When AI meets Computational Pathology

Companion test, translational projects and data challenges

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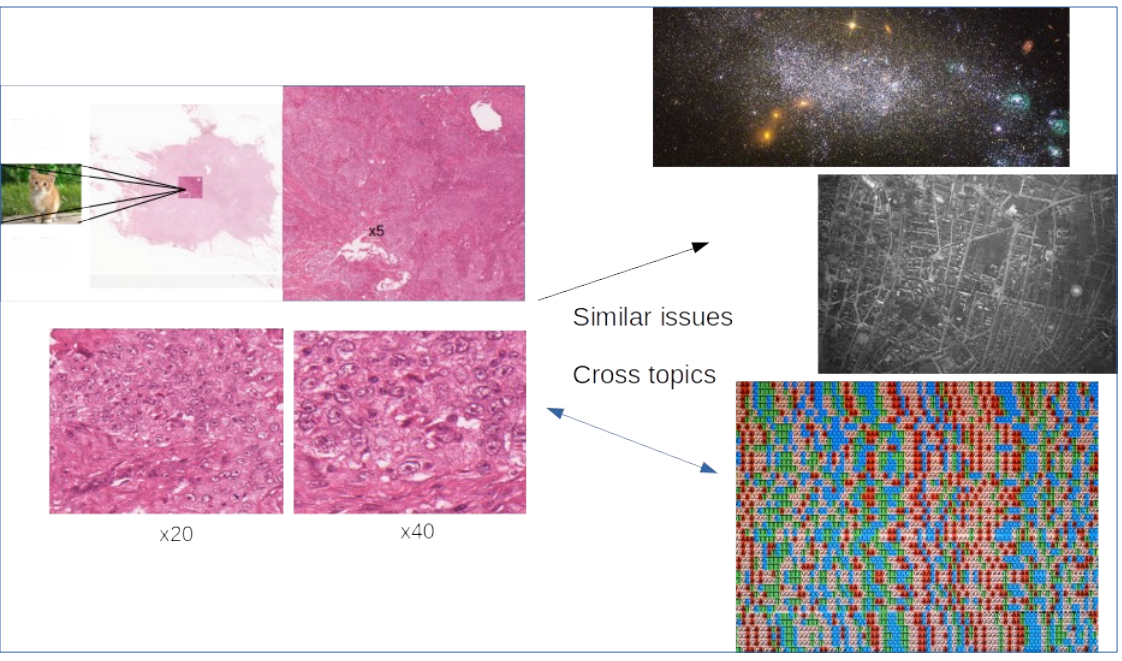
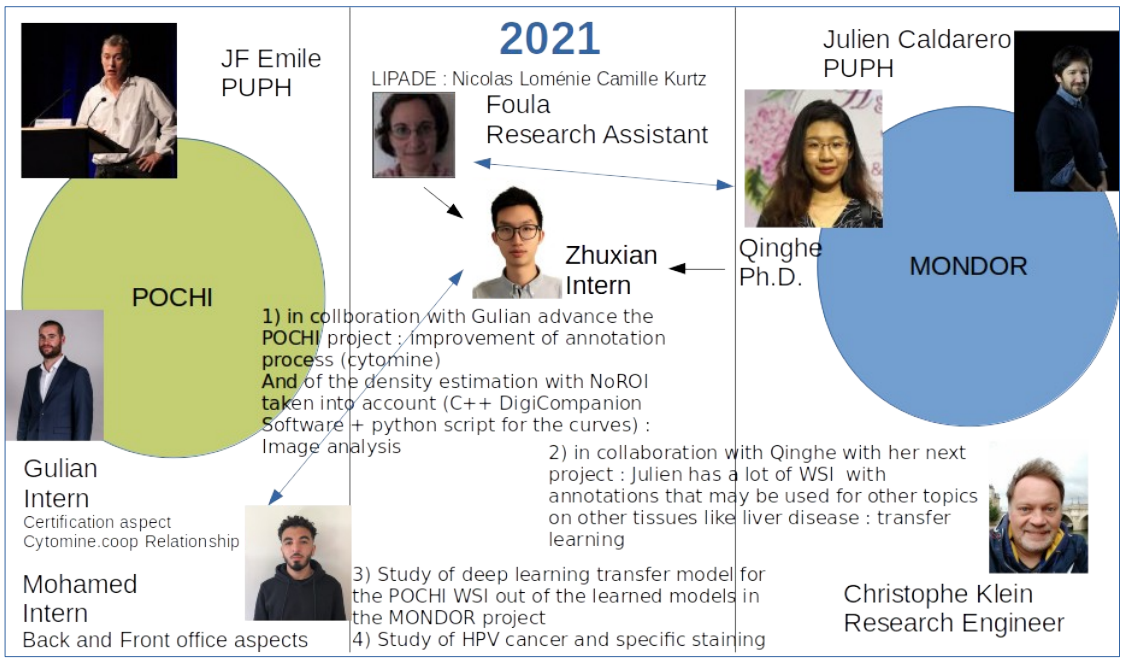
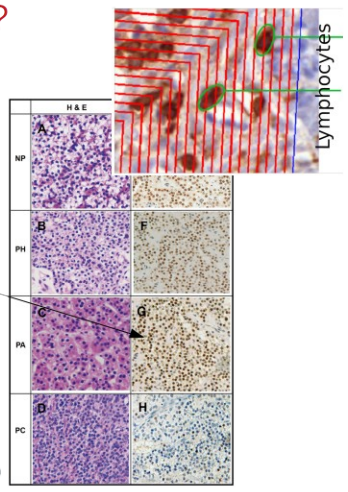


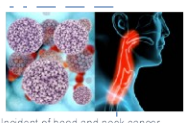


Can we skip the IHC process ?

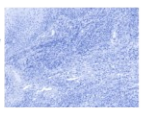
Current project, 250 annotated colon WSI stained with IHC (thousands of small patches for deep learning by WSI)
→ lymphocytes / specific proteins like Ki67 appear in **brownish**



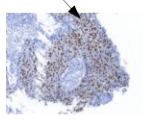
Alcohol and tobacco



Incident of head and neck cancer
World: 500 000/year
US: 38 500/year
France: 16 000/year
Mostly squamous cell carcinoma

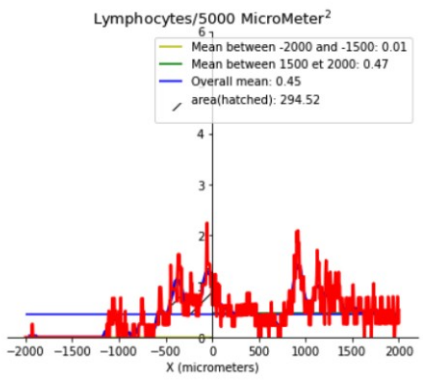


Higher risk diseases from human papilloma virus (HPV)



Less risk diseases from human papilloma virus (HPV)

POCHI



By-product issue :

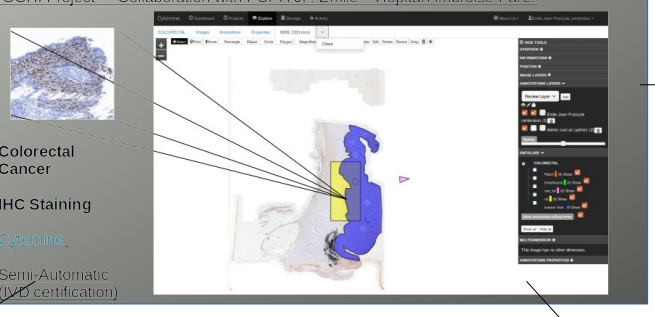
How to classify time series-like data into 4 type of infiltration based on :
- rule system by the pathologist
- online learning ?

Djiro, Kurtz, and Loménie, "Assessment of Anti-Tumor Immune Response in Colorectal Carcinomas from Whole Slide Images.

A Companion Test

POCHI

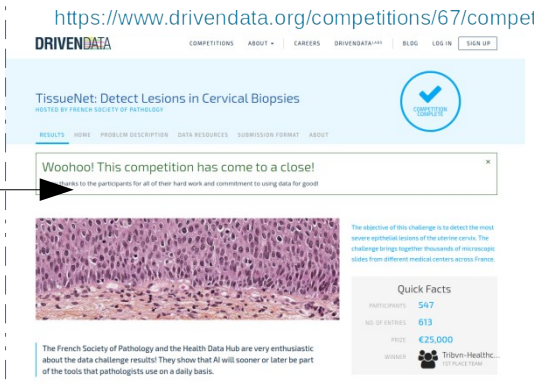
POCHI Project - Collaboration with PUPH JF. Emile – Hôpital Ambroise Paré.



Data Challenges, more to come

Challenge

https://www.drivendata.org/competitions/67/competition-cervical-biopsy/

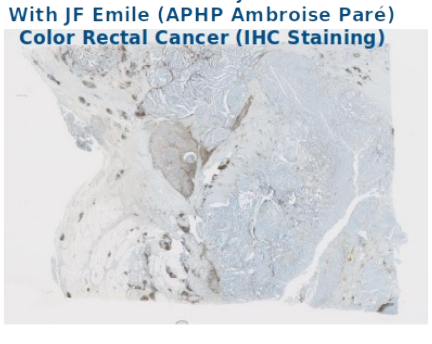


https://www.health-data-hub.fr/

http://www.sfpathol.org/

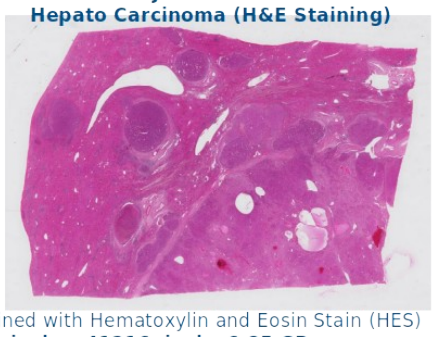
Can we learn the tumoral front independently of tissue / staining etc. ?

POCHI Project
With JF Emile (APHP Ambroise Paré)
Color Rectal Cancer (IHC Staining)



Immunohistochemistry Stain
69632pixels x 48384pixels, **9.41 GB** uncompressed

MONDOR Project
With Julien Caldarero
Hepato Carcinoma (H&E Staining)



Stained with Hematoxylin and Eosin Stain (HES)
59520pixels x 41216pixels, **6.85 GB** uncompressed

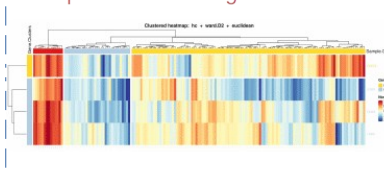
Can we link the phenotype to the genotype ?

(PhD thesis Qinghe Zeng - Mondor Project)

MONDOR

Colorectal cancer

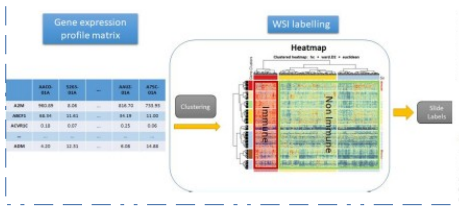
Unsupervised learning on TCGA



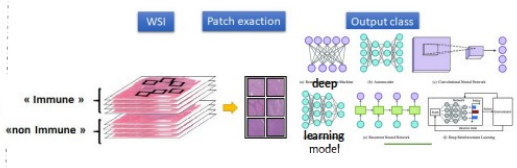
H&E

Weakly Supervised learning

Part A



Part B



data intelligence institute of Paris

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