelligence

Especially in the life sciences sector, VRVis successfully introduced KI as a key technology into ongoing projects. In 2018, VRVis developed several AI-based solutions to improve existing radiological workflows in hospitals. The KI-based image processing technology of the VRVis is an important contribution to the further development of imaging diagnostics.

A recent research success with an exciting use case as part of the Integrative Visual Computing for Future Radiology (INFUTURA) project is the development of an Artificial Intelligence image processing algorithm implemented by COMET's long-standing partner AGFA Healthcare. The prototype is currently being used in hospitals in Dubai and provides deep learning support for diagnosing tuberculosis diseases. Detecting this infectious disease is particularly challenging as it provides many different symptoms and appearances. Using deep learning, the artificial neural network learns to recognize the disease by itself – for this it needs to be trained with many pre-classified im-

ages. The algorithm is designed to evaluate the likelihood of tuberculosis on 2D x-rays of the chest area, thereby increasing screening throughput. The training data consist of large sets of tissue images of sick and healthy people, which have been previously evaluated by physicians. Several thousand images in the various stages of the disease are necessary to allow the algorithm to "practice" sufficiently. This provides the algorithm with a reliable sensitivity that is sufficient to support the specialist staff who ultimately make the decisions and make the actual findings. The physicians are provided with a ranking of images and patients in order to be able to react quickly if necessary and initiate further examinations. This shows that technological progress does not replace physicians, but rather focuses even more on the human factor.

In addition to speed, the solution also offers another major advantage. After the time-consuming learning phase, which requires a lot of computing power, the finished AI application finds its place in everyday hospital life on a standard laptop.

Media Reach

Dr. Katja Bühler, group leader of the Biomedical Image Informatics group at VRVis, was invited several times as a podium guest to panel discussions about artificial intelligence, for example at the 1st Artificial Intelligence Conference of the WKÖ, and gave interviews to different media on this topic, so that VRVis could achieve a broad media reporting (e.g. reports in Der Standard, Life Sciences Vienna, Special Issue on AI in Report Plus). The Biomedical Image Informatics research group published three scientific papers on artificial intelligence in high-ranking publications in 2018 and also applied for a patent.
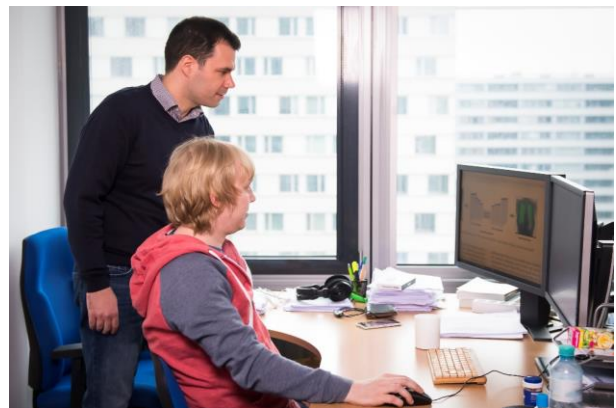
Two researchers from the Biomedical Image Informatics group.
© VRVis

Project coordination
Dr. Katja Bühler
Project coordinator
VRVis

T +43 (0) 1 9089892
buehler@vrvis.at

VRVis K1/INFUTURA
Donau-City-Straße 11
1220 Vienna
T +43 (0) 1 9089892
office@vrvis.at
www.vrvis.at

Project partner

- AGFA
- AVL

- IMP – Research Institute
  for Molecular Pathology

Federal Ministry
Republic of Austria
Transport, Innovation
and Technology

Federal Ministry
Republic of Austria
Digital and
Economic Affairs

Austrian Research Promotion Agency
Sensengasse 1, A-1090 Vienna
P +43 (0) 5 77 55 - 0
office@ffg.at
www.ffg.at