ThinkSono

ThinkSono
Fouad, CEO
UNIVERSITY OF Southampton
Imperial College London
Sven, CTO
HPI
MAX-PLANCK-GESELLSCHAFT
ThinkSono
thinksono.com

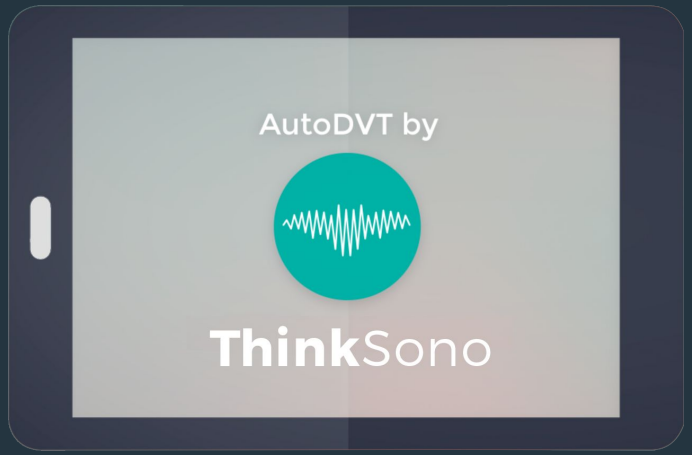
Engineering

Medicine

Experiences of ThinkSono

The Implications of using Deep Learning in Diagnostic Care

We have created the world's first software to diagnose a deadly condition called Deep Vein Thrombosis (DVT).



Blood Clots

Blood Clots

Pulmonary Embolism

Bayer Pharma AG
thrombosisadvisor.com

Fatal, if untreated.

800,000
Deaths

10 million people
affected worldwide.

800,000
Deaths

10 million people affected worldwide.

No. 1 preventable hospital death.

800,000
Deaths

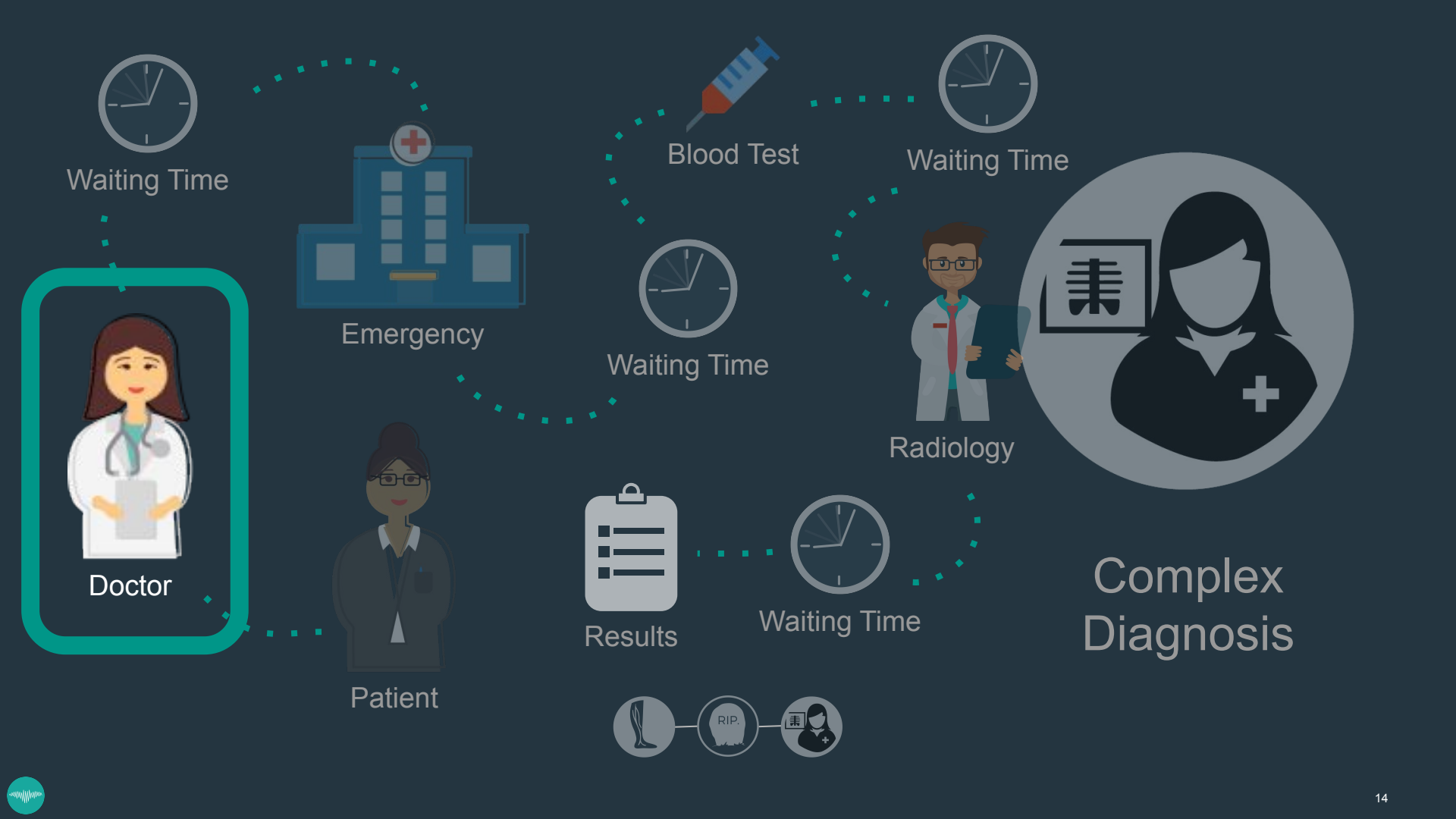
Complex Diagnosis

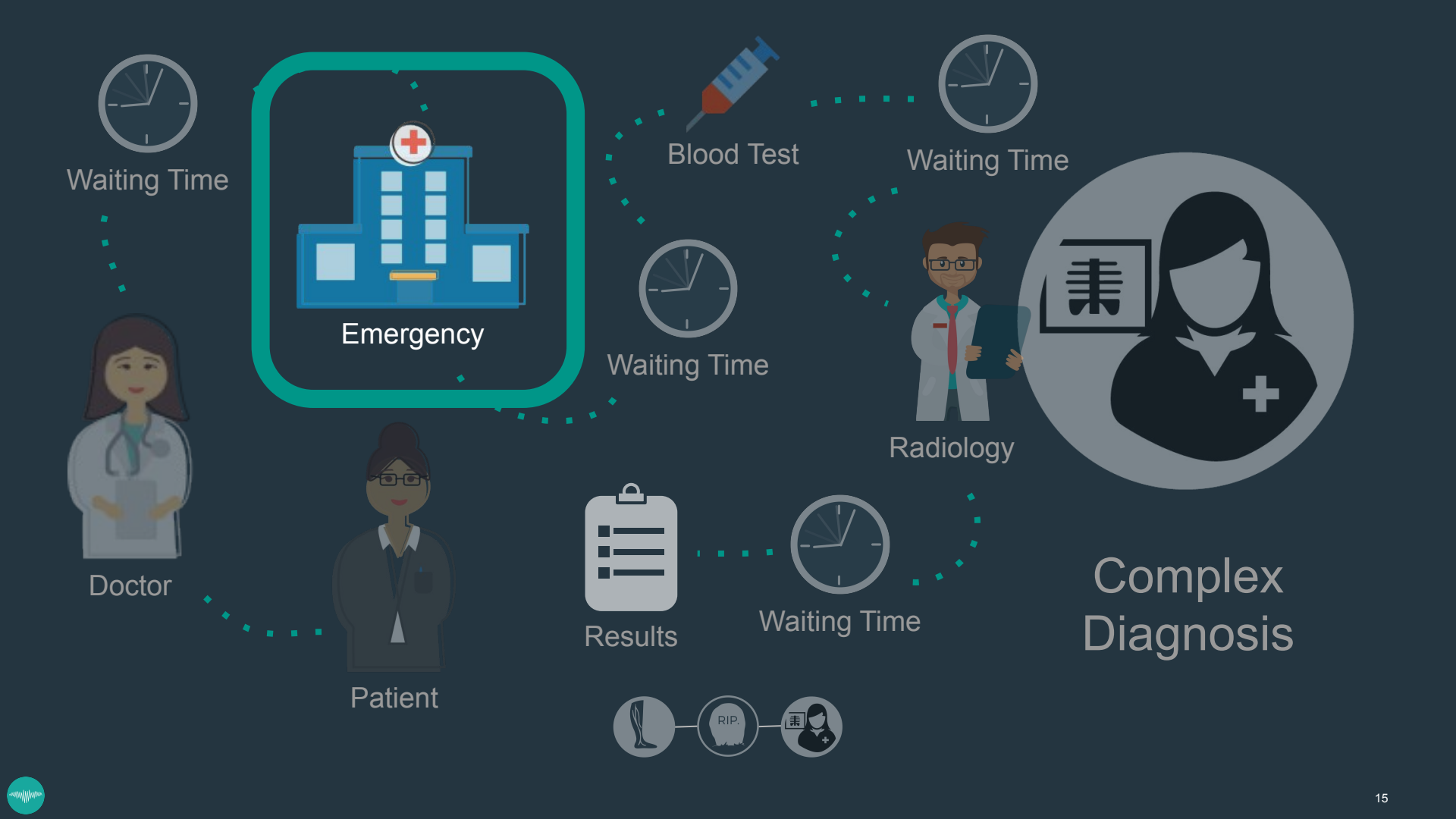
Complex Diagnosis

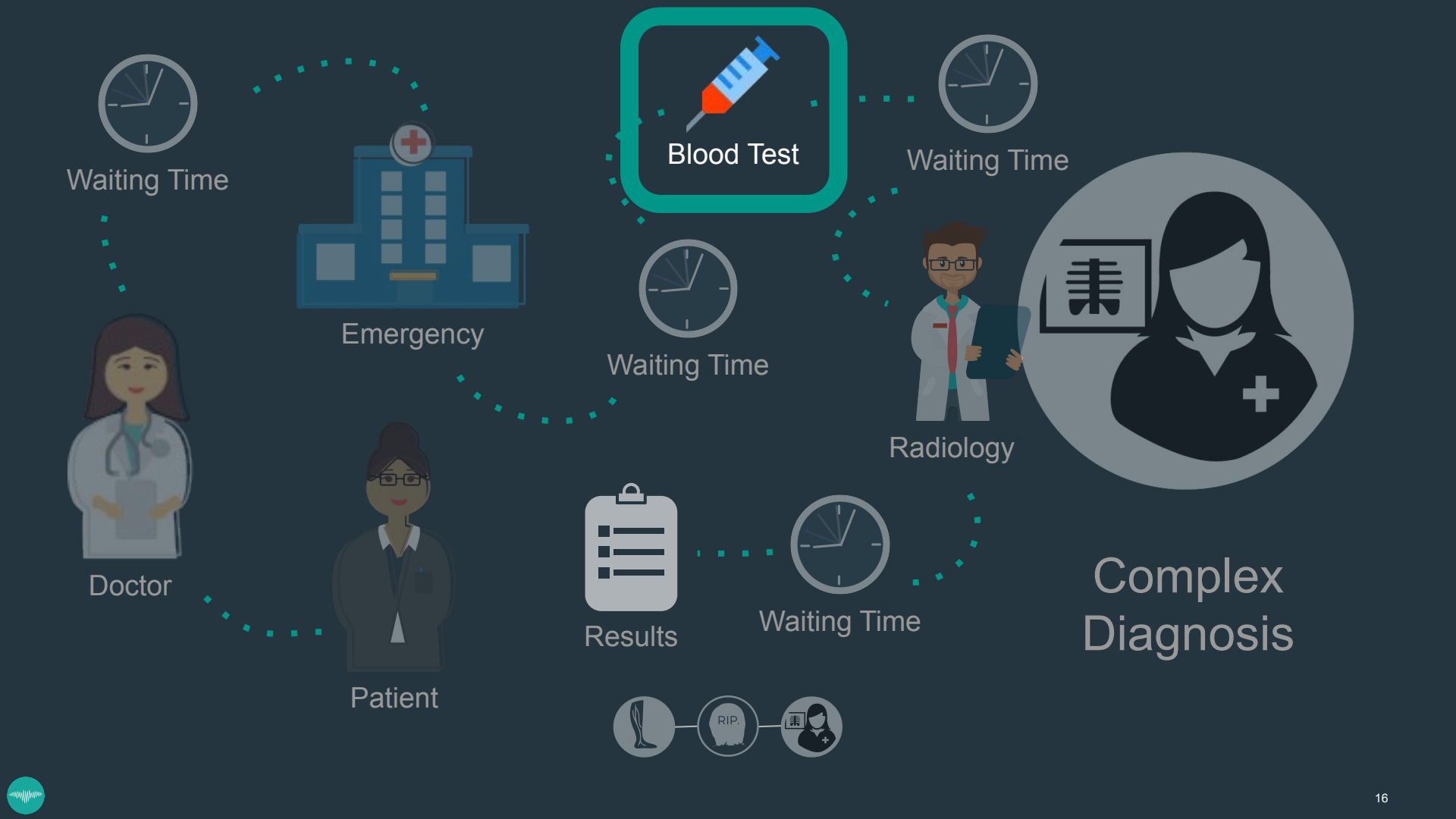
Patient

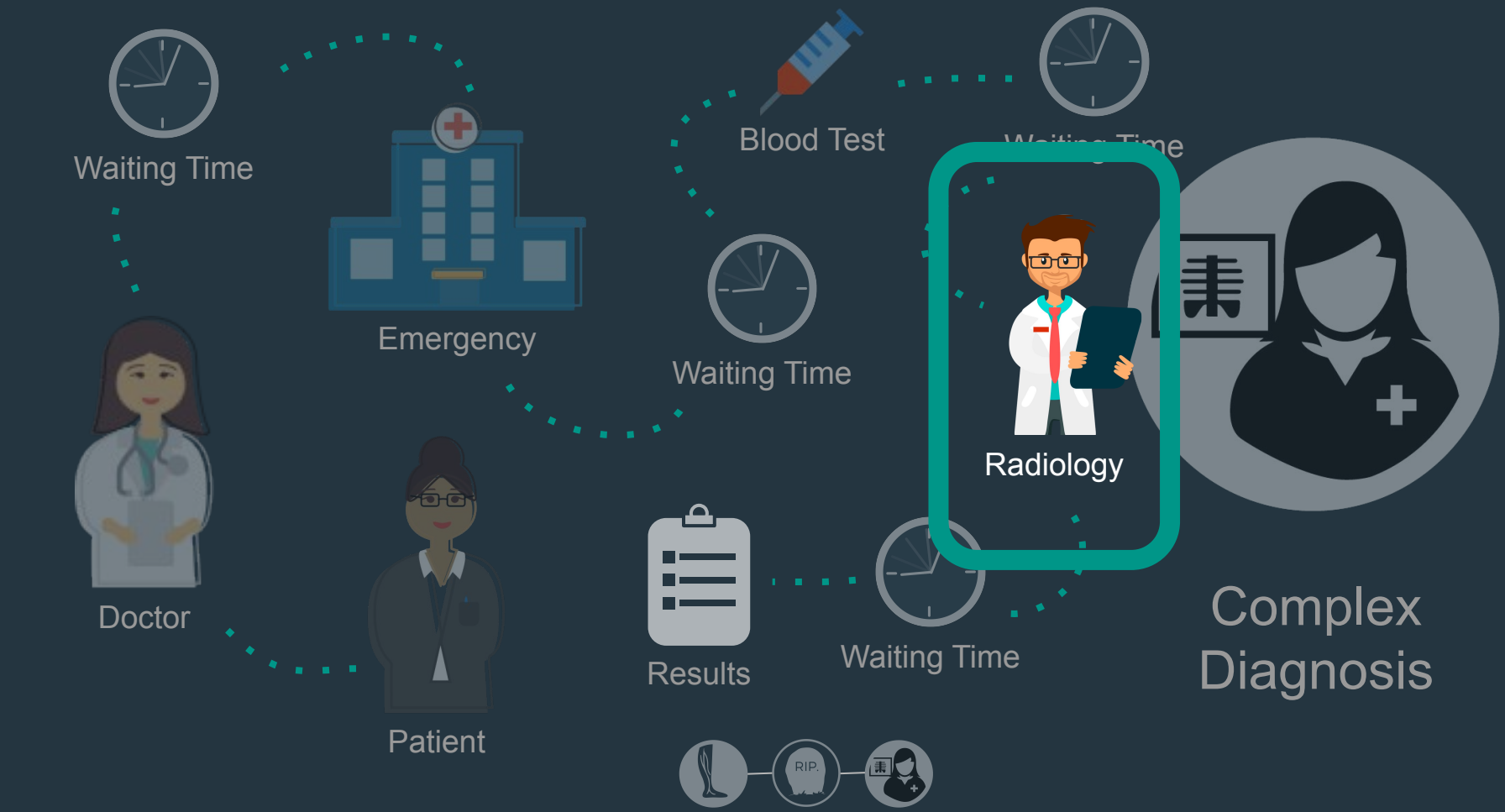
Results

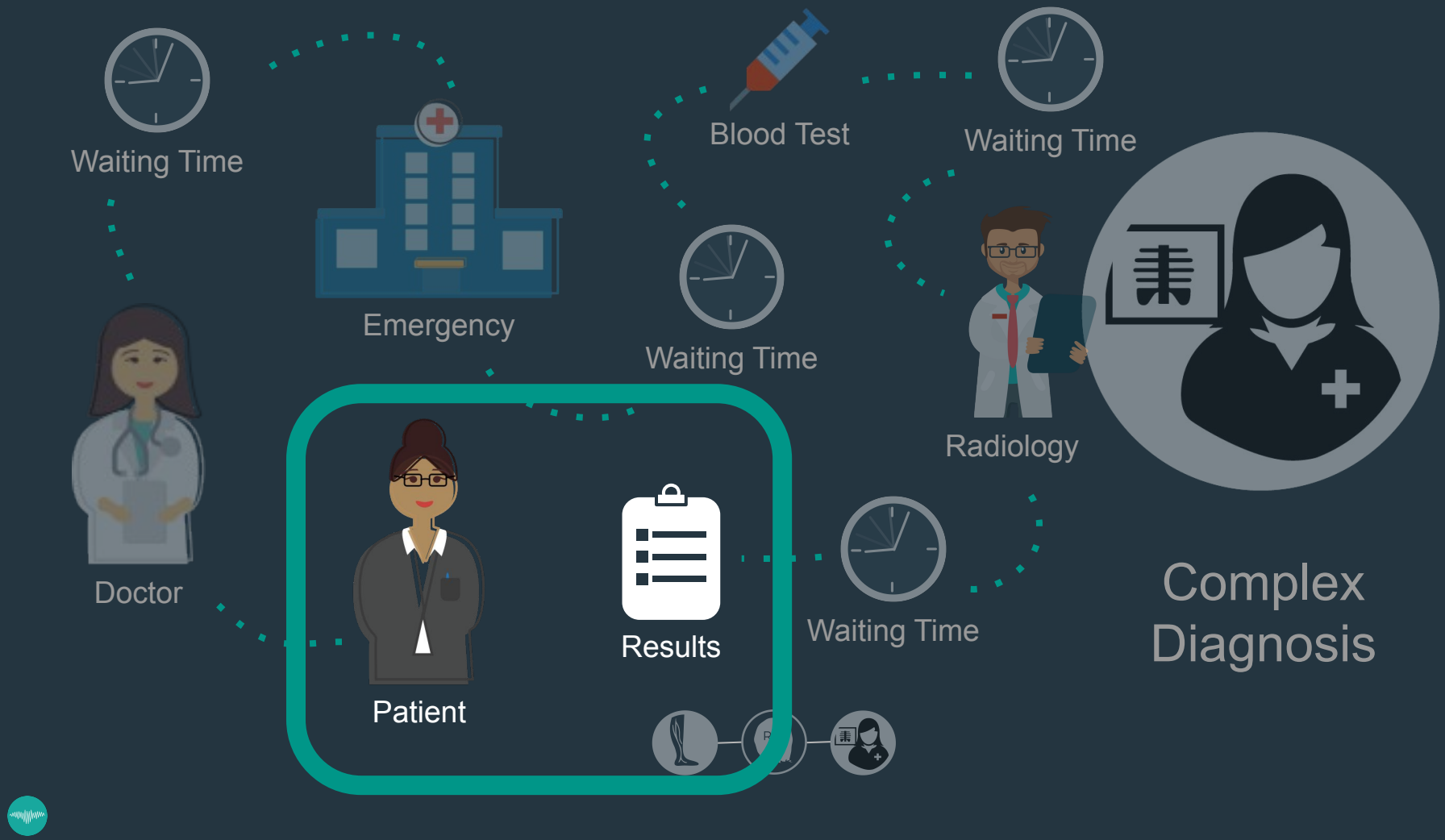
Waiting Time
Emergency
Blood Test
Waiting Time
Waiting Time
Radiology
Doctor
Patient
Results
Waiting Time
RIP.
Complex Diagnosis


Waiting Time
Emergency
Blood Test
Waiting Time
Waiting Time
Radiology
Doctor
Patient
Results
Waiting Time
RIP.
Complex Diagnosis

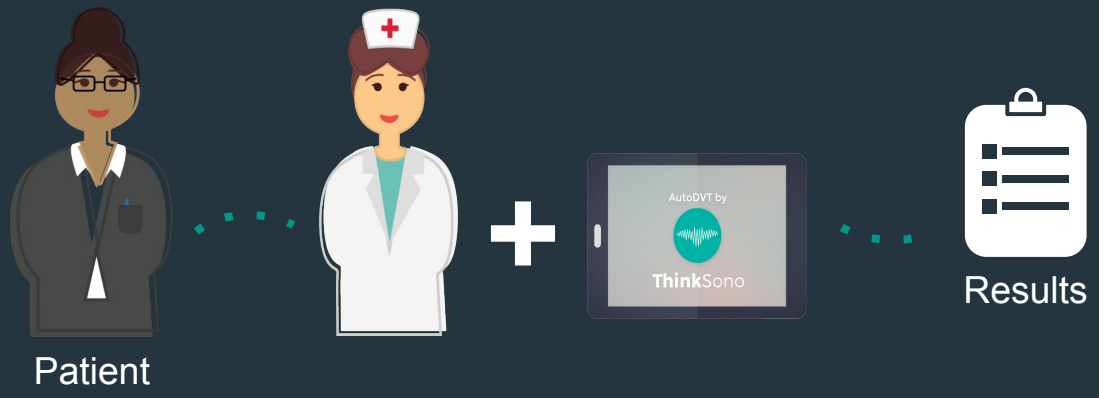

Waiting Time
Emergency
Blood Test
Waiting Time
Waiting Time
Radiology
Doctor
Patient
Results
Waiting Time
Complex Diagnosis
RIP.


Waiting Time
Emergency
Blood Test
Waiting Time
Waiting Time
Radiology
Doctor
Patient
Results
Waiting Time
Complex Diagnosis
RIP.


Waiting Time
Emergency
Blood Test
Waiting Time
Waiting Time
Radiology
Doctor
Patient
Results
Waiting Time
Complex Diagnosis
RIP.


Waiting Time
Emergency
Blood Test
Waiting Time
Waiting Time
Radiology
Doctor
Patient
Results
Waiting Time
Complex Diagnosis

New patient journey from symptoms to final diagnosis



Leveraging Portable Ultrasound

Philips Lumify
lumify.philips.com

Clarius Mobile Health Corp.
clarius.me

Software Architecture

Product Design

User Experience and Interaction

EU and USA Healthcare Systems

Team Building and Leadership

Deep Learning

Grant Support

Certification and Regulation

Fund Raising

Reimbursement Systems and Insurances

Disease Management and Guidelines

Patents & IP Rights

Partnerships

Clinical Protocols

Clinical Trials

Medical Research

Patient Consent

Software Architecture

Product Design

User Experience and Interaction

EU and USA Healthcare Systems

Team Building and Leadership

Deep Learning

Grant Support

Certification and Regulation

Fund Raising

Reimbursement Systems and Insurances

Disease Management and Guidelines

Patents & IP Rights

Partnerships

Clinical Protocols

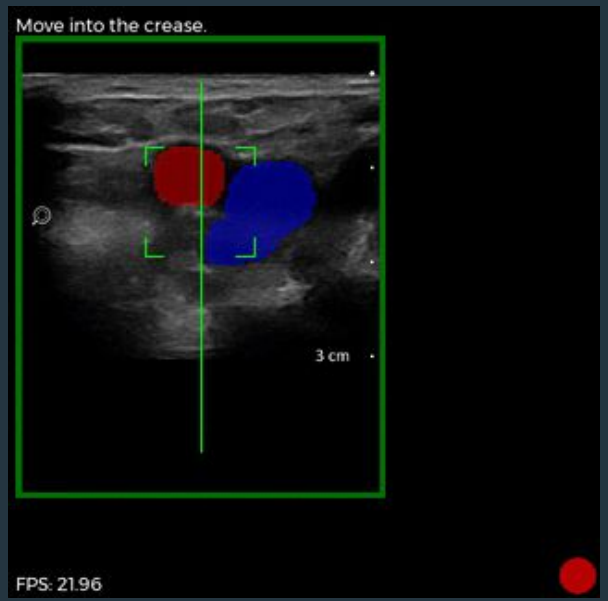
Clinical Trials

Medical Research

Patient Consent

AutoDVT: Real-Time Image Analysis

Raw Ultrasound



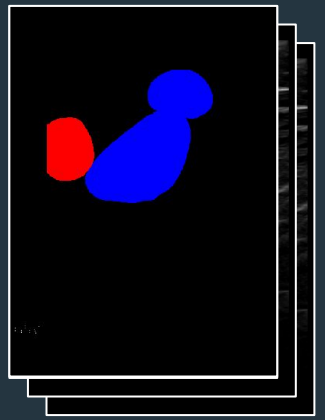
AutoDVT – Expert Mode

AutoDVT – Novice Mode

Note: No Doppler used.

Image Sequence

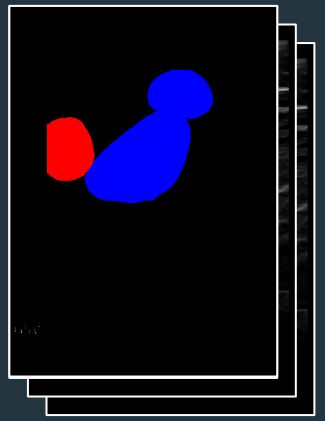
Deep Learning Model



Segmentation Sequence

Image Sequence

Deep Learning Model



Segmentation Prediction

Manual Segmentation Labels

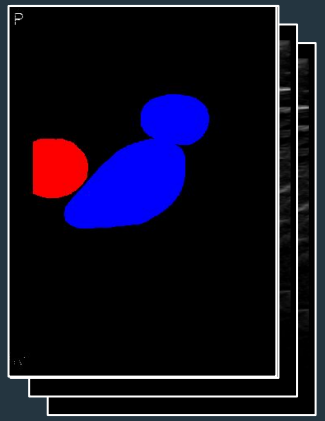
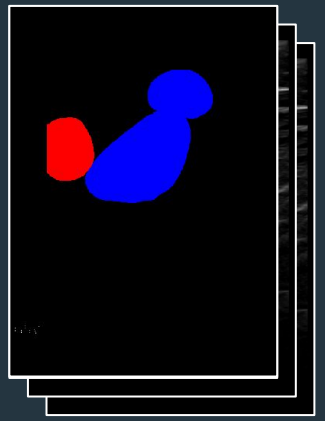


Image Sequence

Deep Learning Model



Segmentation Prediction

Manual Segmentation Labels

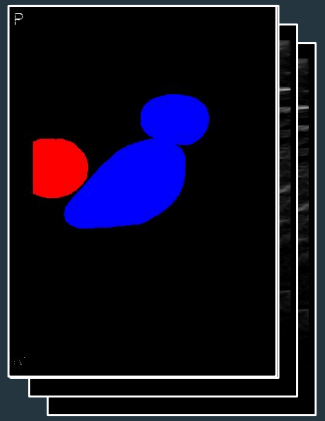
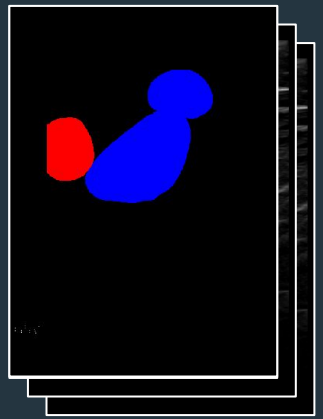


Image Sequence

Deep Learning Model

Compare label and prediction



Segmentation Prediction

Manual Segmentation Labels

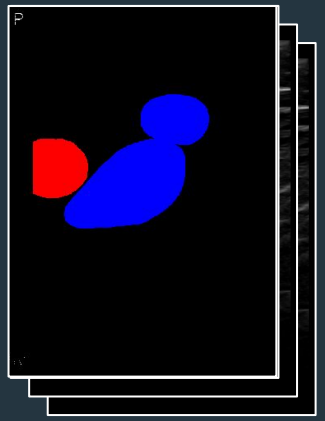
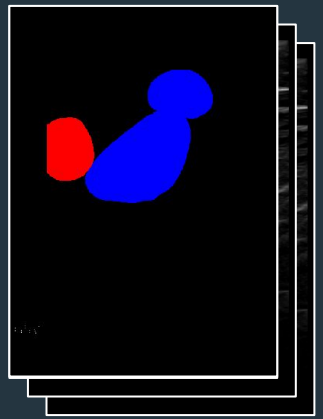


Image Sequence

Deep Learning Model

Error / Loss

Compare label and prediction

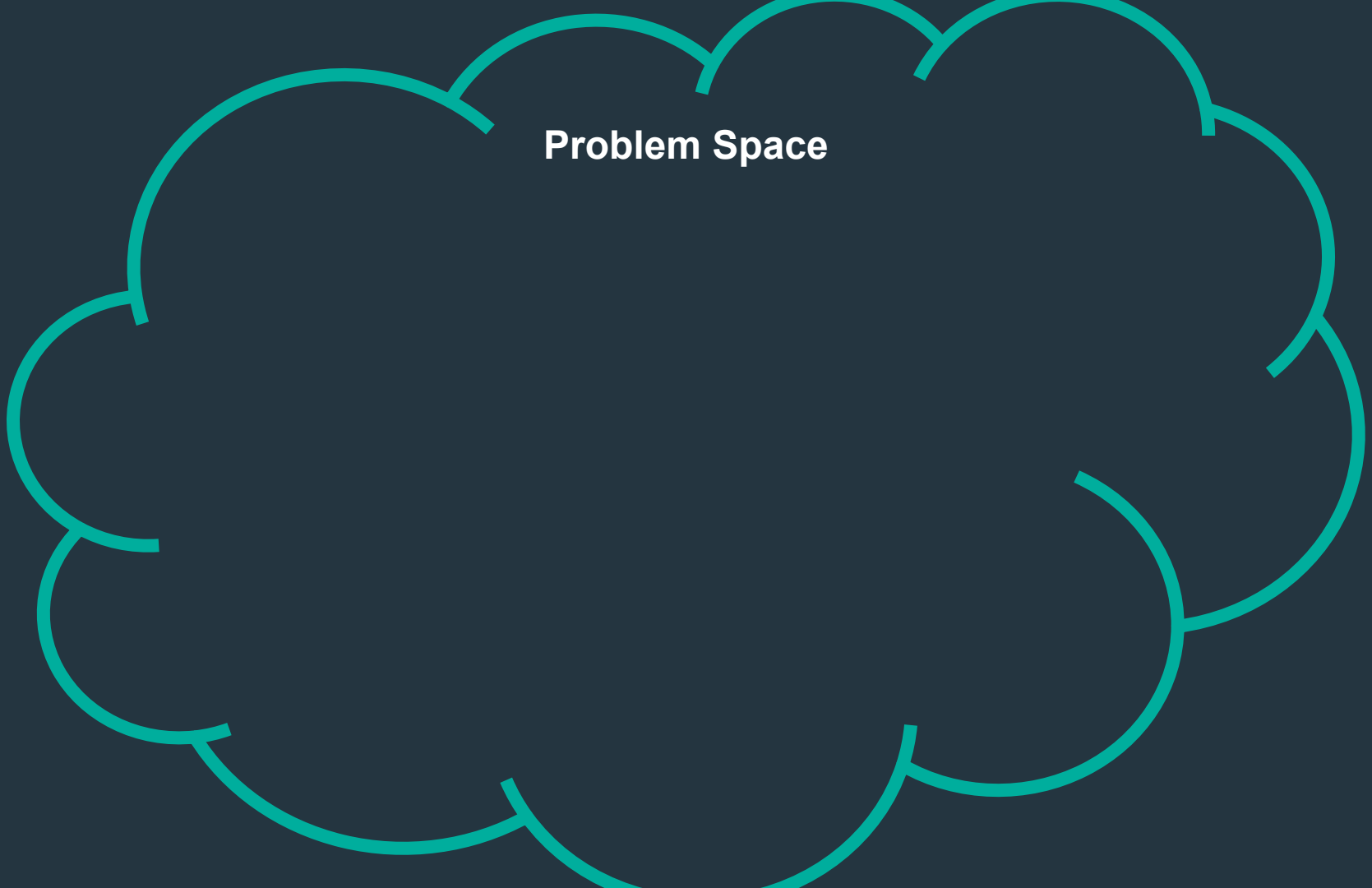


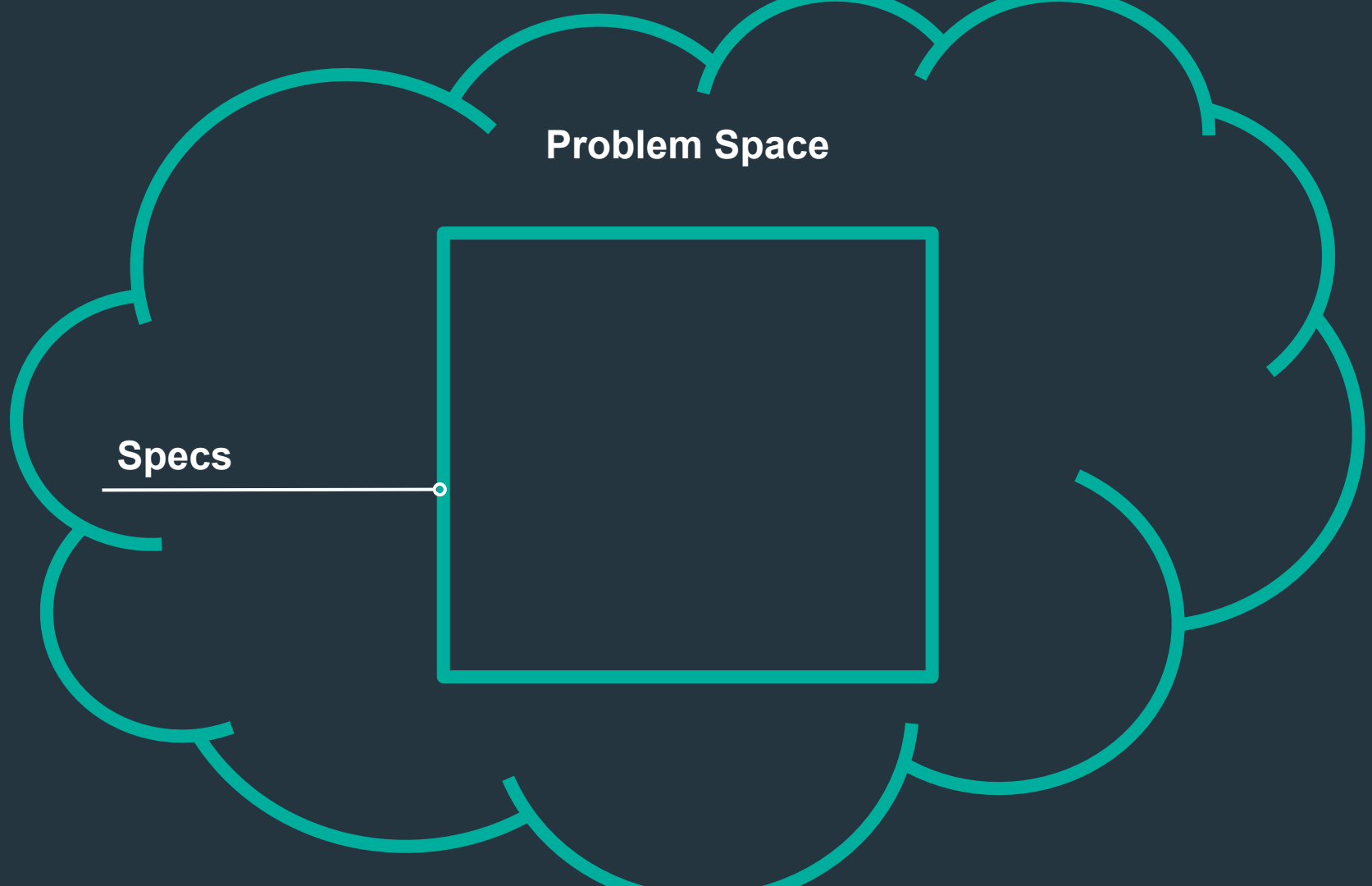
Segmentation Prediction

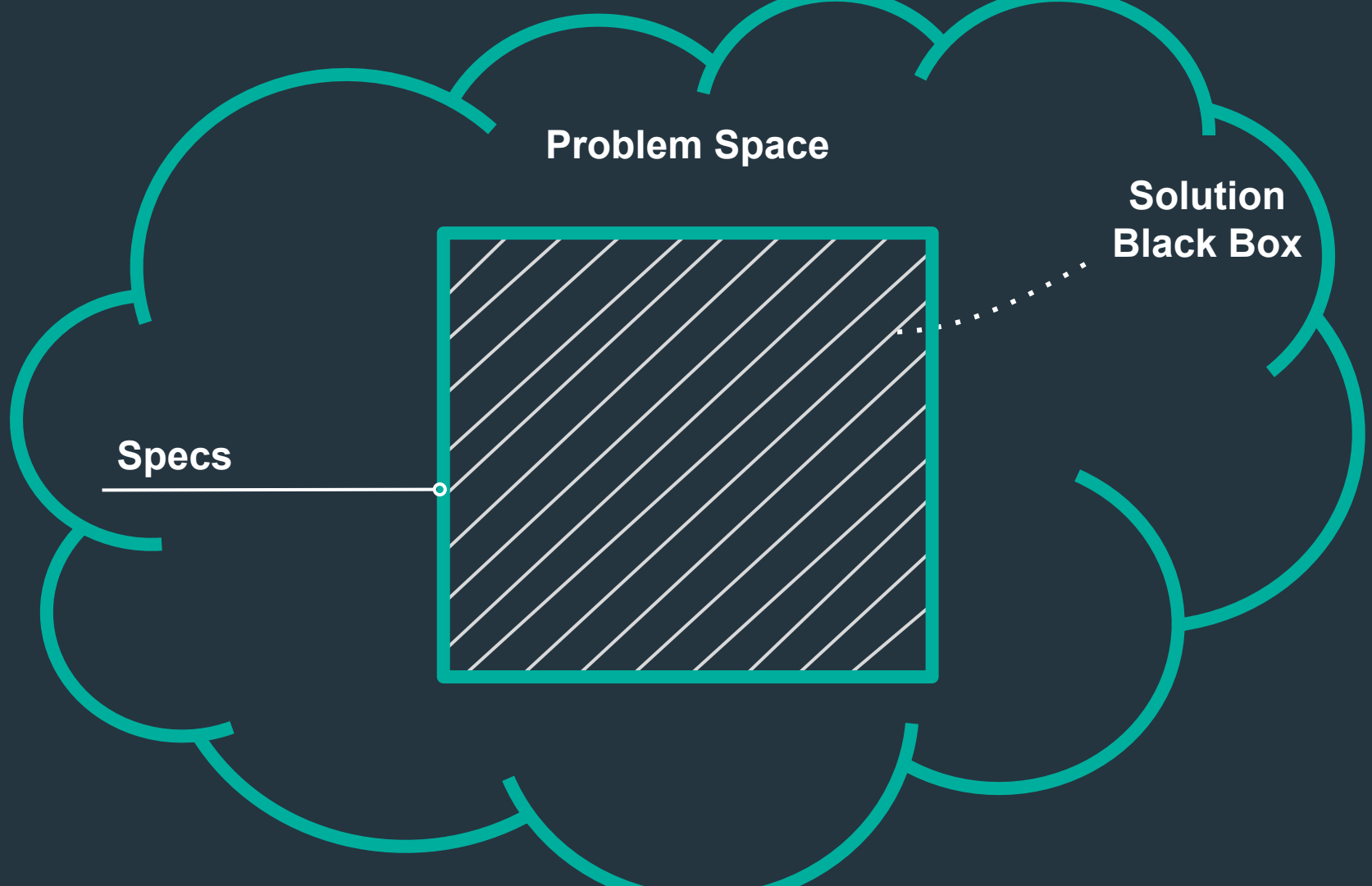
Should we* use Deep Learning?

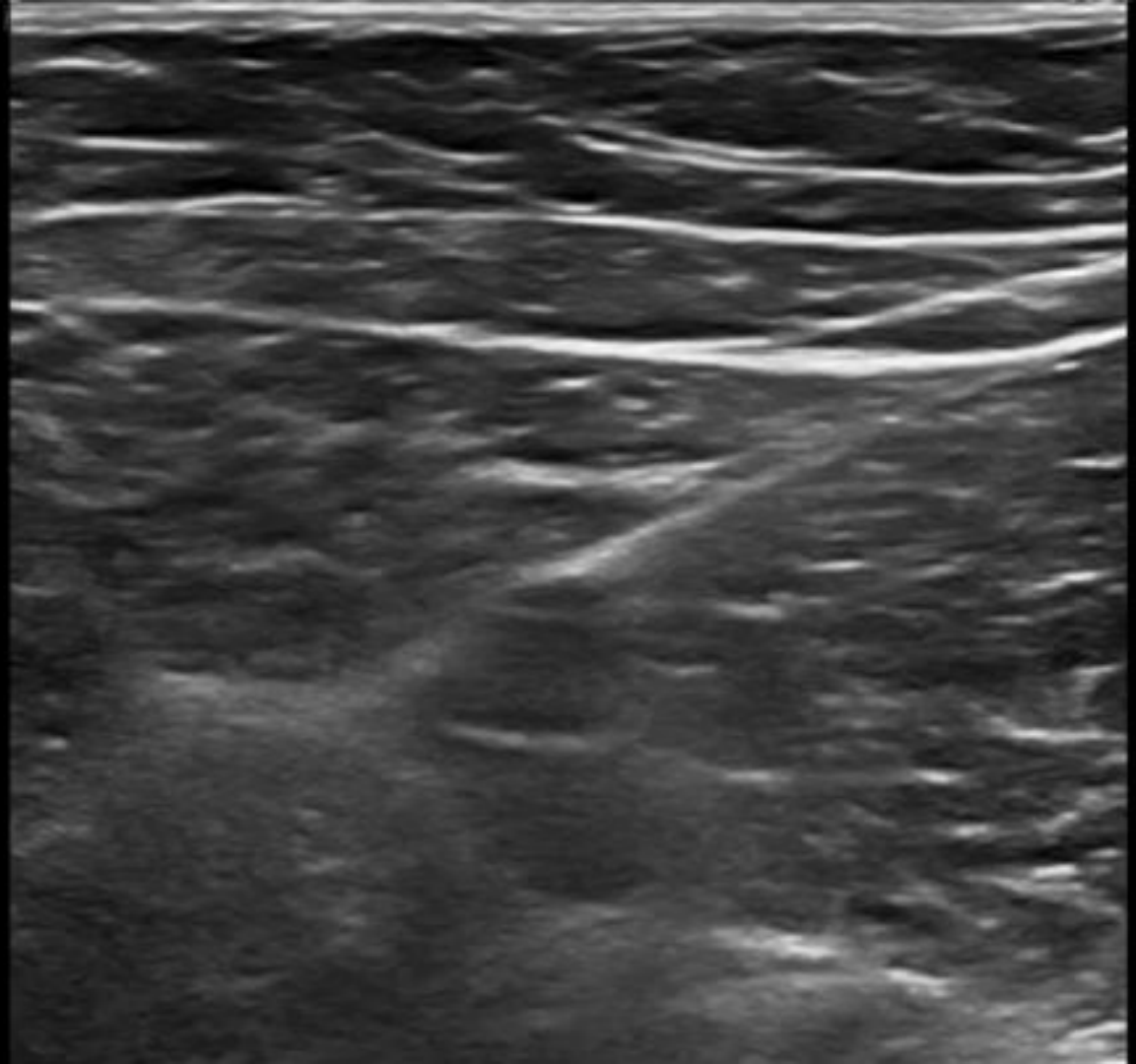
* ThinkSono

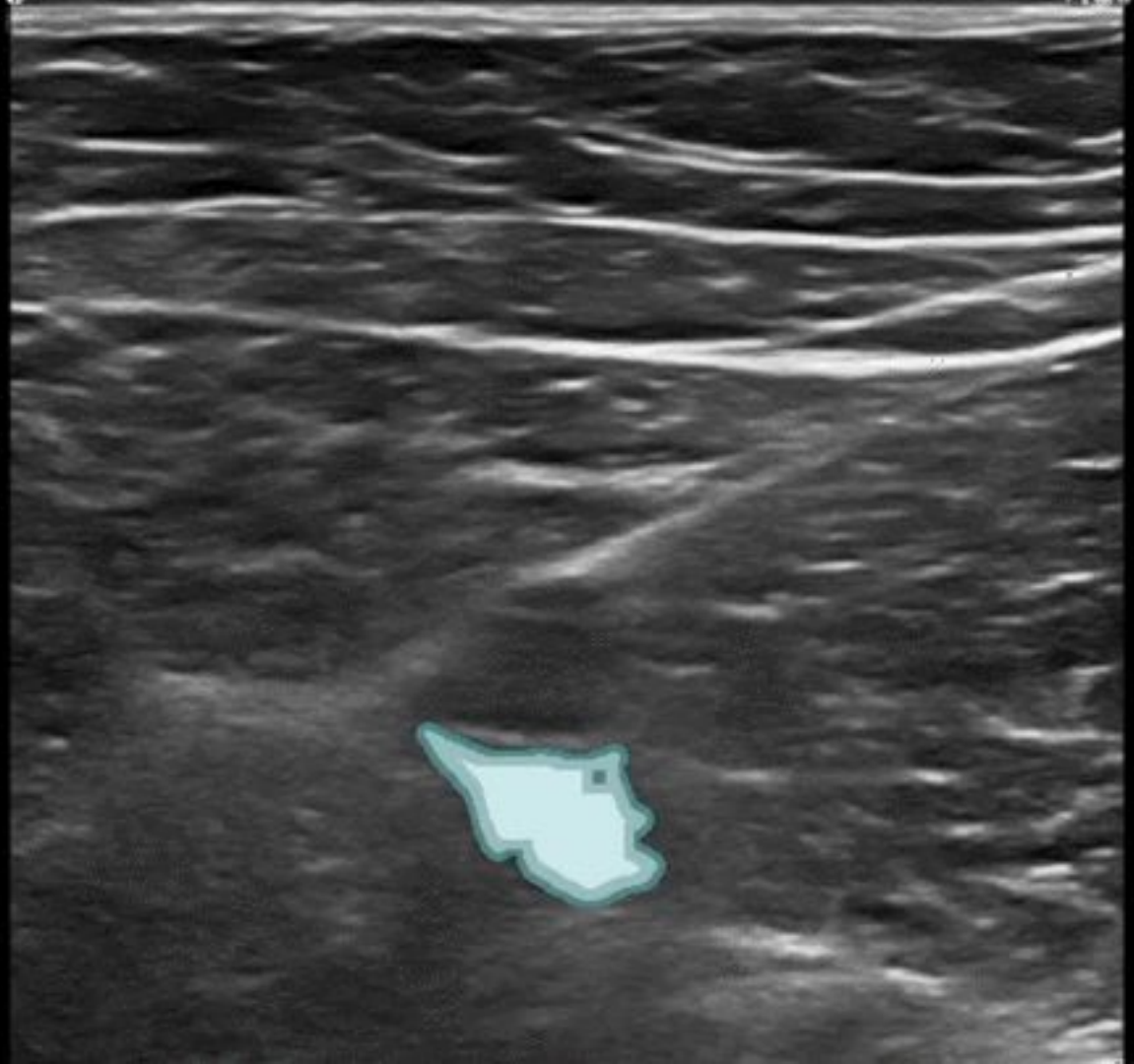
Problem Space




Problem Space
Specs


Problem Space
Solution
Black Box
Specs





Anatomy Detection

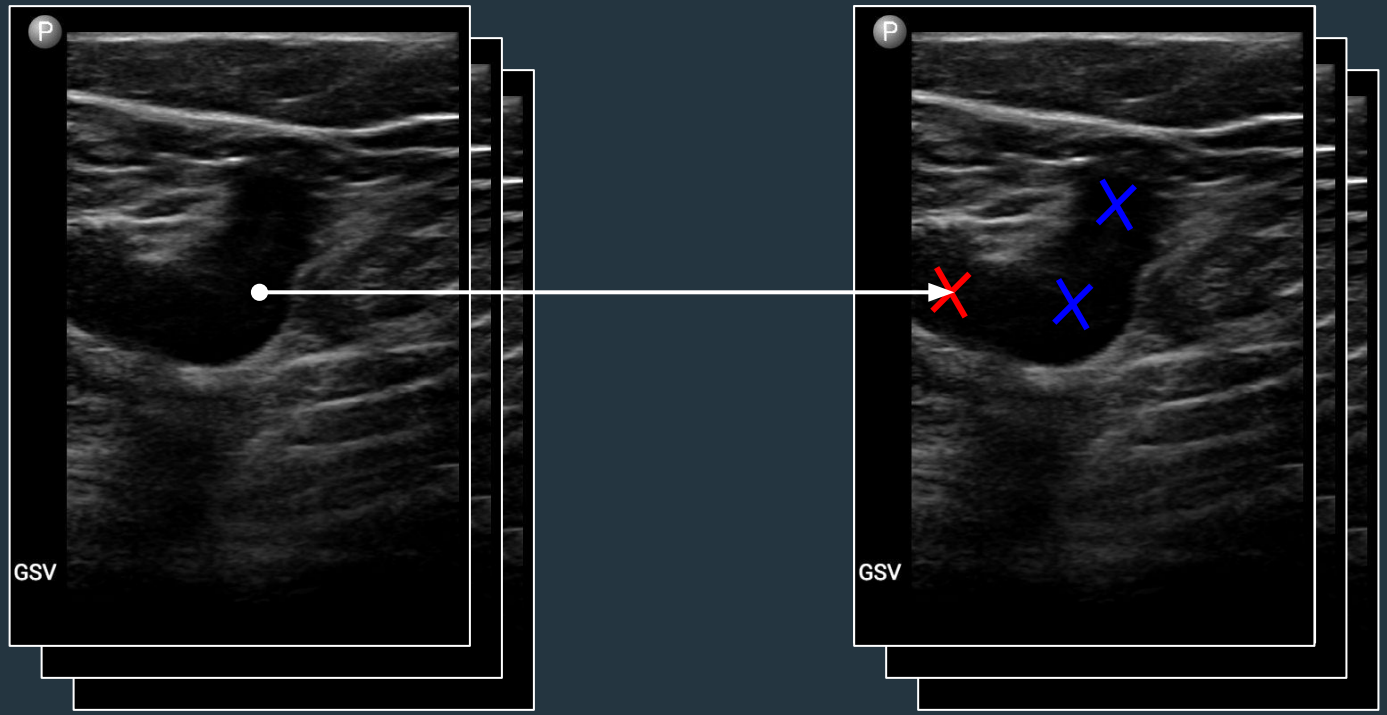
Vessel Segmentation

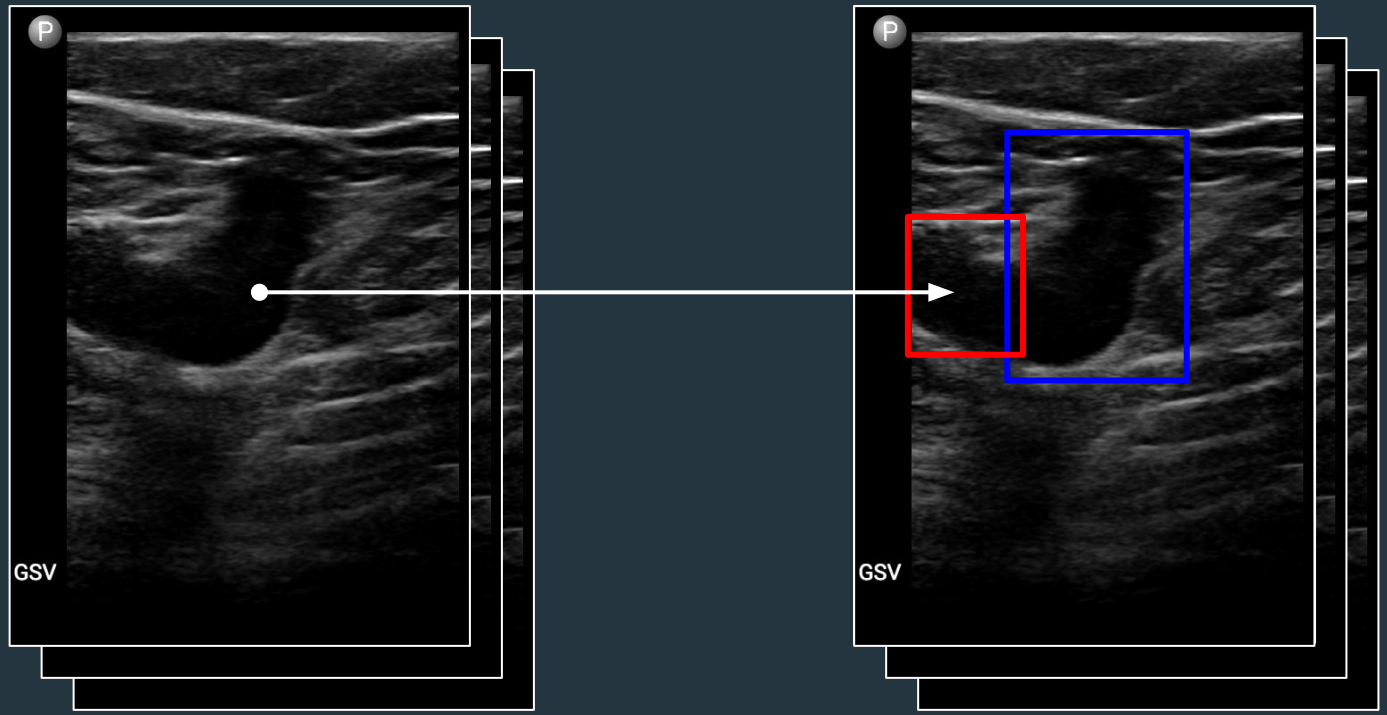
Real-time Sequences

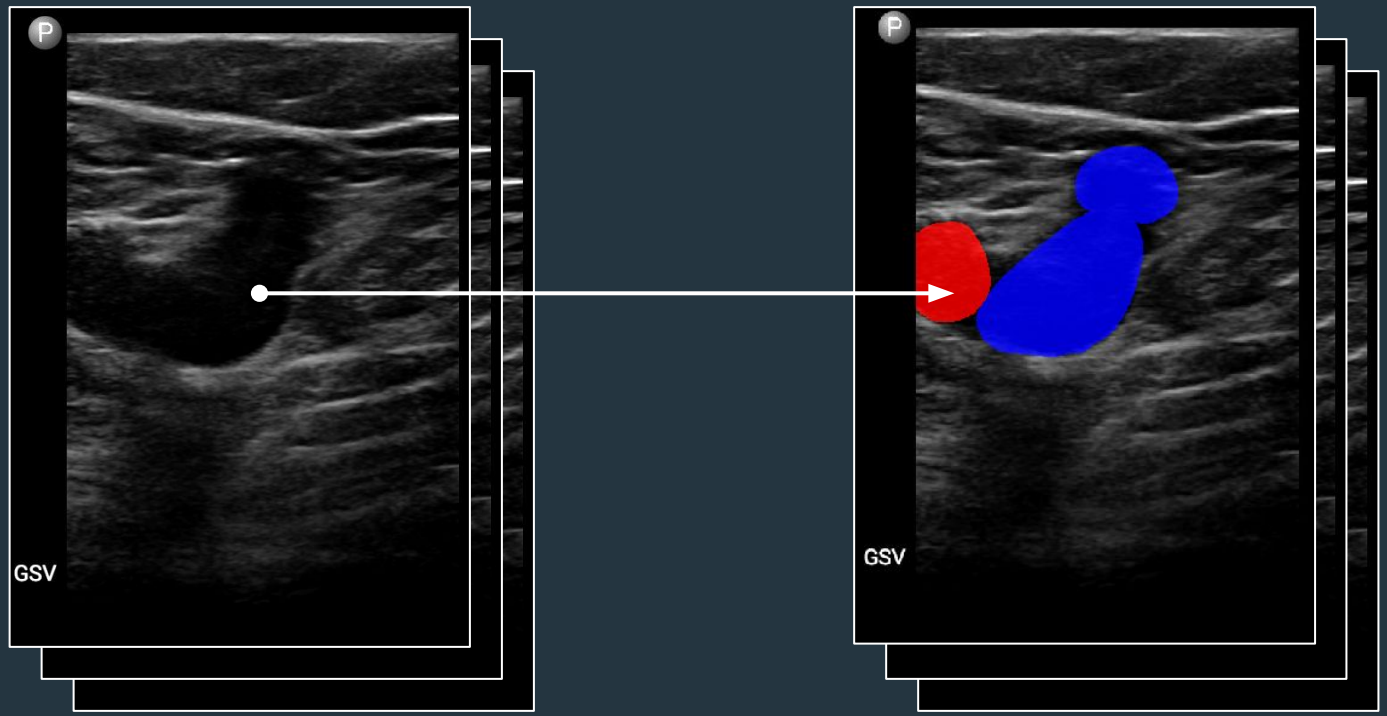
Dr. Bernhard Kainz
Lecturer Imperial College London
Biomedical Image Analysis Group
Scientific Advisor at ThinkSono

A huge dataset is required.

- Representative
- Variable
- Labeled


P
GSV
P
GSV


P
GSV
P
GSV


P
GSV
P
GSV

Human not needed.

Human ~~not~~ still needed.

Dr. Ramin Mandegaran
Radiologist
University of Alberta, Canada
Guy's and St Thomas Hospital, London

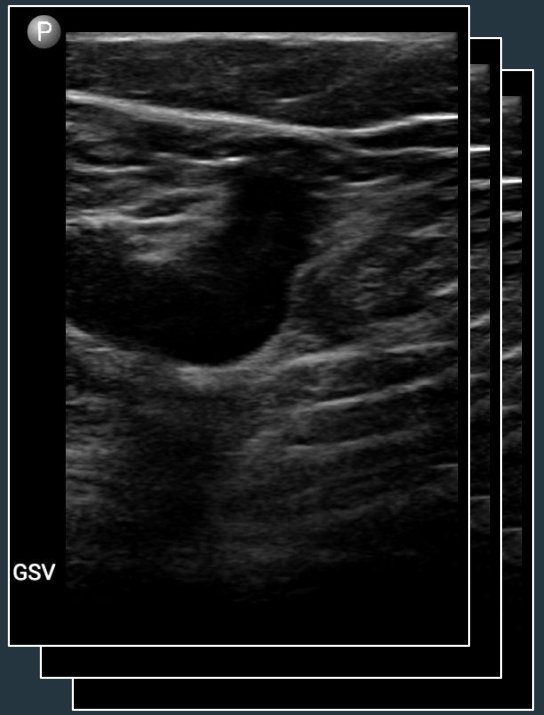
Do you trust it though?

But it's a black box!

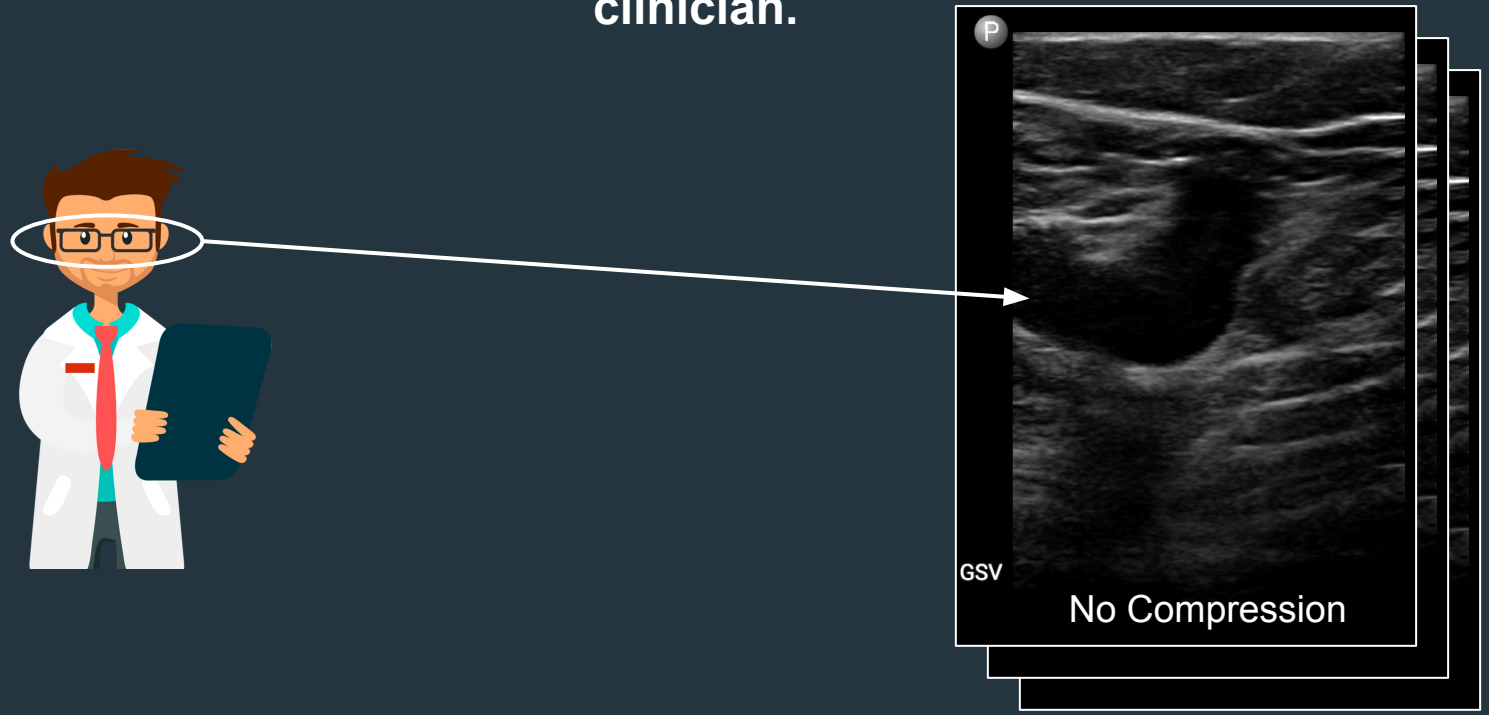
Make it understandable for the engineer.

Make it understandable for the clinician.

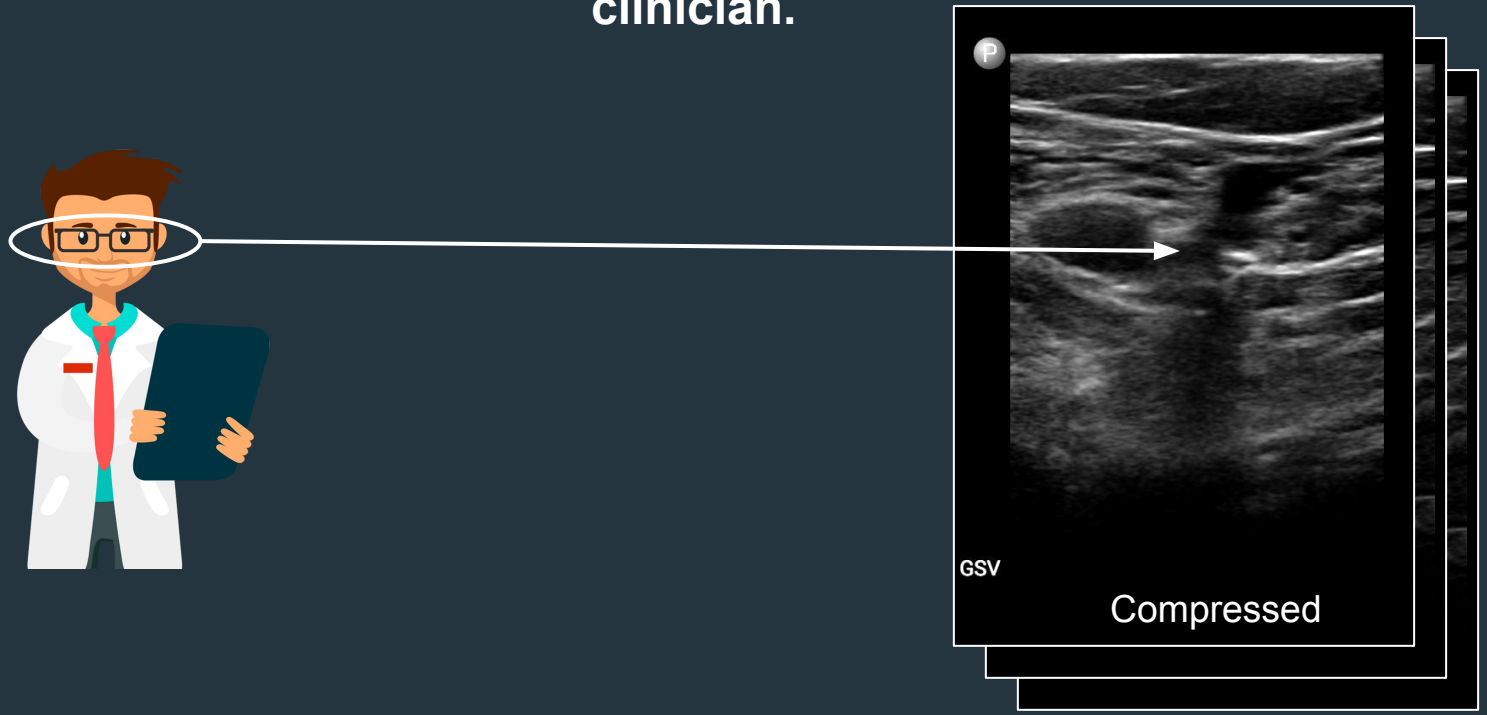
Make it understandable for the clinician.



Make it understandable for the clinician.

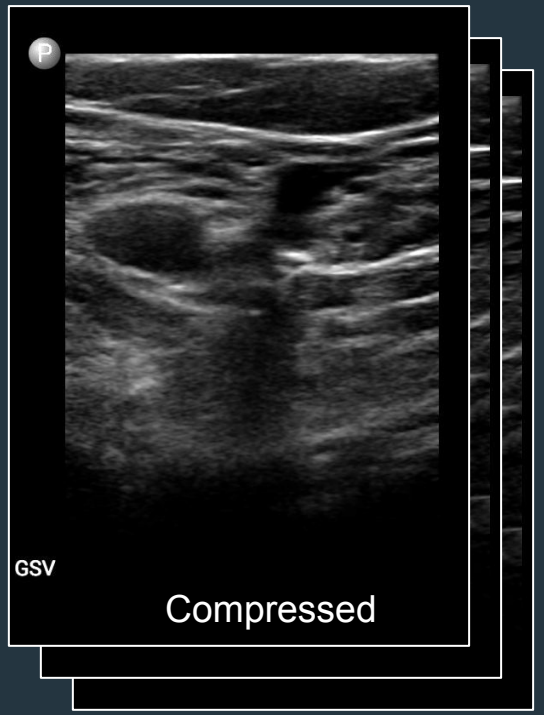


Make it understandable for the clinician.

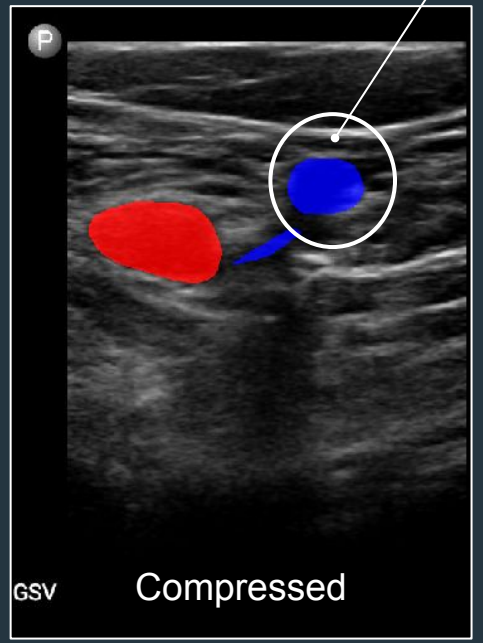


Make it understandable for the clinician.

Thrombosis present.



Make it understandable for the clinician.



CoCoAI

Cooperative and **Co**mmunicating **AI** methods for medical image-guided diagnostics addressing ethical, social & user-data-interaction challenges

Prof. Dr.
Mattias Heinrich
(Medical Deep Learning, Project Coordinator)

Dr.-Ing.
Christian Herzog
(Head of Engineering Ethics Lab)

Prof. Dr. rer. nat.
Thomas Franke
(Engineering Psychology and Cognitive Ergonomics)

UNIVERSITÄT ZU LÜBECK

Deep Learning is a* tool.

* fantastic

Hiring and Product Development

Build first product, ready to be certified.

2017/18/19

Certification

Trials to prove product safety and accuracy.

2020

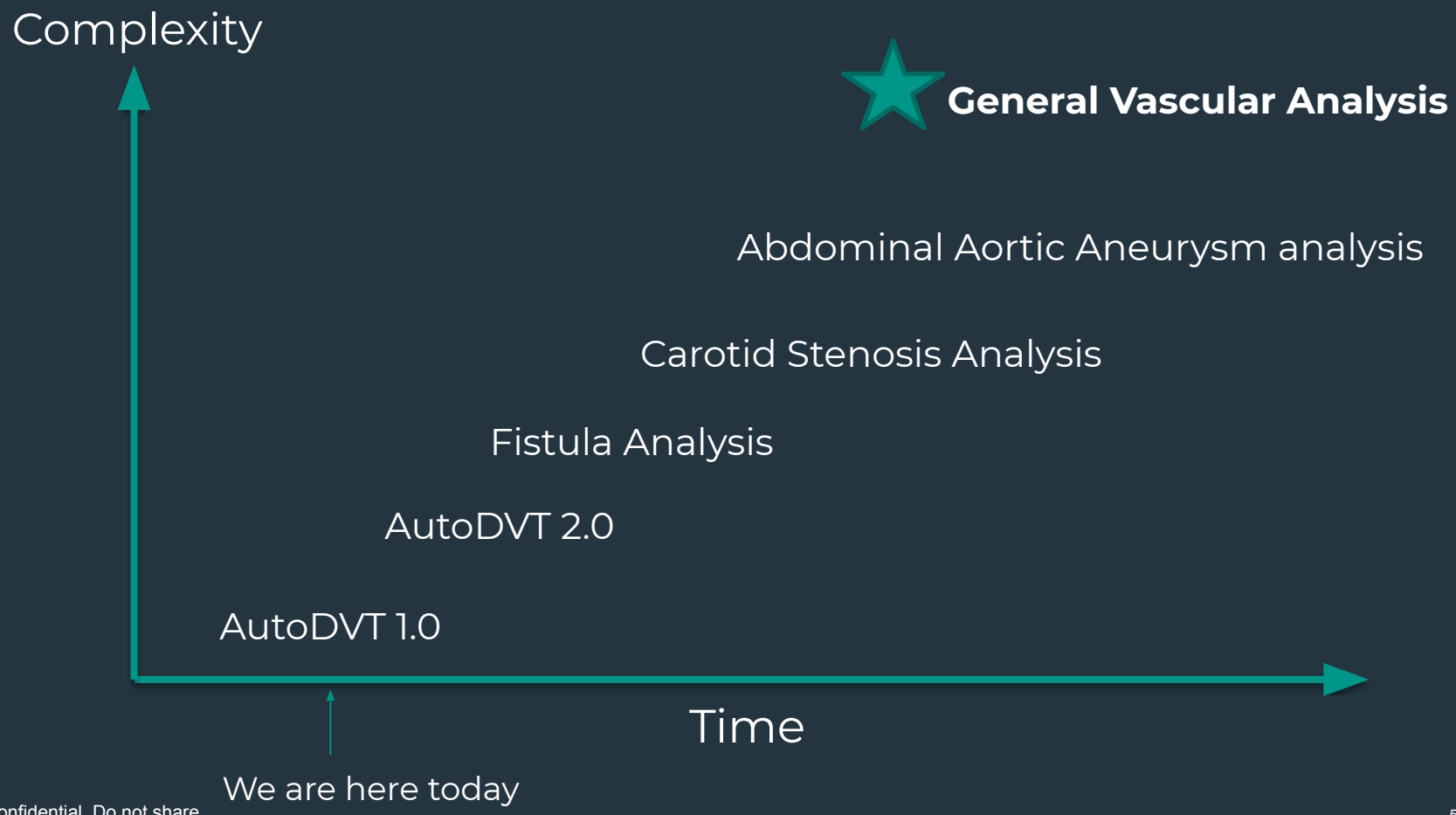
Growth

Convert hospitals we are working with right now and close new opportunities.

2021

57

Growth map



Strictly confidential. Do not share.

ThinkSono

ThinkSono

Point of Care DVT Diagnosis

Get in touch! :)

Contact

Sven Mischkewitz
sven@thinksono.com
www.thinksono.com