What's the point of the project? - A Summary

Issue

The medical field lacks **high quality and quantity training data** to **train AI models**

Why

- **Shortage** of research volunteers
- Lack of medical professionals
- **Expensive** to gather data

Our Solution

- **AI + Crowdsourcing =** Increases the amount of available training data
  - → **Generative AI** helps increase the low number of available images
  - → **Segmentation AI + Public participation in annotating medical images** quickly labels high-quality datasets comparable to an expert

Project Impact

- Gather **large, high-quality** datasets **quickly**
- **Improve the training performance** of other medical AI
- **Adaptable** for various types of medical image

Future Work

- Implement **a robust weighting and verification system** to uphold **labelling quality**
- Explore **alternative segmentation model** to provide base annotation without user prompt
- **Quantitatively** investigate the **efficacy of synthetic images**

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Coupling AI and Citizen Science

Creation of Enhanced Training Dataset for Medical AI Training

BerryinBarry2

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Motivation

Advancements in AI are enhancing medical image analysis, aiding **precise diagnoses** and **more effective treatment plans**.

A major challenge is the **lack for high-quality training datasets**.

AI-based medical image analysis models need **large amounts of labelled data** to achieve **precise and accurate results**.

However, **manually creating** these labelled datasets by **medical experts is costly and time-consuming**.

To overcome this, there's a need for innovative methods to generate **large amounts of high-quality labelled datasets efficiently**.

Aims

Accessibility
Website Based

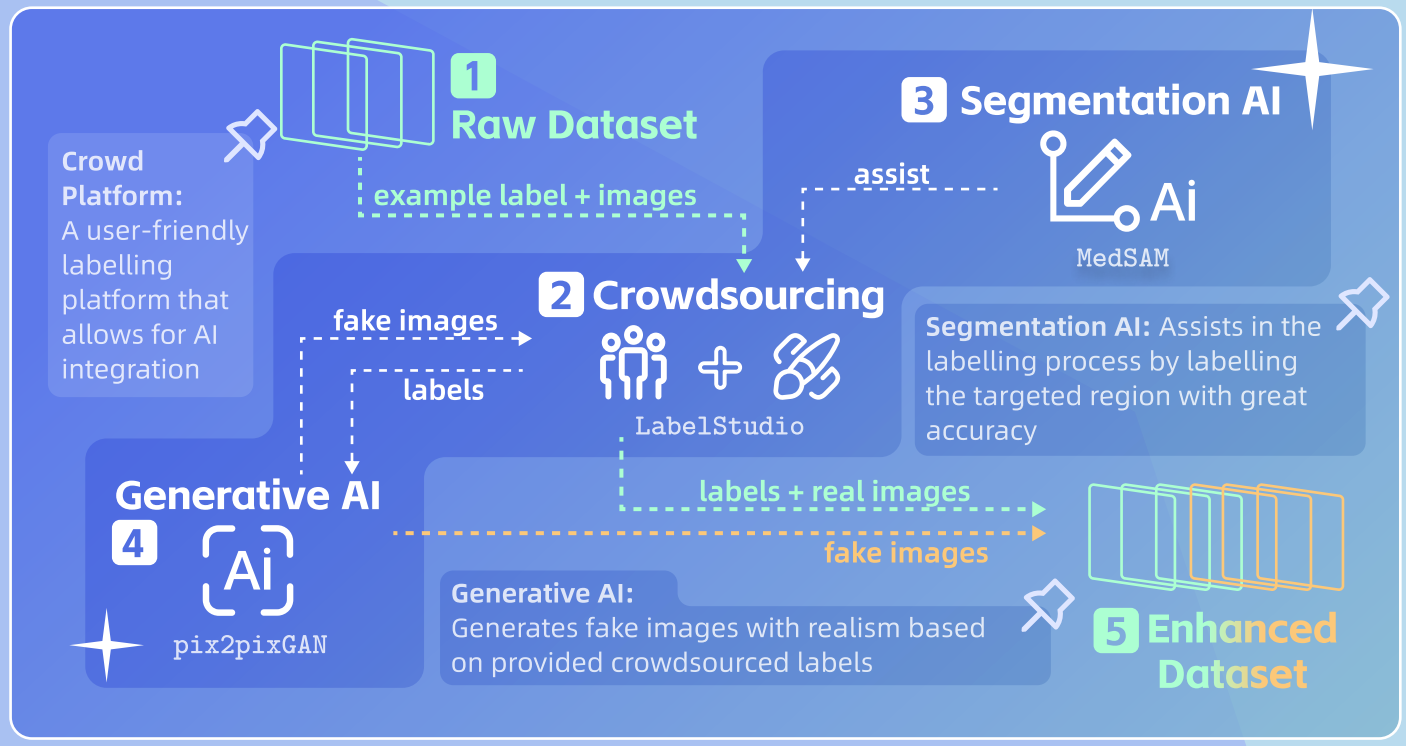
Quantity
Enlarge Existing Dataset

Quality
Accurate Labelling

Efficiency
Low Cost & Less Time

Outcomes

Our **proposed workflow integrates advanced AI and crowd involvement** to enlarge and improve existing unlabelled medical image datasets. This contains **3 main components**:

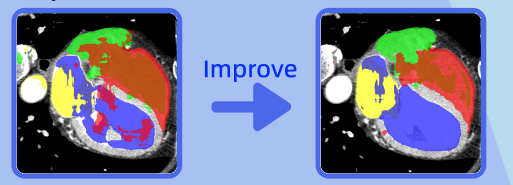


We proposed a **user-friendly online labelling platform**, implemented on LabelStudio, that **gathers volunteers to label medical images** with the **help of Segmentation AI to ensure accuracy**. The labels are then **passed to Generative AI to create fake images**.

By **merging** the fake images and crowd-averaged labels, **a robust and extensive training dataset is created for further medical AI applications**.

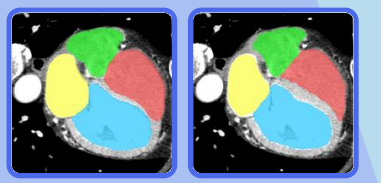
Is this really better?

- **23.2% increase** in test AI model accuracy **with the enhanced dataset**



Original Dataset Enhanced Dataset

- **Comparison** of **crowd-averaged** and **ground-truth labels** show a **76.6% similarity**



Averaged Ground Truth
Heart CT Label