

DermExpert™ FAQs

What is DermExpert?

DermExpert is an add-on feature to VisualDx that helps non-dermatologists better understand, diagnose, and treat skin conditions. The feature lets clinicians take a picture of the patient's skin condition. Using artificial intelligence and machine learning, the application analyzes the lesion type, then provides simple questions to quickly get to a differential diagnosis.

What does DermExpert do when analyzing a picture?

DermExpert runs the image through two machine learning models:

1. The Lesion Model analyzes the image against a set of approximately 80 lesion types and returns a score for each lesion indicating the model's confidence that the image is a match. The top 3 matches are shown to the user, who must then select a lesion type to continue. The selected lesion is then added to the DermExpert workup as a finding, and the user continues through the workflow and answers questions about the lesion(s) to build the differential diagnosis.
2. The Diagnosis Model analyzes the image and returns a set of diagnoses with confidence scores. The results of the diagnosis model are never shown to the user, but they are used as part of the calculation that determines the differential diagnosis presented at the end of the workflow.

After the image is analyzed by each model, it is deleted from the user's device.

What does DermExpert NOT do when analyzing a picture?

DermExpert does NOT:

- Store the image
- Use the image to improve the machine learning models
- Transfer the image off the mobile device to another server
- Automatically determine the lesion type or provide a guaranteed diagnosis - DermExpert only provides recommendations based on the models' level of confidence
- Modify or enhance the image. Poor quality images (blurry, background noise, etc) will not yield accurate results.

How accurate is DermExpert?

There are three components to the AI in DermExpert: the Lesion Model, the Diagnosis Model, and the Differential Algorithm. We always take the top 5 lesions (with weights based on the Lesion Model's certainty) and top 5 diagnoses (with weights based on the Diagnosis Model's certainty) from the models, and send them to the differential algorithm for calculation along with other findings entered.

- The correct lesion is in the Lesion Model's top 5 between 80-90% of the time.
- The correct diagnosis is in the Diagnosis Model's top 5 between 70-80% of the time.

The other findings that the user enters as part of the workup are also essential in building the differential. The results from the lesion model and the diagnosis model are simply added to the other findings as inputs to the differential algorithm.

Is DermExpert HIPAA/GDPR compliant?

Yes. VisualDx and DermExpert do not collect any information that can be tied back to a specific patient. We also do not transmit or store any images from the mobile device.

What devices support DermExpert?

- iOS mobile devices using 11.2 or later
- Android mobile devices using 6 (Marshmallow) or later

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What is the machine learning/artificial intelligence framework for DermExpert?

VisualDx uses a combination of machine learning techniques and rules-based decision support. The models used in our products are taken from the current state of the art in image recognition, deep convolutional neural networks. We are continually experimenting with different architectures, transfer learning techniques, and training methodologies, both from the latest ML literature and through in-house research and development. Keras and Tensorflow are used in our experimental environment for model training and validation. The models are then exported to mobile-friendly formats to be run on-device for our DermExpert and Aysa products: CoreML for iOS devices, and Tensorflow Lite for Android.

When training models for integration with a decision support system, it is important to carefully balance the class distribution of disease so as to avoid biasing the system. When creating a data split of dermatologic cases for training, validation, and test images, the morphology, diagnosis, and other case findings are taken into account. This helps to ensure that a variety of presentations and distributions for each target class is represented in both the training and the holdout data. Additionally, our image collection contains representative cases of skin disease across the range of skin types. In order to ensure good generalization, case data is also taken into account when producing a data split. No two images from the same case are allowed to cross split boundaries, helping to ensure the integrity of our validation metrics.