

## AI-driven Augmented Diagnosis and Prediction on Musculoskeletal Conditions from Automated Interpretation of MRI

- ScanDiags automatically interprets sequences of musculoskeletal MRI images.
- Historical and current EHR-information can be aggregated for monitoring and prediction.
- Use cases include real-time second opinion, peer review, retrospective review, case comparison and more.
- Catalog of detectable conditions is being developed in cooperation with Switzerland's leading hospitals.
- Clinical trials since 2018 show AUC, specificity and sensitivity on par with experienced human radiologists.
- ScanDiags' AI-algorithms perform equally well independent of MRT manufacturer and image parameters.
- Large and heterogeneous sets of training data from many different sources avoid bias and provide quality.

## Comprehensive Benefits for Clinicians and Radiologists

■ **Improve detection rate for rare conditions** through AI-consolidated radiology knowledge.

■ **Have radiologists' skills available in remote locations and during off-hours.**

■ **Avoid repetitive tasks**, e.g. when qualifying and segmenting MRI of the spine.

■ **Save time** by automating peer reviews, knowledge sharing and quality assessments.

■ **Prioritize and triage** cases automatically during times of high pressure.

■ **Simplify training of new radiologists** through automated assessments.

■ **Easily look up similar cases from colleagues**, even across organizations.

■ **Avoid unnecessary treatments** through predictive AI-capabilities.

■ **Justify treatment recommendations** with automated predictive second opinions.



- Built in collaboration with the leading public and private hospitals of Switzerland.
- Validated by globally recognized clinicians and radiologists.
- Research- and validation-modules deployed since December 2018.



swiss made software

## The ScanDiags R&D Project and its Resulting AI Service

The ScanDiags project was initiated in 2016, after preliminary work since 2011. In May 2019, the fifth generation prototype was made available.

### ■ A Coordinated Effort of Swiss Health Providers

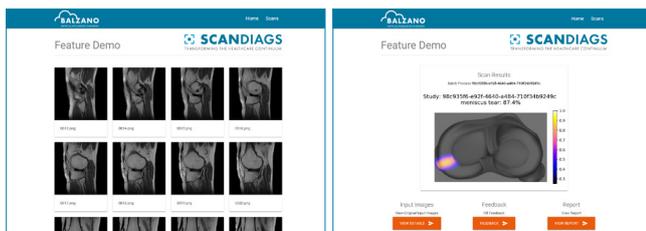
In cooperation with Swiss hospitals, a comprehensive catalog containing the majority of MRI-identifiable clinical conditions is being AI-trained. The ongoing engineering process will continuously add new modules from this catalog to the ScanDiags product. Participating partner hospitals during training and preview receive free credits for the use of the resulting solution.

### ■ Pay-per-use

Once the commercial version of the product is made available, its features can be consumed by customers through a pay-per-use model with a fee per examination.

### ■ The ScanDiags Service Architecture

The ScanDiags service can run locally in a customer's internal IT infrastructure or in the cloud. It will receive one or more MRI-sequences via a direct, protected and monitored connection from either an MRT machine, PACS system, RIS or other software layer or via direct user interaction through the ScanDiags test app or website. It communicates with PACS, RIS, EHR and other systems through standardized APIs, such as DICOM and HL7. The service will optionally call into EHR systems to gather additional data, or look up its own internal historical data for the analysis of time sequences. After processing all input data and performing its interpretation and prediction routines, the service will return to the calling system or user its recommendations to augment diagnosis and prediction facilitated by a radiologist or clinician.



The ScanDiags software solution is developed by Balzano Artificial Intelligence Engineers, a team of seasoned machine learning specialists with a track-record of 20+ years of successful artificial intelligence ventures. Balzano is a Gold Certified partner of Microsoft and part of Microsoft's exclusive AI Inner Circle. The ScanDiags solution carries the „Swiss Made Software“ quality label.

- HQ: Balzano Informatik AG  
8008 Zurich, Switzerland
- US distribution: Balzano Informatics Inc.  
Tampa, FL 33602-4319, United States

### ScanDiags' Artificial Intelligence

ScanDiags is a modern implementation of artificial intelligence. It combines deep learning, image and text analysis, as well as regression-based machine learning methods. Its core AI is built by applying supervised and unsupervised deep learning methods on unstructured MRI-images and structured EHR-data. Data is cleansed, pseudonymized and preprocessed through traditional image analysis and data aggregation methods. Image data used for training the ScanDiags AI is labeled through automatic text extraction from clinical reports and augmented with manual validation by experienced radiologists. No annotation of image content is applied, and a broad and heterogeneous set of data sources from different clinical practices, MRT manufacturer-platforms and sequence parameter values is aggregated into the AI training process. The ScanDiags AI thus learns autonomously and with as minimal bias as possible. All used data sets a backtrackable for quality validation and GDPR-compliance.

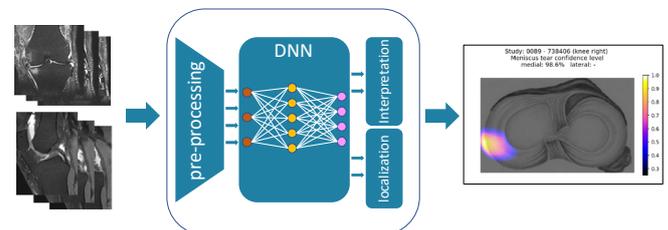


### ■ Continuous Learning

Finalized reports from radiologists and clinicians will be reprocessed by ScanDiags periodically. This feedback loop allows for ScanDiags' continuous learning and quality-improvement

### ■ Globally Aggregated Radiology-Expertise

ScanDiags, through its feedback loop and redistribution of virtualized radiology skills, will provide consolidated knowledge and experience from all globally participating institutes, radiologists and clinicians.



### ■ Road Map

As of May 2019, ScanDiags modules for classification of several clinical conditions as well as for segmentation and quantification have been provided into clinical validation and research for knee and lumbar spine. Further modules and use cases are planned to be released into validation during 2019, with commercial availability during 2020 (dates and features subject to change).