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| **Abstract:** | We present InferScholar Center, an artificial intelligence research platform especially designed for medical researchers. InferScholar Center integrates GPU server, user management module, medical database, image labelling tool, deep learning (neural network) module, multi-center (transfer learning) module and radiomics module. The platform offers an interactive interface and even medical researchers with no coding background are able to easily finish the full process of AI research. In deep learning module, more than 50 mainstream deep learning algorithms are optimized for medical images and embedded into the platform. The researchers can train models for classification, detection, and segmentation problems with these algorithms. They can also import/export trained models and conduct transfer-learning among different centers. In radiomics module, more than 4,000 features are extracted from each lesion, and classification models are built with the statistical analysis and machine learning tools. InferScholar Center can analyze medical texts like EMRs, and all kinds of medical images, including X-ray, CT, MRI, PET/CT, pathological slides. Therefore, it can be applied to a wide range of medical fields, including oncology, cardiology, neurology, respiratory diseases etc. With InferScholar Center, we aspire to empower the medical researchers with the most advanced tools, and promote the development of multidisciplinary AI researches. |

InferScholar Center is a medical research artificial intelligence platform with both hardware GPU server and software interface. Such AI infrastructure enables the medical scholars from difference fields to conduct researches with no coding barrier. It is a powerful tool to truly facilitate the development of medical AI research, which brings infinite possibilities for future medical discoveries.

In recent years, medical data has grown exponentially in terms of type, amount, and generation speed. Taking medical imaging as an example, the annual growth rate is 30%-40%. In order to maximize the value of big data, InferScholar Center’s datasets are designed with the ability to store and analyze millions of medical data. They are compatible with medical images in DICOM/JPEG/PNG formats and in various modalities. The researchers can import data, perform analysis, label the images, and track labelling progress via the interface.

Academic publications in the field of medical imaging deep learning has increased by four times during the past four years，implying a huge potential for medical AI research. However, programming usually imposes a barrier for most medical researchers. In InferScholar Center, we replace all the coding work behind data transformation, data augmentation, hyper-parameter optimizations and algorithms selection with input boxes and check boxes.

The researchers can easily train and test models for classification, detection, and segmentation. If they have coding background, they can also design their own customized networks. On the platform, the data quality, the labelling standard, and the training parameters are all decided by the doctors. For them, artificial intelligence algorithms are no longer a complete “black box”, or machine with no feelings, they are instead the creatures of human solicitude and medical intelligence. Meanwhile, InferScholar Center supports transfer learning among multiple centers, which increases the model’s robustness and makes possible the transition from academic research to clinical product.

In addition to deep learning, radiomics has also been an eye-catching research trend in recent years, known for its high dimension of information. For one single lesion, more than 4,000 features are extracted and analyzed with the patient’s clinical record. InferScholar Center offers various tools for feature selection and feature analysis with clear visualization. Even researchers with rare statistical knowledge can monitor the progress and understand the results easily. The researchers can solve practical problems like lesion’s malignancy prediction with the machine learning models embedded, and test the model performance.

Meanwhile, system security is still our top priority. With the option of installing server within internal network, the data can be analyzed in a secure environment.

InferVision has launched several products under the InferRead product line on lung cancer, breast cancer, fracture, stroke, and bone age, currently serving radiologists in near 300 hospitals. InferScholar Center is the first product for all medical researchers by InferVision. We have not seen benchmarking products yet with such comprehensive functions in data management, labelling, deep learning and radiomics.

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