جامعة
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UNIVERSITY
عضو في مؤسسة قطر
Member of Qatar Foundation

HBKU Thematic Research Grant 2nd Cycle– Project Highlight

Project Title: Large-Scale Human-in-the-Loop Histopathology Dataset Creation and AI Models for Clinical Pediatrics Applications

LPI: Dr. Sabri Boughorbel

Executive Summary

The digital transformation in Pathology has opened the door to new opportunities to reshape this field. In the last decade, AI has made major advances in the detection, classification and prognostication of different cancer types in adult tissues based on Whole Slide Images (WSI). However, there has been limited effort targeting the development of AI models for pediatrics tissues. Accurate and fast diagnosis of pediatric diseases in the pathology department can positively impact the long-term population health and reduce the cost burden on the healthcare system. This grant is in partnership with Sidra Medicine to develop AI models for Pediatrics Pathology. The development of these models requires the creation of large-scale datasets of annotated images. Most of the existing ones focus on cell segmentation for a limited number of cell types. Such datasets are costly and time-consuming to create, as the task of annotating the complete cell boundaries is very tedious. We argue that adopting an annotation strategy of one point per cell, known as dot annotation, can be sufficient in several downstream tasks such as cell counting, detection, density estimation and region-growing segmentation. This project is in partnership with Sidra Medicine and Nvidia.

Expected Outcome

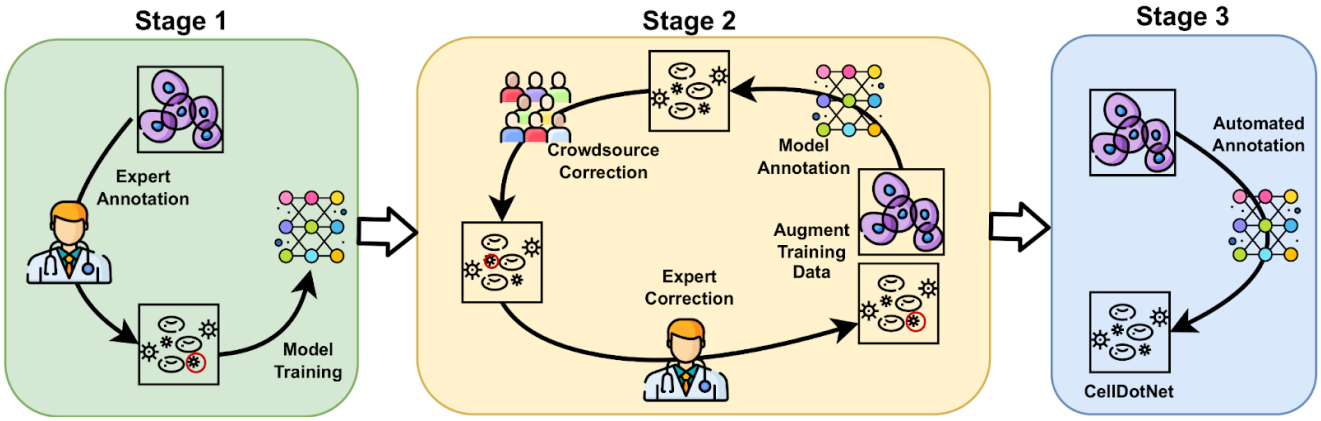
The project will set up a platform for human-in-the-loop annotation. The annotated dataset will be used to train AI models for cell counting to assist pathologists in disease diagnosis. The models will be integrated in web-based pathology imaging platform for pre-clinical evaluation.

Collaborating HBKU entities:

Dr. Marco Agus, College of Science and Engineering, HBKU

Dr. Jens Schneider, College of Science and Engineering, HBKU

Schematic:



Architecture of the human-in-the-Loop data creation