DeepEVision: An end-to-end deep learning framework for the fully automated annotation, quantification, and characterization of extracellular vesicles in transmission electron microscopy images

1 out of 13 funded EU proposals (PI: Dr Theodora Katsila)

PRACE

Partnership for advanced computing in Europe

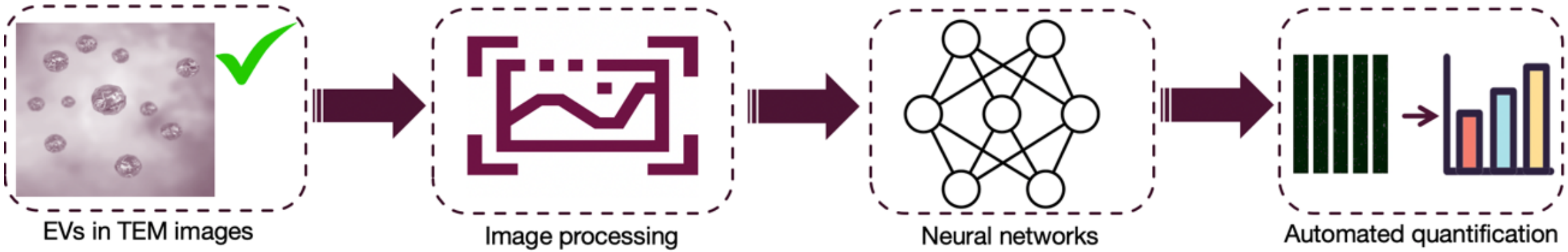
- Access to a research infrastructure that enables high-impact scientific discovery and engineering research and development across all disciplines to enhance European competitiveness for the benefit of society.
- World class computing and data management resources and services

Our Research Challenge:

Extracellular vesicles (EVs) are deemed circulating translational biomarkers of choice when inter-individual variability, drug resistance, and adverse drug reactions are considered. Yet, current segmentation attempts are lacking behind, as post processing of the predicted masks is required.

Our Research Answer:

We propose a fully automated multi-task deep learning model to optimally segment EVs in TEM images



Our Impact:

- Datasets on n=500 public and in-house TEM images; n=6,000 EVs
- Datasets on EVs and their sub-types plus their morphological features
- A unified & robust solution for automated detection, quantification & characterization of EVs to accelerate digital translational biomarkers in drug repurposing