

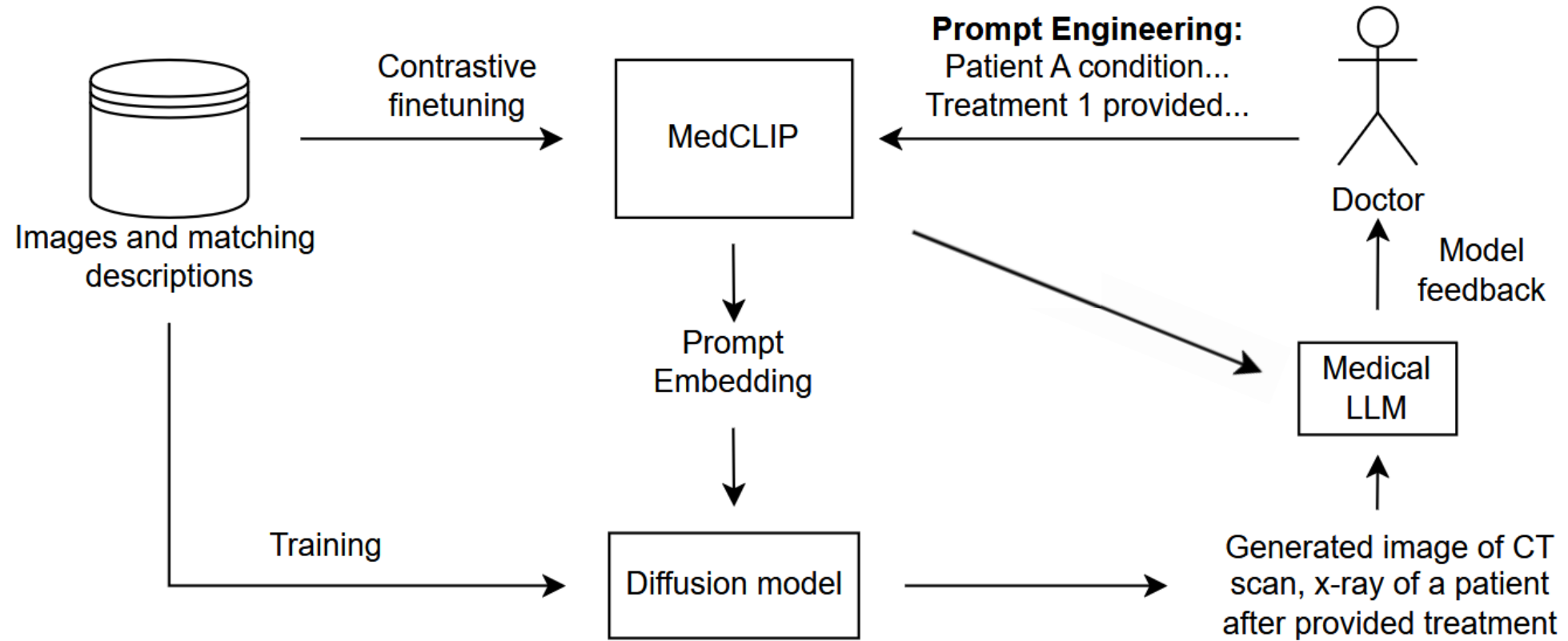
**Treatment planning for head and neck cancer
with
Vision-Language Modeling**

Filip Ręka, Bartosz Minch

What are the problems?

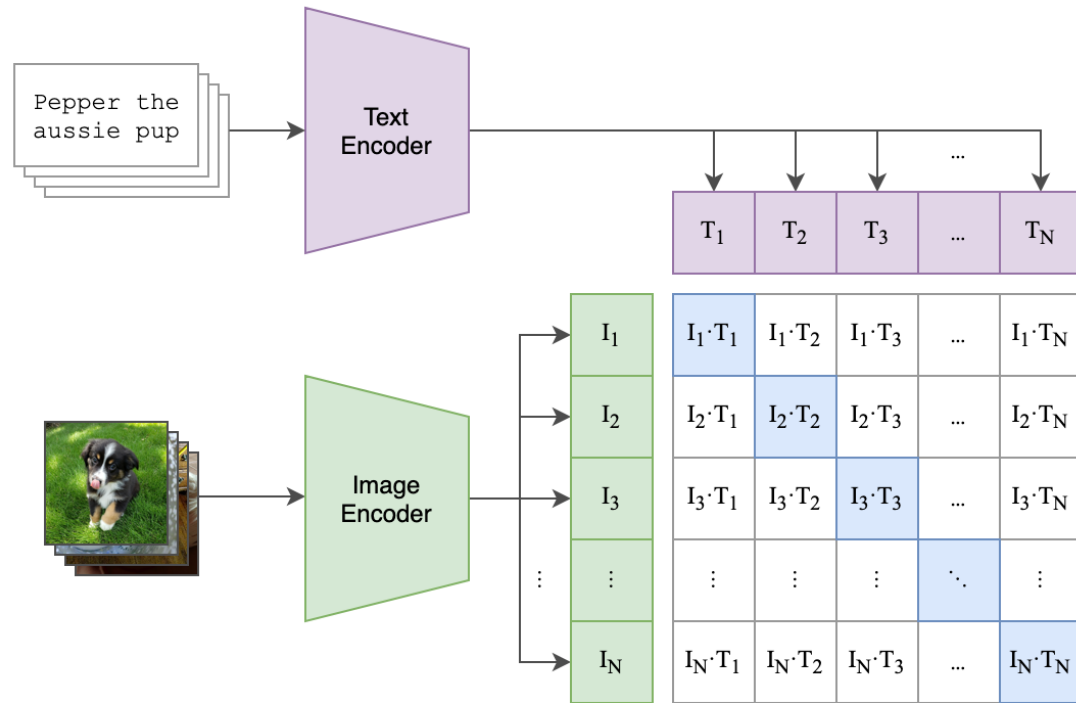
- Many medical LLMs but no framework to use them in real life
- Data may not be personalised for each domain of medicine
- Privacy concerns with corporate LLMs
- Lot of historical health data lying without use

System architecture

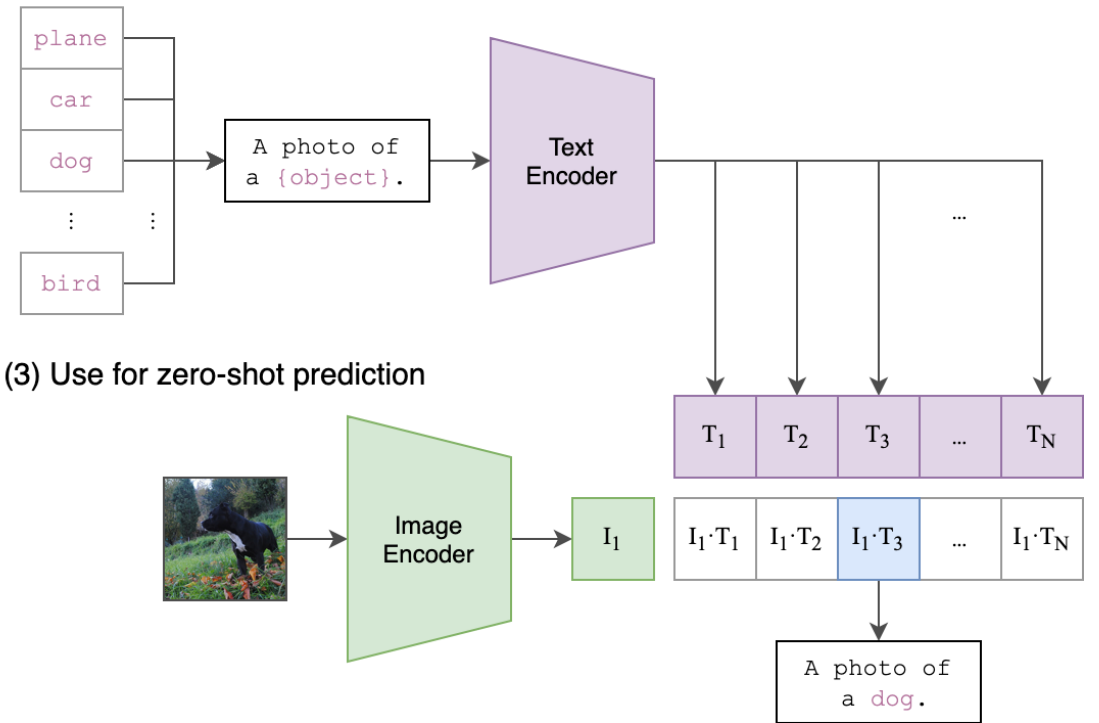


Contrastive Language-Image Pretraining

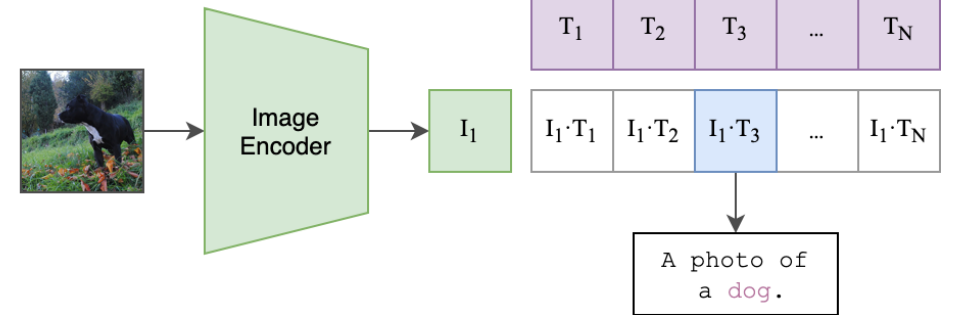
(1) Contrastive pre-training



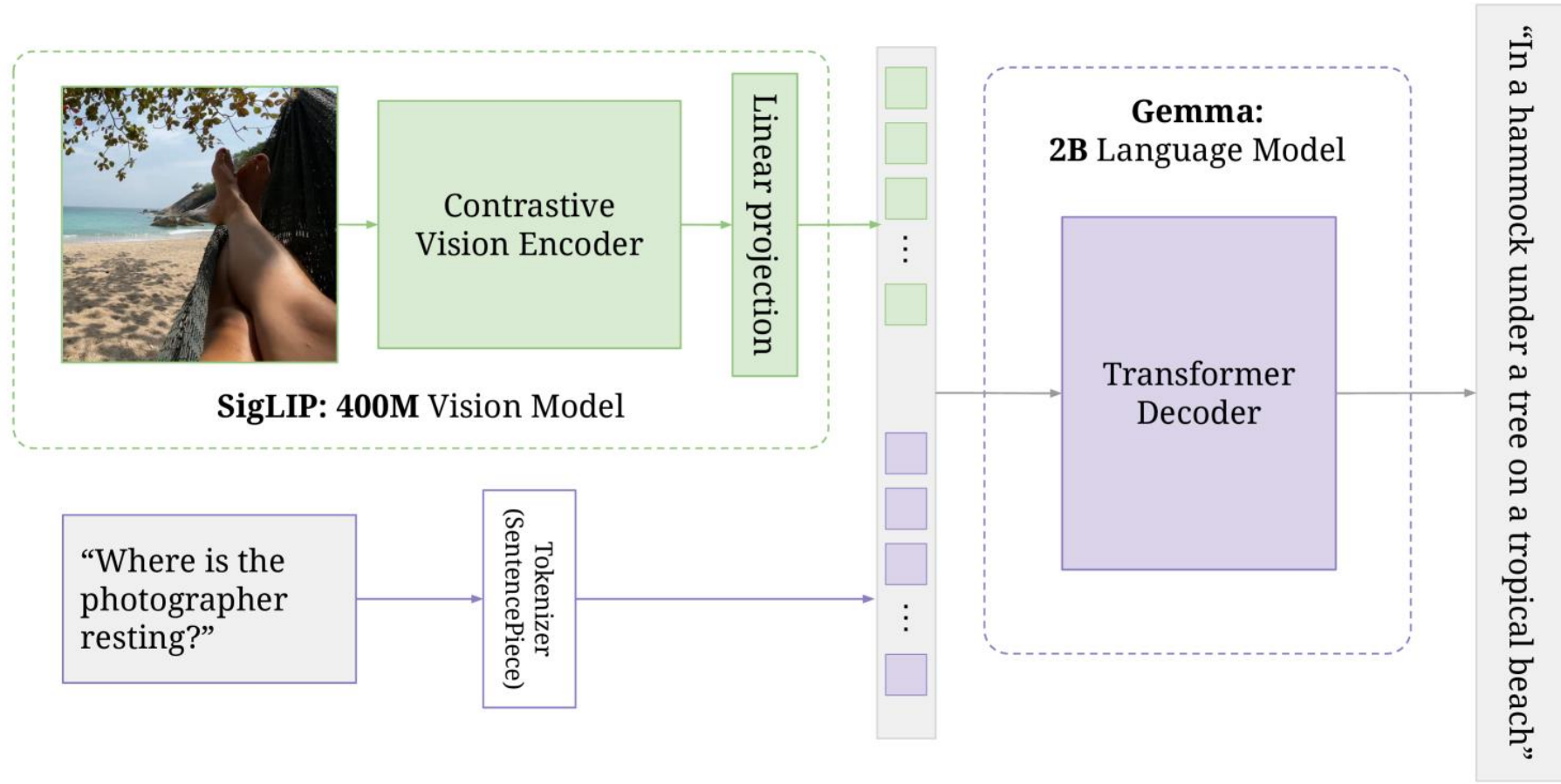
(2) Create dataset classifier from label text



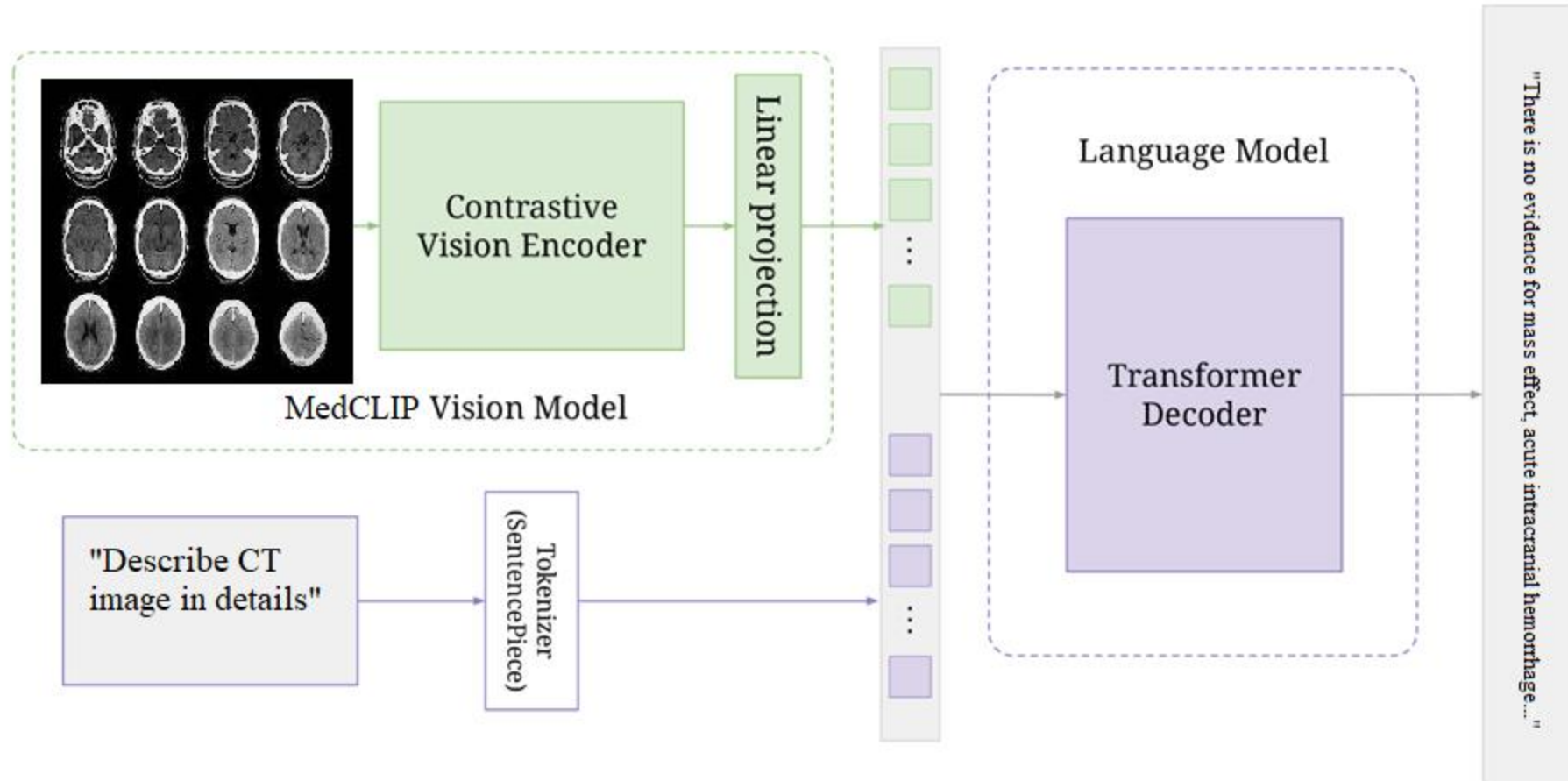
(3) Use for zero-shot prediction



PaliGemma2 Architecture

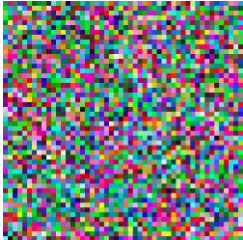


CT model architecture



Diffusion models

„...Basal ganglia and posterior fossa structures are normal. No established major vessel vascular territory infarct...”



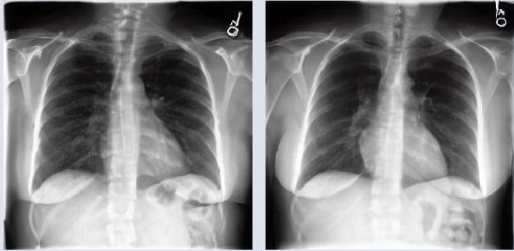


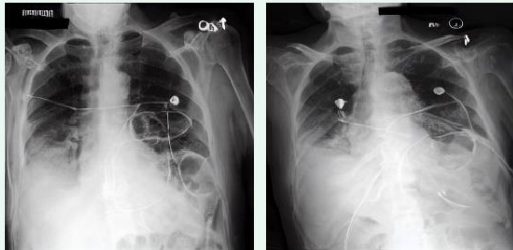
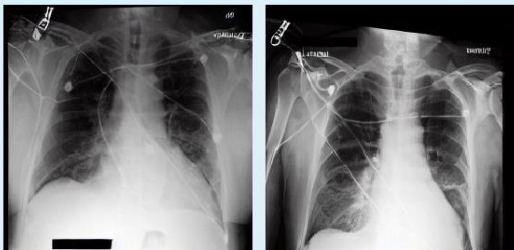

MedCLIP

$V_{embedded}$

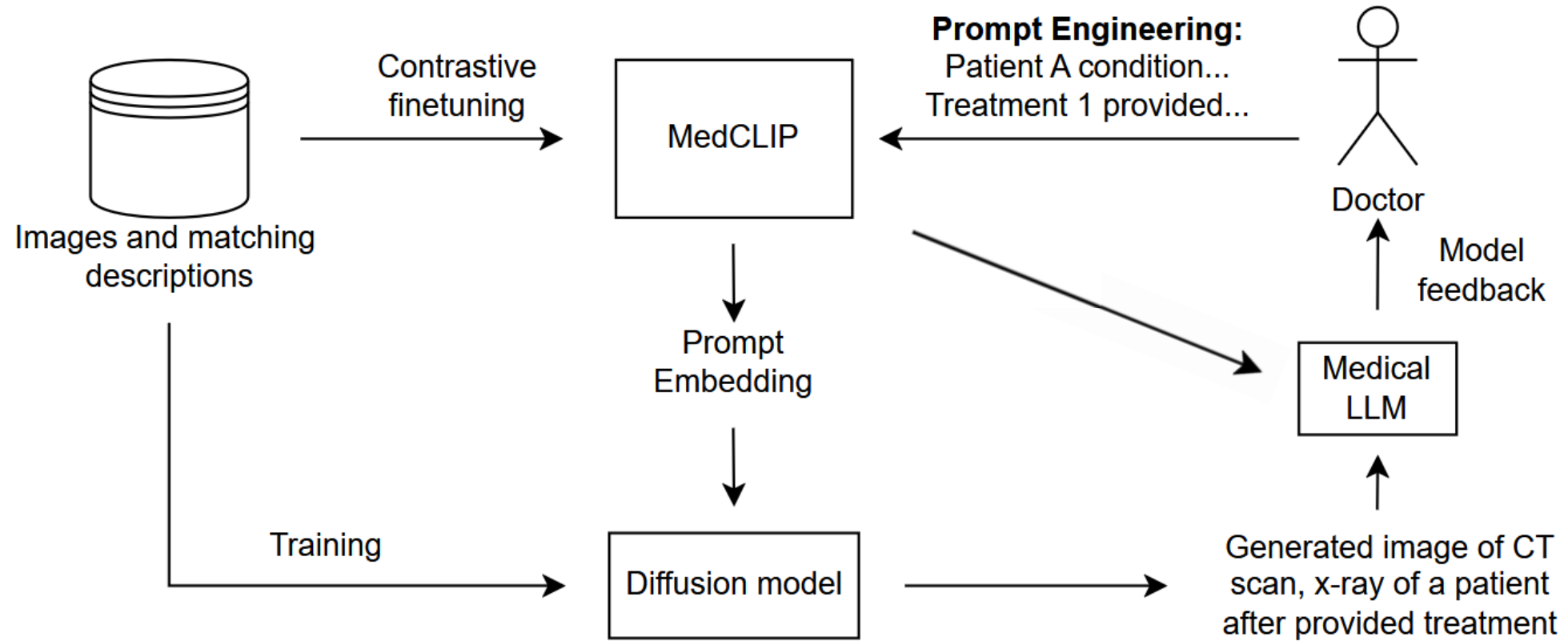
Diffusion model
 $T_1 \rightarrow T_2 \rightarrow \dots \rightarrow T_N$



Chest-Diffusion

Input Report	Generated CXRs	Input Report	Generated CXRs
(a) Health No new focal consolidation, pleural effusion, or pneumothorax.		(c) Pleural effusion Pleural effusion on the left lung.	
(b) Pulmonary edema Severe pulmonary edema.		(c) Pleural effusion Pleural effusion on the right lung.	
(b) Pulmonary edema Mild pulmonary edema.		(c) Pleural effusion Bilateral pleural effusion.	

System architecture



Thanks for listening

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