AZ Delta's journey towards data-driven healthcare

Challenges and opportunities when engineer meets physician

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RADAR azdelta

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Why AI in Healthcare?

Growing need for decision support

- Exploding volume of multimodal clinical data (images, notes, ECGs, labs, wearables, pathology …)
- Increasing need for workflow optimization
- Clinicians need fast, reliable insights at the point of care

Why AI in Healthcare?

AI as an enabler

- Transforms raw data into meaningful insights
- Combines expertise and experience from multiple clinicians
- Helps optimize treatment pathways
- Supports early detection and personalized care

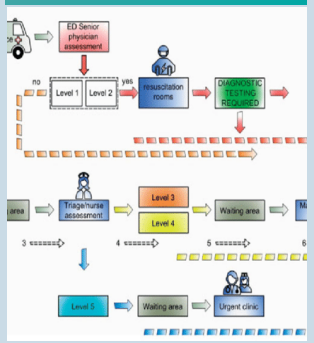
RADar

Focus: Data and Research & Innovation (R&I)

Our focus on Data and R&I is crucial for the future of our hospital and our patients.

RADar COMMITTEE

RADar EXECUTIVE COUNCIL (REC)

EVENTS & BRANDING	LEARNING & DEVELOPMENT	DATA	CLINICAL STUDIES	RESEARCH & INNOVATION	PROCESS TECHNOLOGY	PARTNERSHIPS
				16 innovatieprojecten in uitvoering		

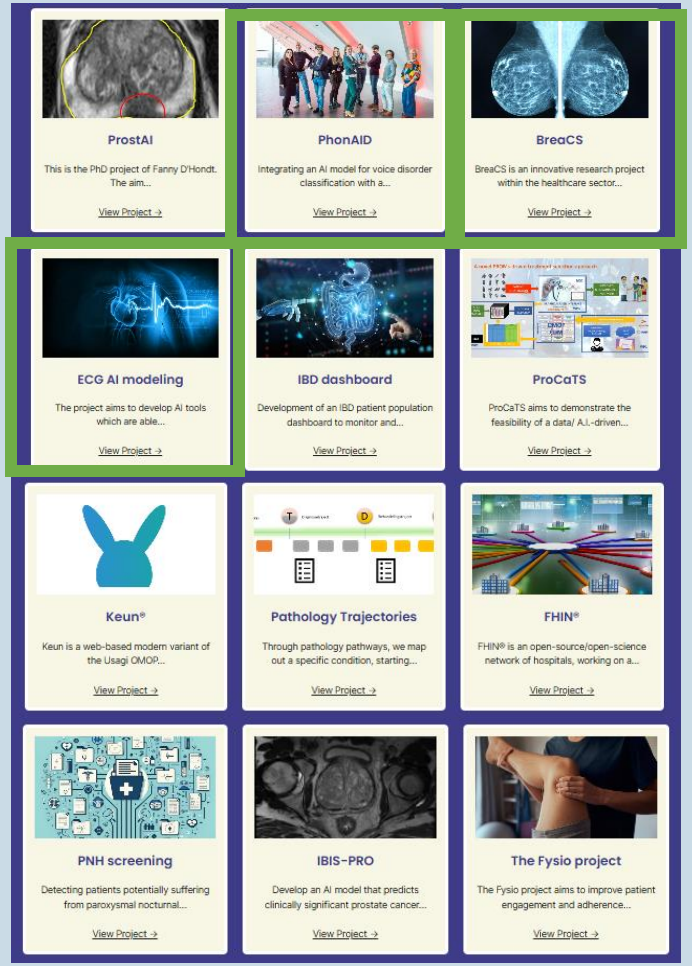
azdelta + [ ] = RADAR

How does RADar work?

- Learning and Innovation Centre AZ Delta, 2020, business unit AZ Delta
- RADar: **Revolutionary Algorithms & Data – actionable results**

- **Data use** to support **optimal care & treatment of patients.**
- **Treasure of knowledge and insights - multimodal data**: images, text, ECGs, lab results, wearables, tissue slides,…
- **AI-based predictions.**
- 11-member **multidisciplinary** innovation team focused on **research**.
- Starting point: **clinical research questions originating from physicians.**

- **Funding** (Vlaio, FOD, AZ Delta, grants, Belspo, etc.).
- **From research to valorization:** research > development > implementation.



Get to know our projects:
www.radarinnovationcenter.com

AZ Delta Central Repository

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IT STARTS WITH ACCESS TO OUR OWN DATA...

EXTERNAL SOURCES

HOSPITAL SOURCES azdelta

BRONZE – SENSITIVE RAW

Pseudonymization, Informed Consent

Pseudonymization, Informed Consent

BRONZE – PSEUDONIMIZED RAW

Data Standardization

RABGIN
VOCABULARY MANAGEMENT

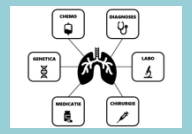
KEUN
MAPPING MANAGEMENT

Rabbit In A Blender

RiaB
AUTOMATED ETL

SILVER – CDM1 Data

Data Cleaning, Context handling and derived information



HEALTHCARE PROCESS REFERENCE DATASET

GOLD – CDM2 Information

Internal & External Request Handling, Data Access registration and Follow-up

Governance

Google Cloud

Secondary Use

DATA SELF-SERVICE

DASHBOARDS

AI & ALGORITHMS

Apache Airflow

eHealth

GOVERNMENT REPORTINGS
FHIR Communication

MZG
MZG AI, benchmarking...

Other Secondary Use
...

...

The reality of real world data

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Challenge

- Physicians write short notes instead of structured data
- Efficiency vs usability for analysis
- Garbage in –> garbage out

Opportunity

- LLMs have become great at analyzing medical unstructured data
- LLM pipeline in development

Translating Algorithms into Clinical Reality

1. Clinical Validity

Does it improve patient outcome?

2. Actionability and Explainability

Are the results understandable and usable?

3. User-Friendliness and Integration

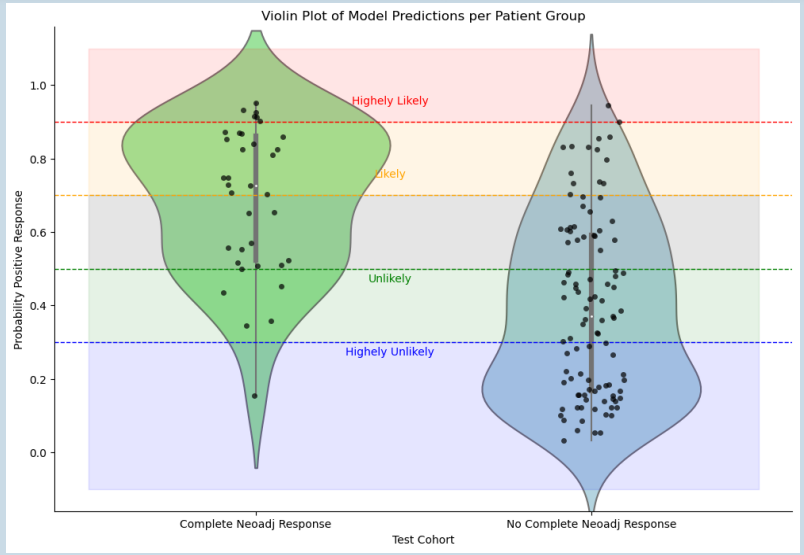
Is it practical and usable for clinicians?

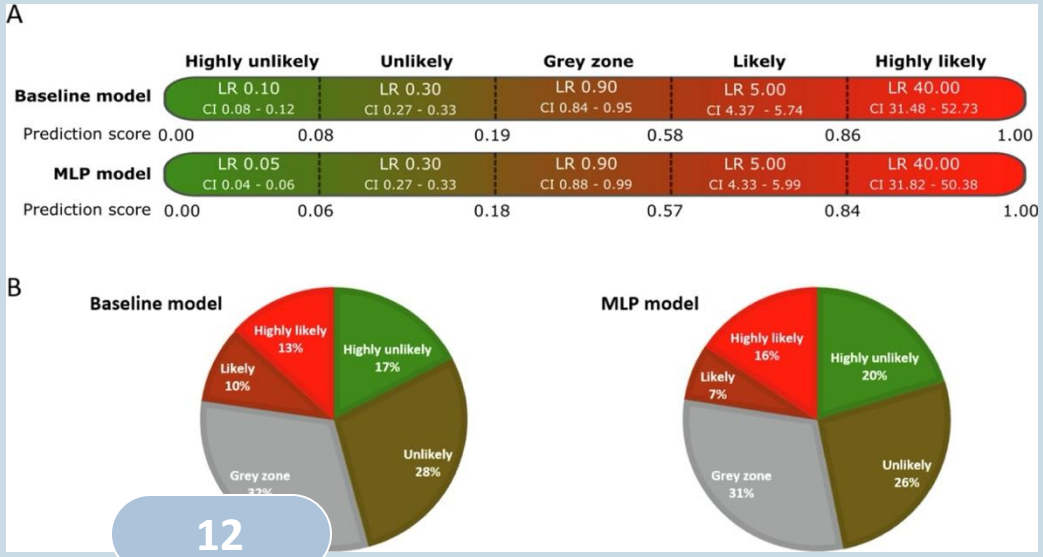
Clinical validity

In 2025, we launched our first clinical study at AZ Delta focused on ECG models, aiming to evaluate their clinical validity and impact within our own hospital environment.

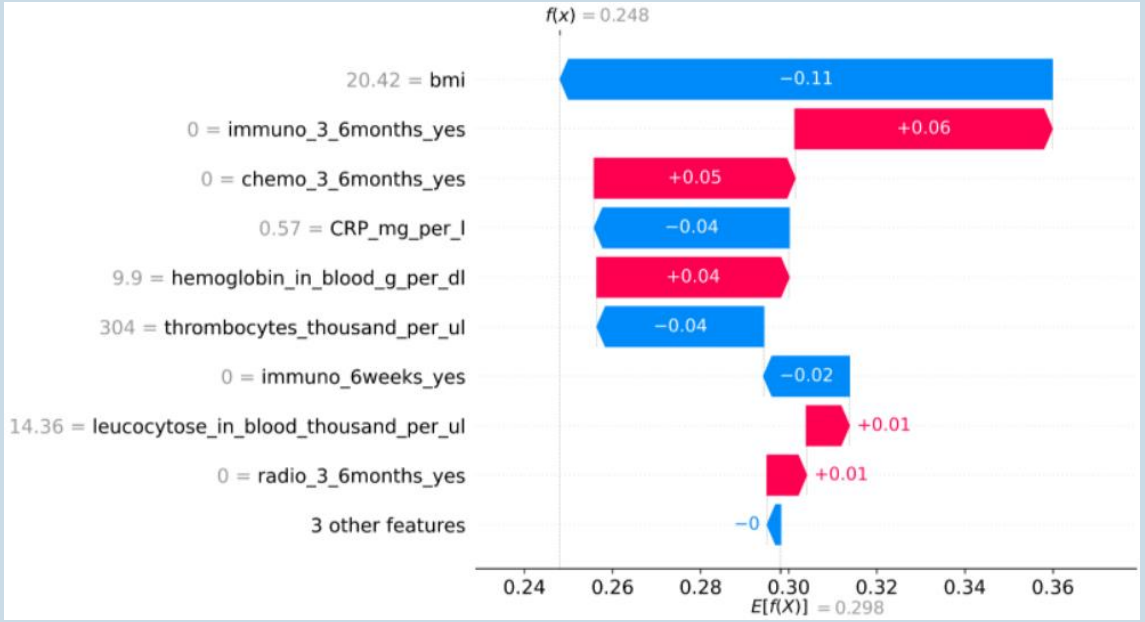
Actionability and explainability

1. Threshold
2. Action





2025: AI as diagnostic test - **The breakthrough!**



Our AI models are not only **accurate**, but also **explainable** and **actionable**. Physicians can understand how the AI reaches its conclusions and directly use the results in diagnosis and treatment selection.

User-Friendliness and Integration

2024: Integration in Sectra-PACS
2025: First integration in HiX

RADar solutions are to be seamlessly **integrated** into AZ Delta's existing IT systems, such as Sectra PACS and HiX. This makes it **easy** and **efficient** for physicians to use the AI tools within their **daily** workflow.

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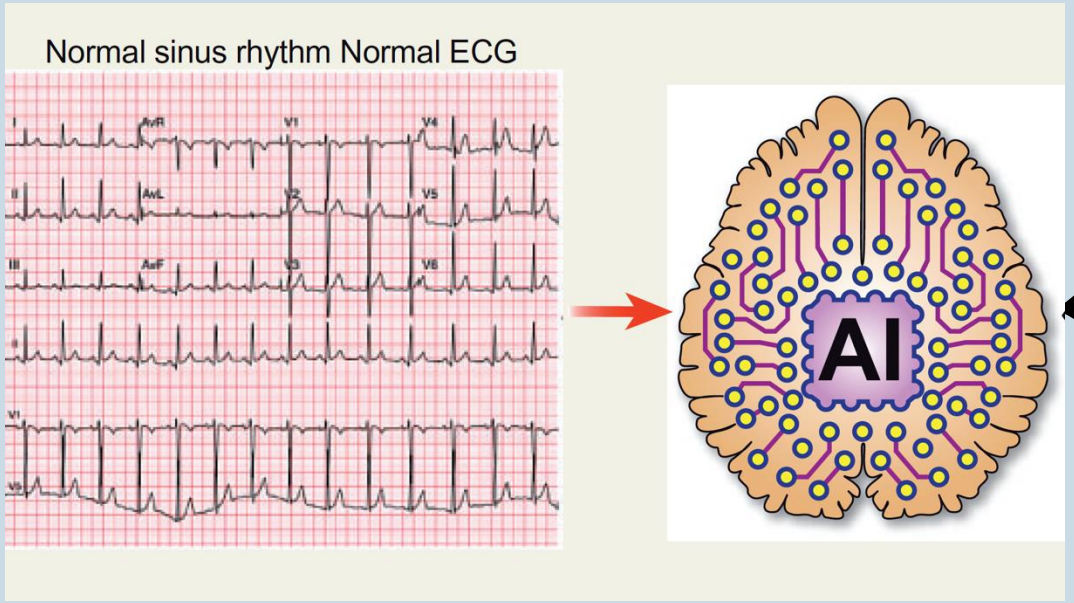
Use Cases

Cardiac Suite



Low ejection fraction & diastolic dysfunction

Biological age

Cardiac amyloidosis

Hypertrophic cardiomyopathy

Aortic Stenosis

Gender and ethnicity

Risk of atrial fibrillation

Hyperkalemia

Cirrhosis

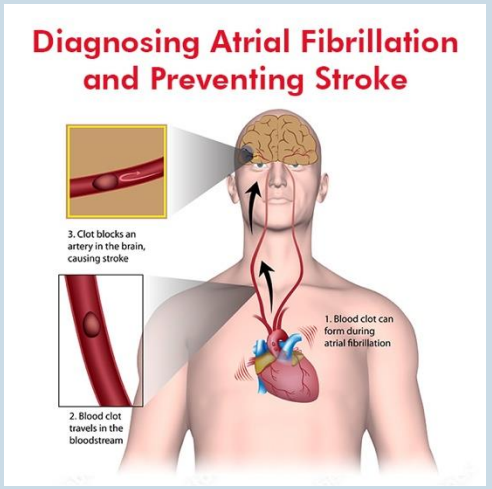
Zachi A et al, European Heart Journal (2021) 00, 1–15

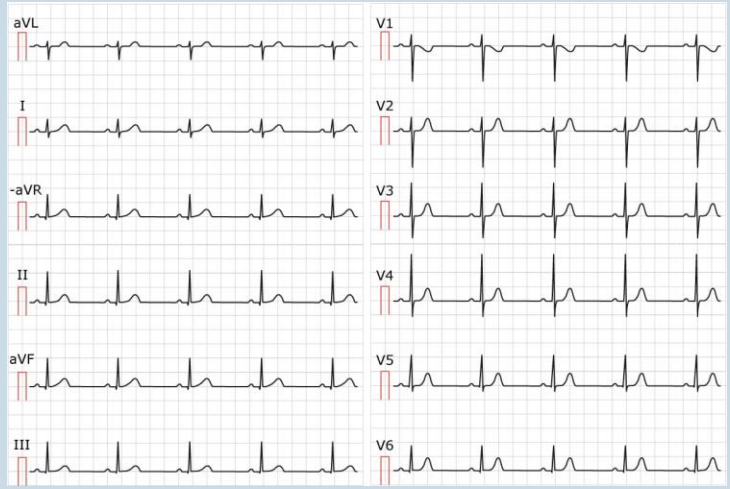
Early detection atrial fibrillation

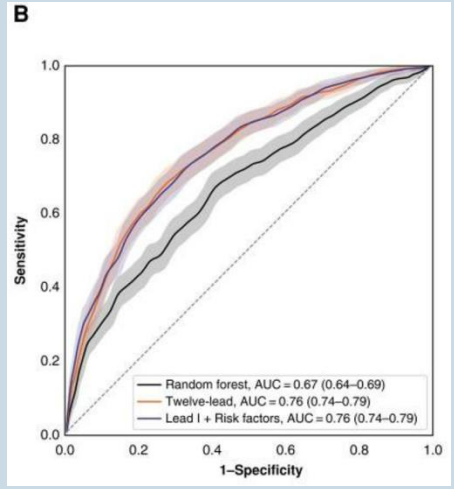
- Research question: Can we detect atrial fibrillation from a sinus rhythm ECG?
- Goal: Atrial fibrillation causes 6,000 strokes per year in Belgium. The goal is to prevent strokes through early detection.

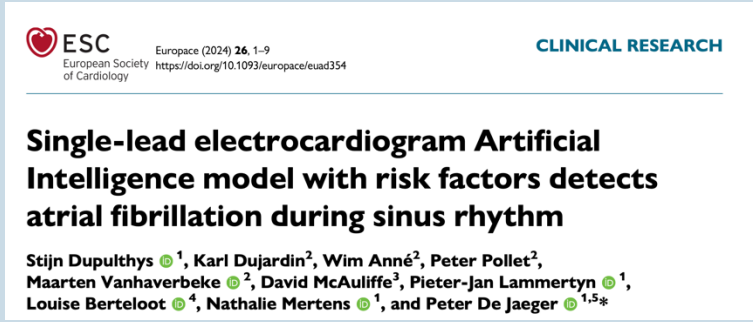
Data: Clinical data, ECG

Result: 0.76 AUC








ESC European Society of Cardiology

Europace (2024) 26, 1–9
https://doi.org/10.1093/europace/euad354

CLINICAL RESEARCH

Single-lead electrocardiogram Artificial Intelligence model with risk factors detects atrial fibrillation during sinus rhythm

Stijn Dupulthys [1], Karl Dujardin[2], Wim Anné[2], Peter Pollet[2], Maarten Vanhaverbeke [2], David McAuliffe[3], Pieter-Jan Lammertyn [1], Louise Berteloot [4], Nathalie Mertens [1], and Peter De Jaeger [1,5]*

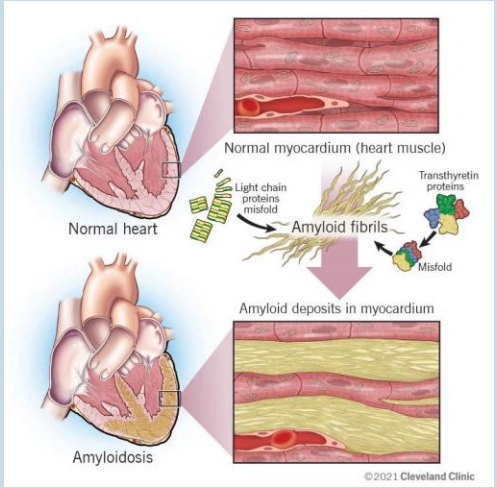
Explainable AI: Which part of the ECG does the model focus on to make its decision? (attention map)

Project
Funding: RADar
Consortium: AZ Delta, ongoing

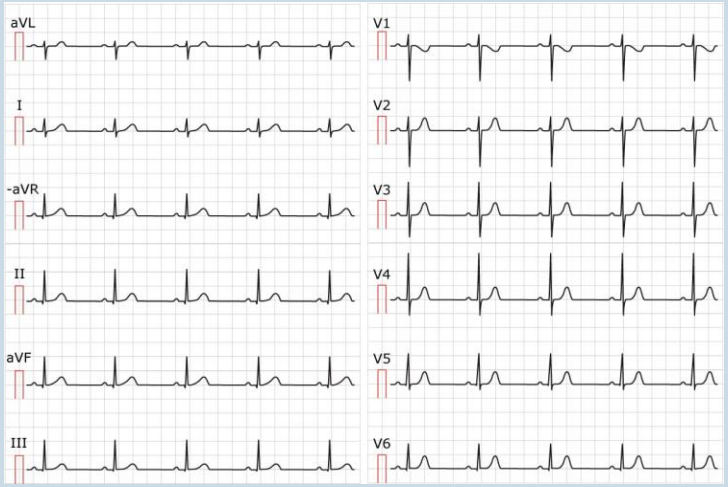
https://drraghu.com/resources/atrial-fibrillation/diagnosing-atrial-fibrillation-and-preventing-stroke/

Early detection amyloidosis

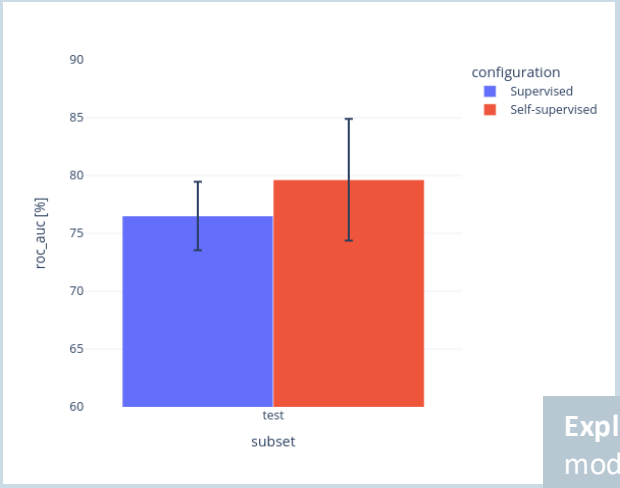
- Research question: Can we detect protein buildup from an ECG?
- Goal: Amyloidosis can be halted but not cured. Therefore, early detection is crucial.



Data: Clinical data, ECG



Result: 0.8 AUC



Explainable AI: Which part of the ECG does the model focus on to make its decision? (attention map)

Project
Funding: RADar
Consortium: AZ Delta, ongoing

https://my.clevelandclinic.org/health/diseases/22598-cardiac-amyloidosis

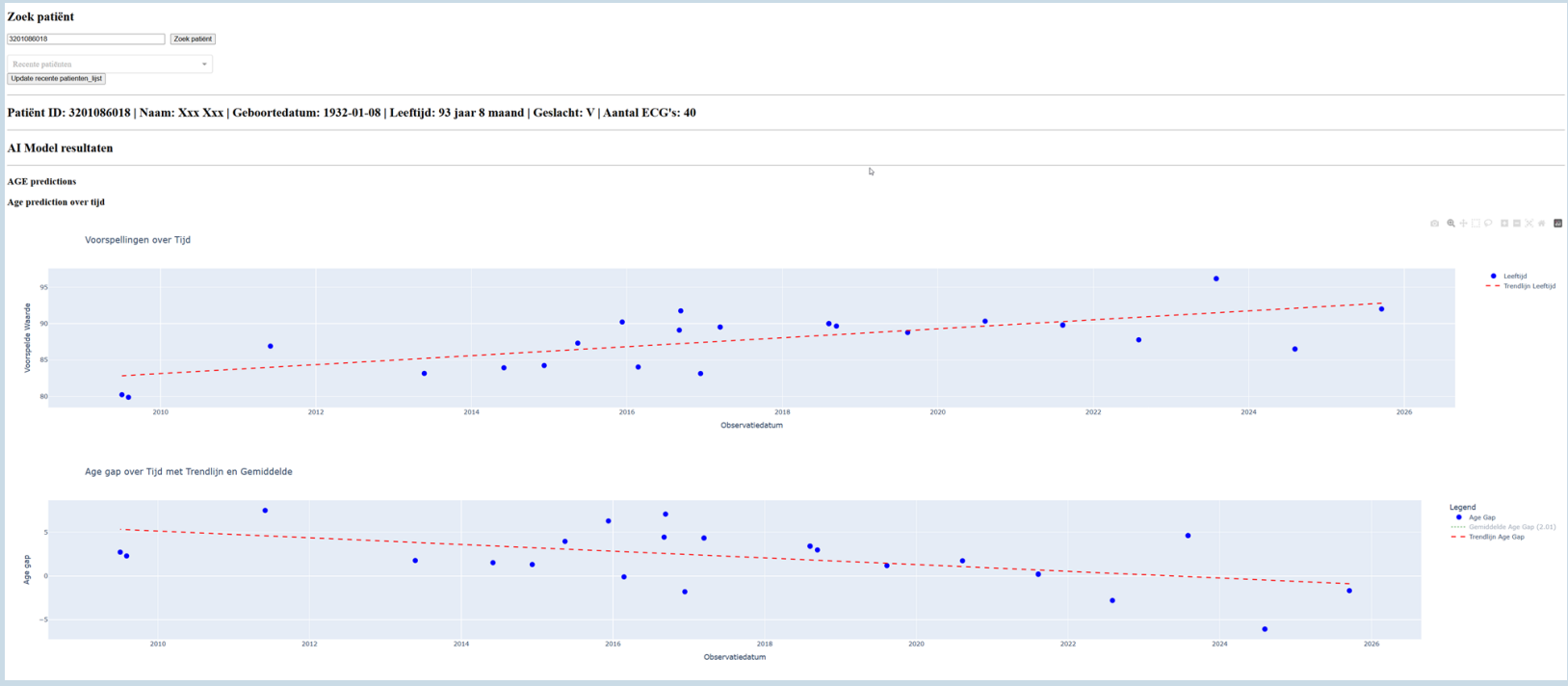
ECG Model Challenges

- Interpretation of model score by doctors

→ Calibration or thresholding

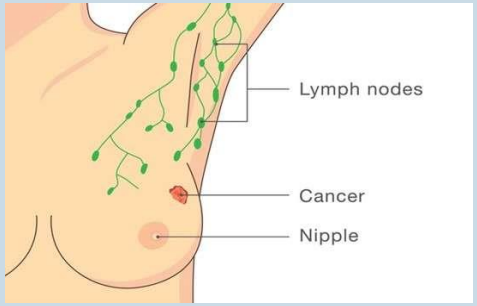
- Not yet integrated in EHR

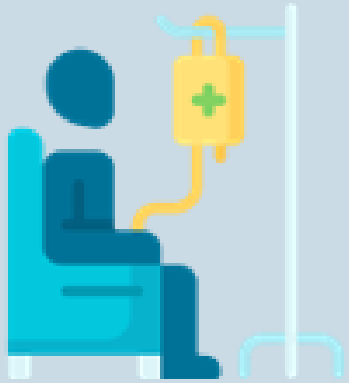
→ Seamless EHR Integration



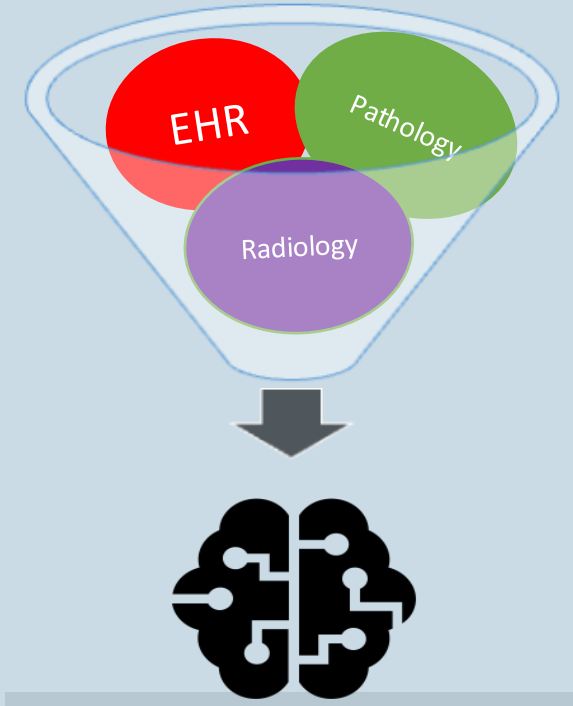
BreaCS: AI-based CDSS for breast cancer

- Research question: Can we better predict in advance who will benefit from:
  - A sentinel/axillary lymph node dissection procedure
  - Neoadjuvant chemotherapy
- Goal:
  - To avoid unnecessary invasive procedures
  - To optimize the treatment pathway for each patient



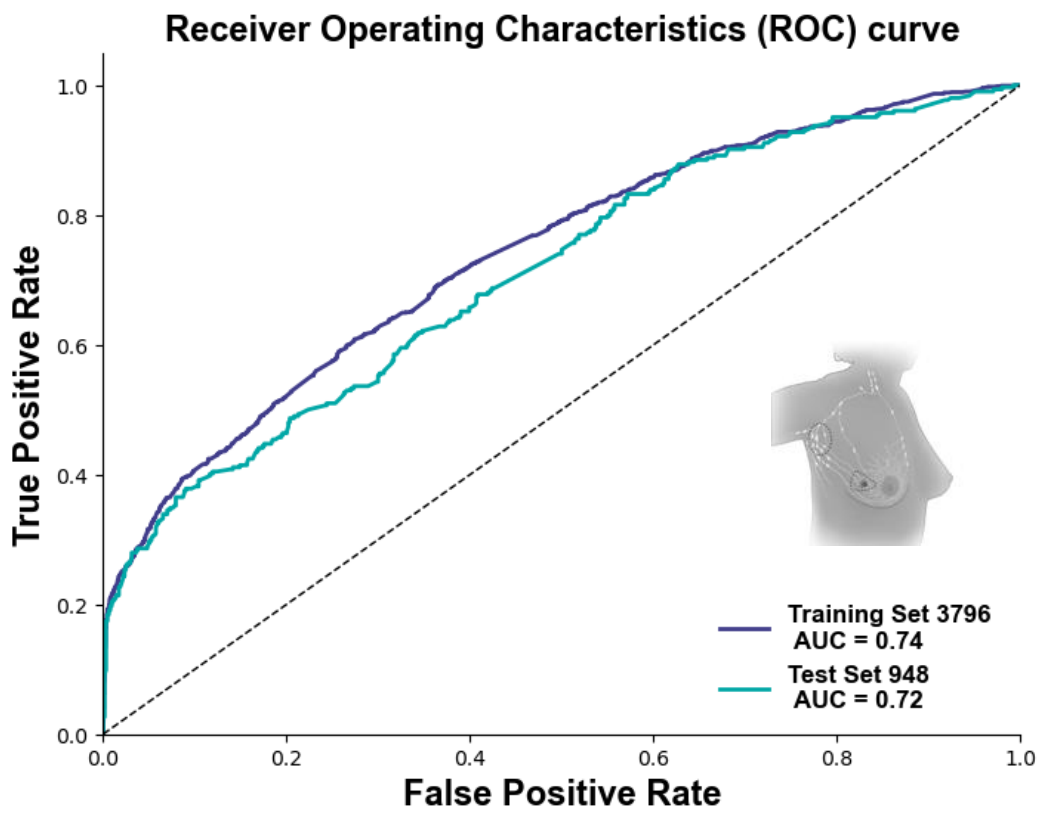


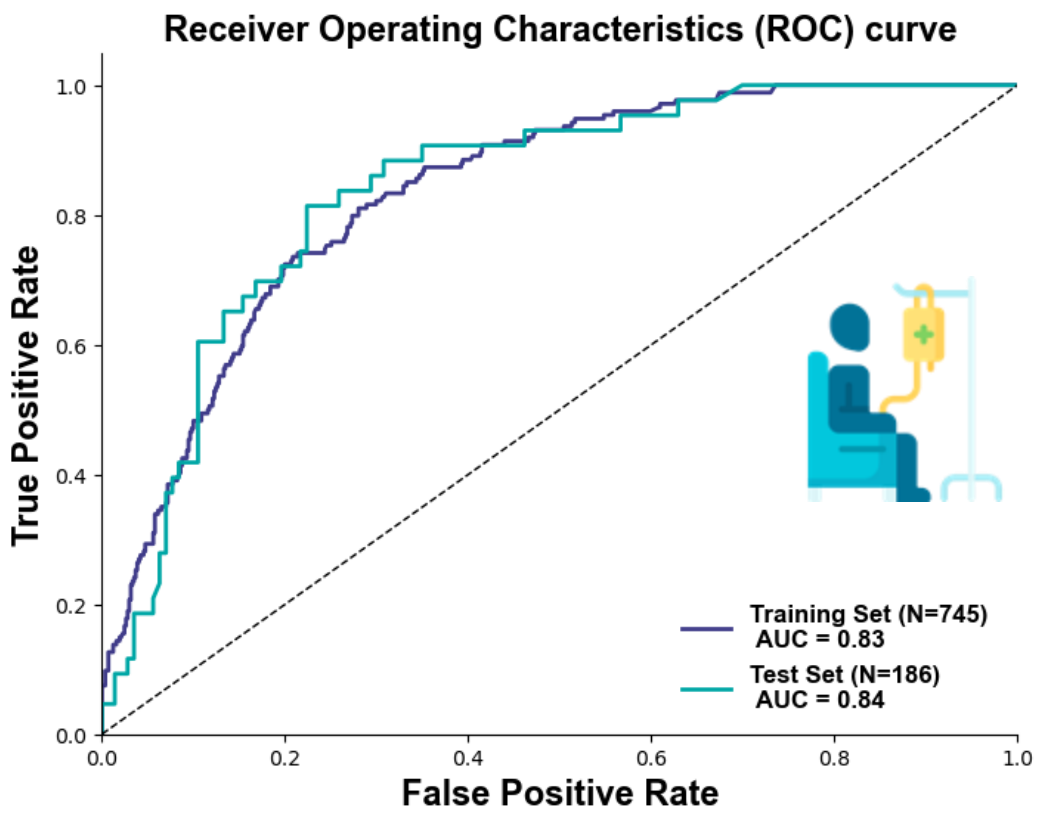
Breast cancer = multifactoral disease
=> Combine multiple data modalities



Project
Funding: Vlaio (BreaCS)
Consortium: AZ Delta, ZAS, AZorg, AZ Groeninge
Project
Funding: Vlaio

BreaCS: Multi-institutional meets multi-modal





BreaCS model Challenges

- Multicentric data
  - Inconsistent annotations
  - Varied data format
  - Different coloring
  - …

→ Manual curation, incentive for prospective standardization

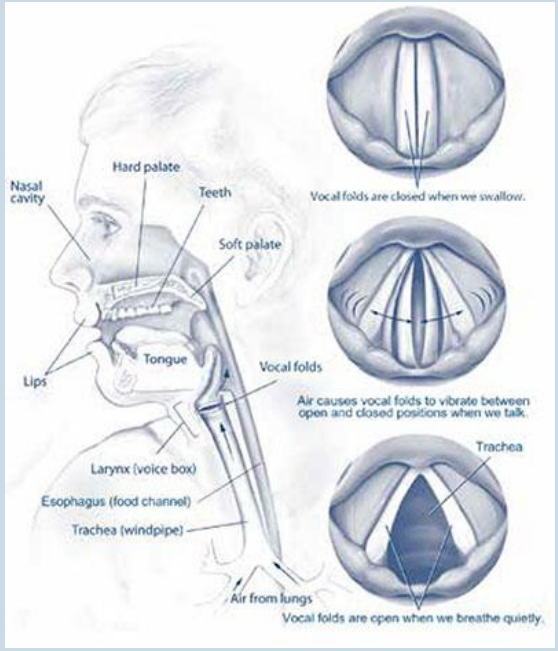
- Redoing the MOC requires ethical approval

→ Incentive for CTC and EC to pave the way for AI-based studies

Real world deployment requires more than good models!

Early detection of voice disorders

- Research question: Is early detection of voice disorders possible through a mobile application?
- Goal: To develop technology for integrated care, focusing on optimal pathology detection and treatment.



Data: Clinical data, Voice data

Result:
Detection disorder > 0.95 AUC,
Classification disorder ca. 0.75 AUC

Explainable AI: Which part of the recording does the model focus on to make its decision? (attention map)

Project
Funding: Vlaio (PhonAID)
Consortium: AZ Delta, ZAS, ELG De Piramide, Goomyx

https://www.nidcd.nih.gov/health/taking-care-your-voice

Early detection of voice disorders

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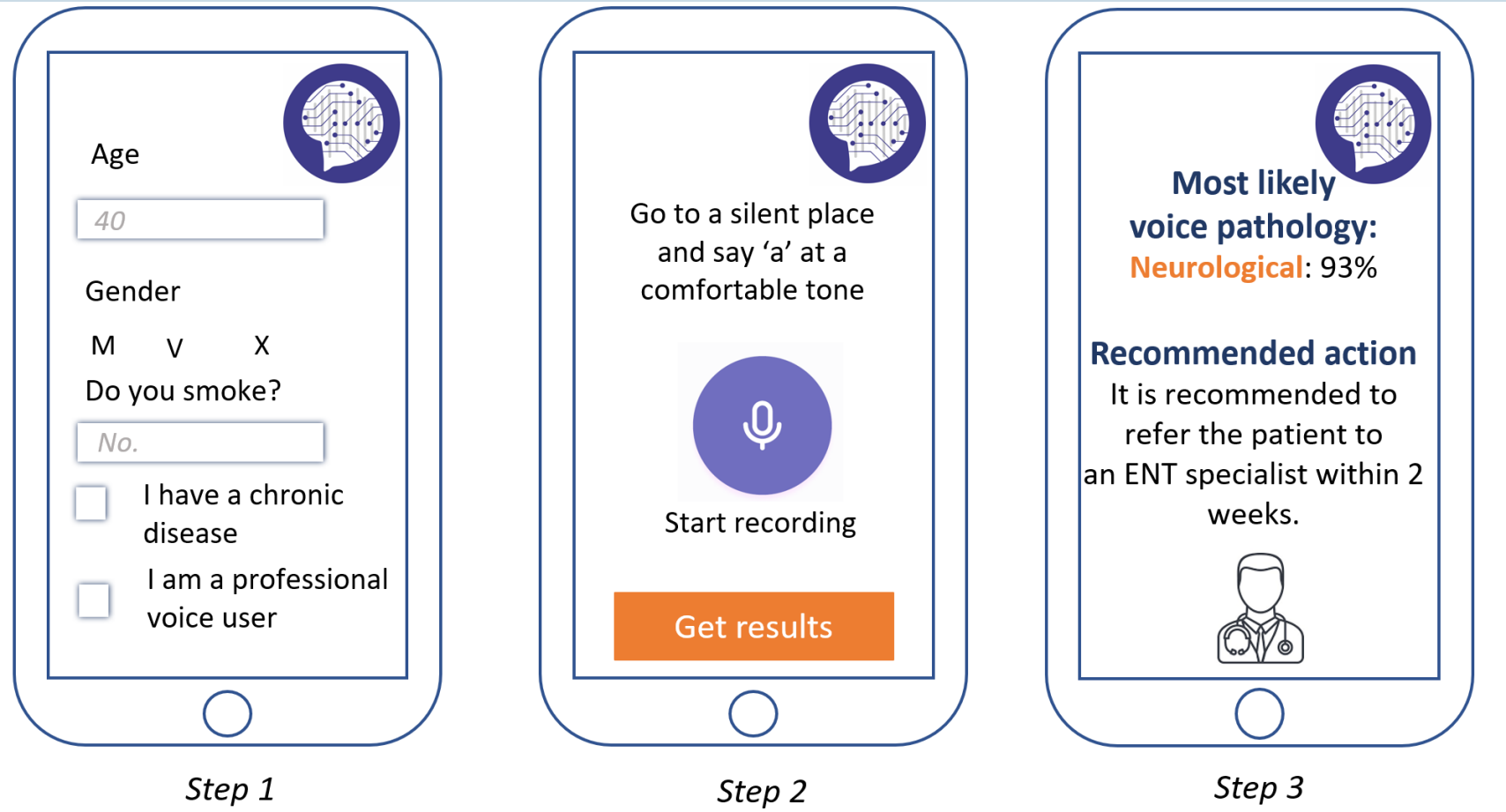

Usability study ongoing

PhonAID model Challenges

• Time slot in GP consultation	→ Limit data input to essentials
• Digital literacy of patients	→ User interface adaptation
• Noisy environments	→Trained on augmented data + noise detection in app
• Difficulty of voice disorder classification	→ Expansion with more datasets → collaborations!

Key Takeaways

- AI has major potential when aligned with clinical reality
- RADar combines research, engineering, and clinical collaboration
- Real-world validation = essential
- Multiple projects now close to clinical implementation

Thanks!

Together with RADar building an innovative and patient-centered AZ Delta.

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