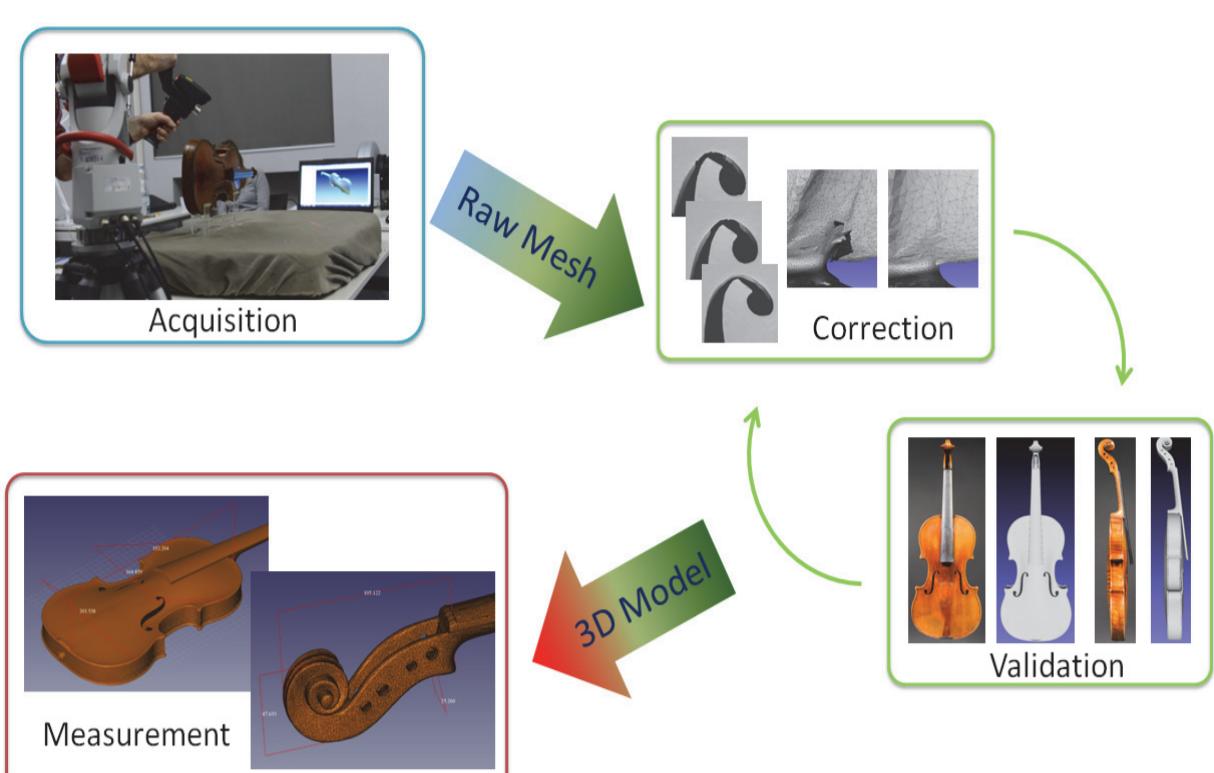
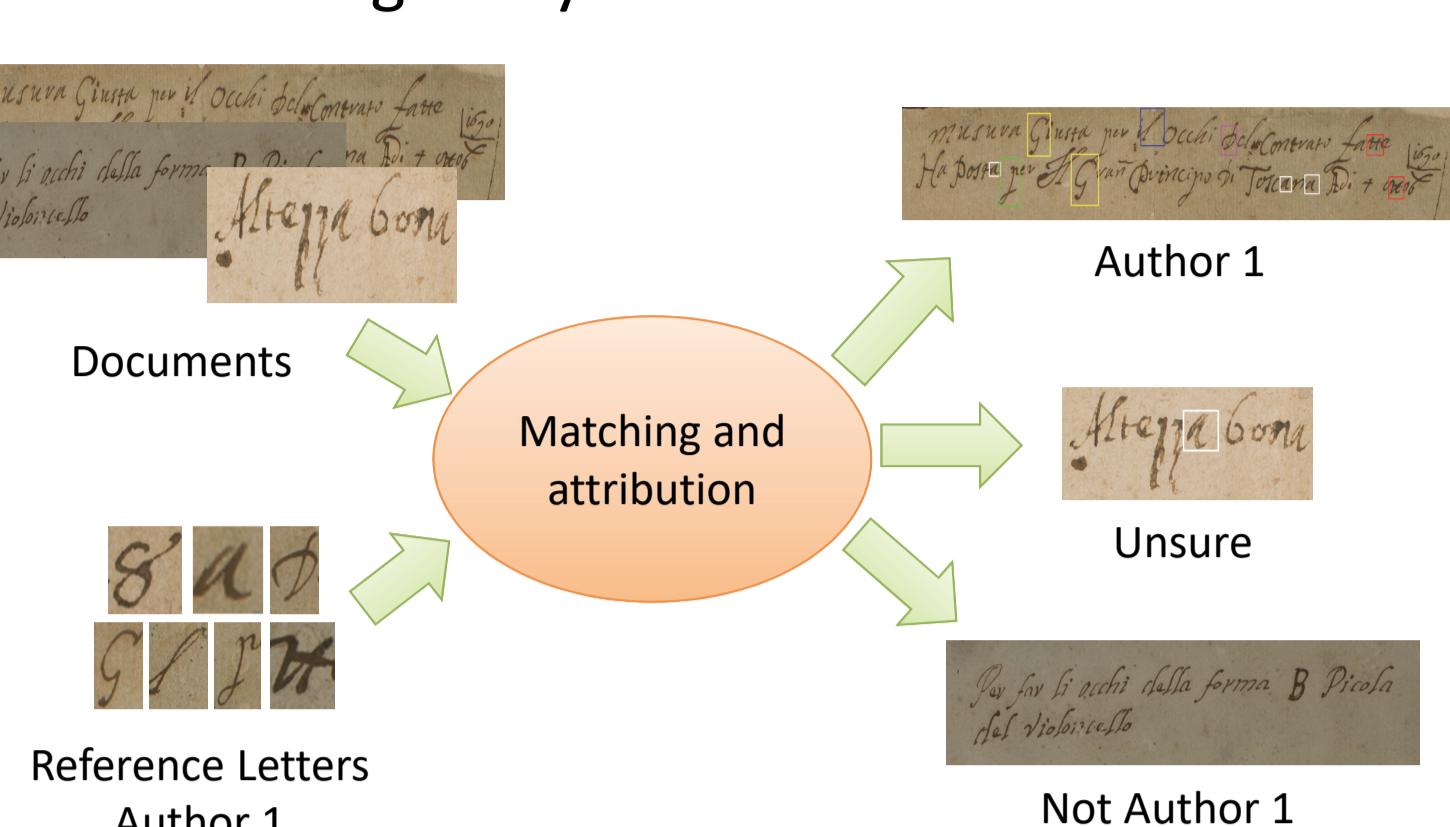


## Digital Heritage

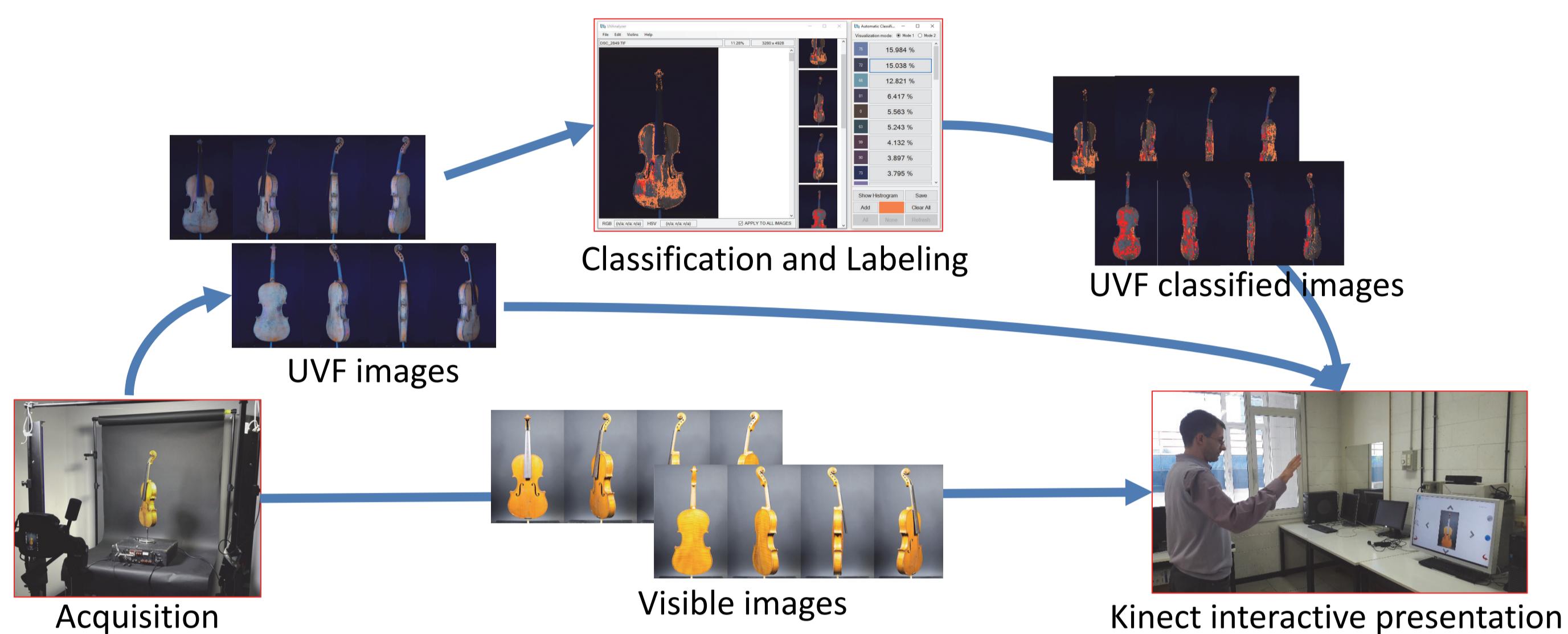
3D scan and measurement of historical instruments



Handwriting analysis of historical documents



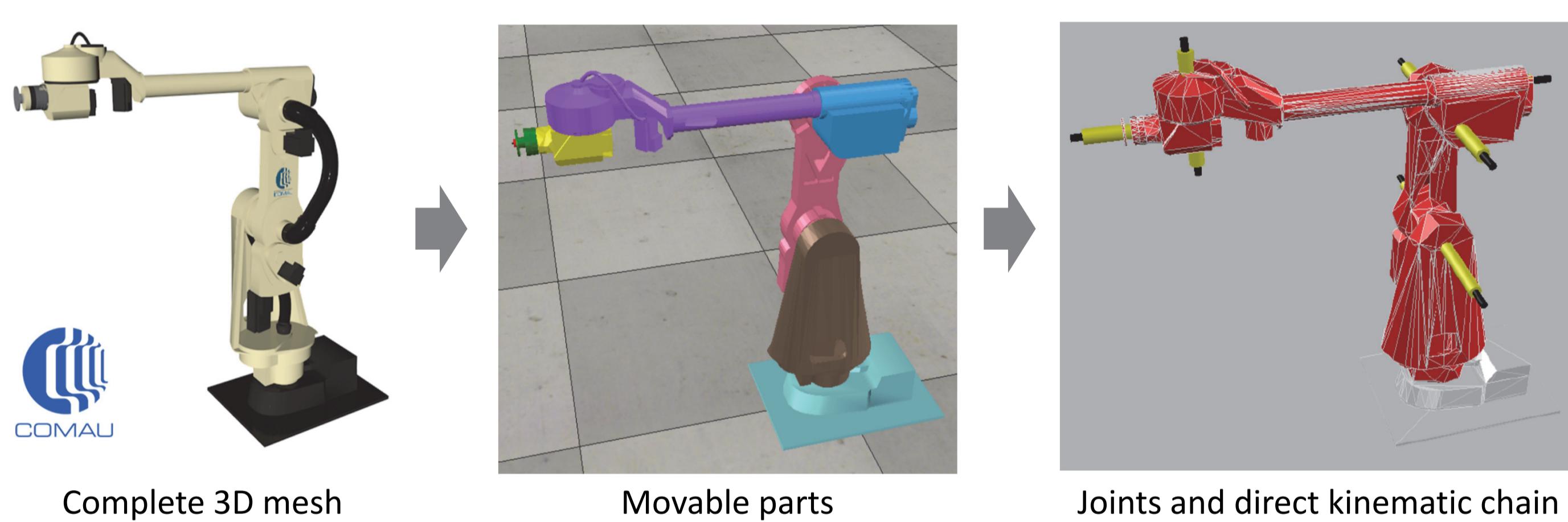
Analysis and presentation of visible and UV induced fluorescence (UVF) images



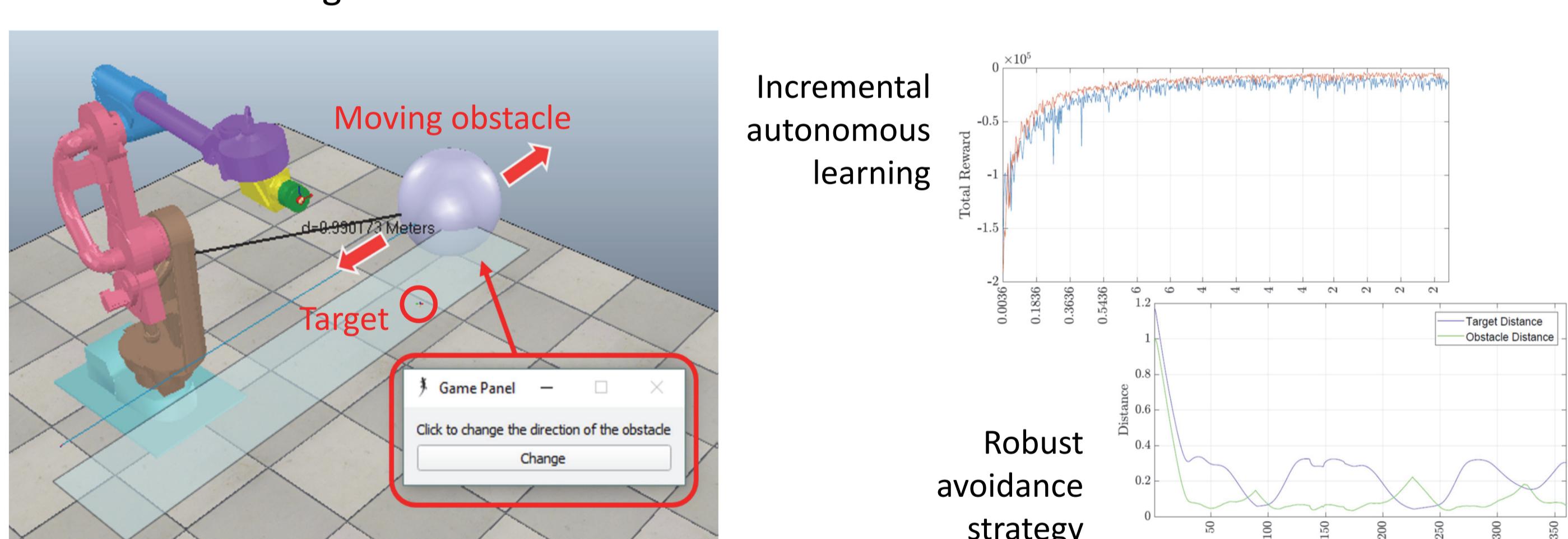
## Deep Reinforcement Learning

For Collaborative Robotics

Virtualization of a real-world robot



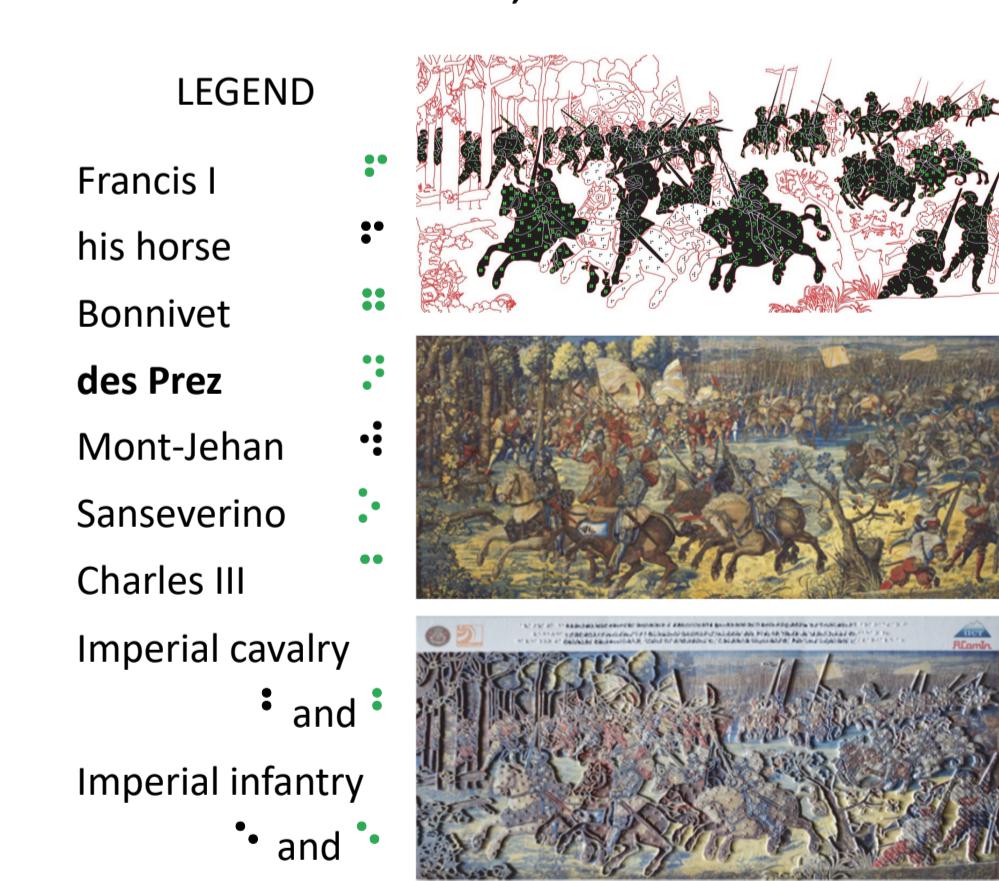
Learning obstacle avoidance in a virtualized simulation environment



## Digital Humanities

### Tactile images

The battle of Pavia, attack of the French



### 3D modeling

A Certosa portal bas-relief



### Augmented reality

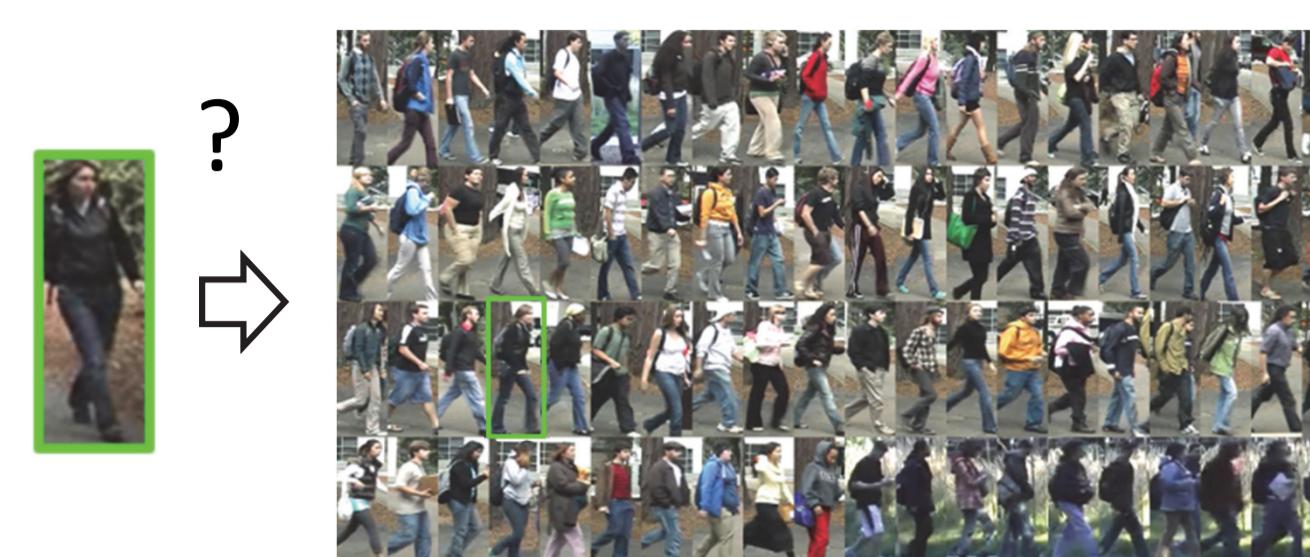
The city of Pavia in the Renaissance



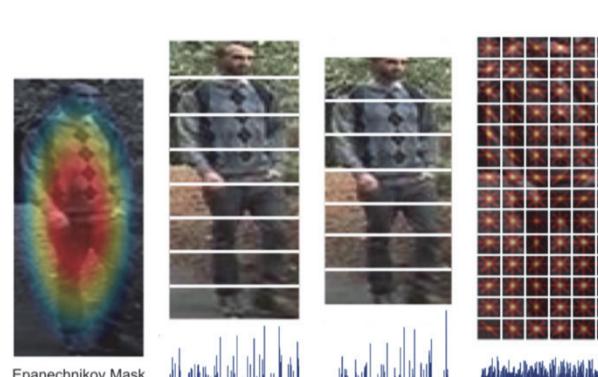
## Human Identification

From Machine Learning to Artificial Intelligence

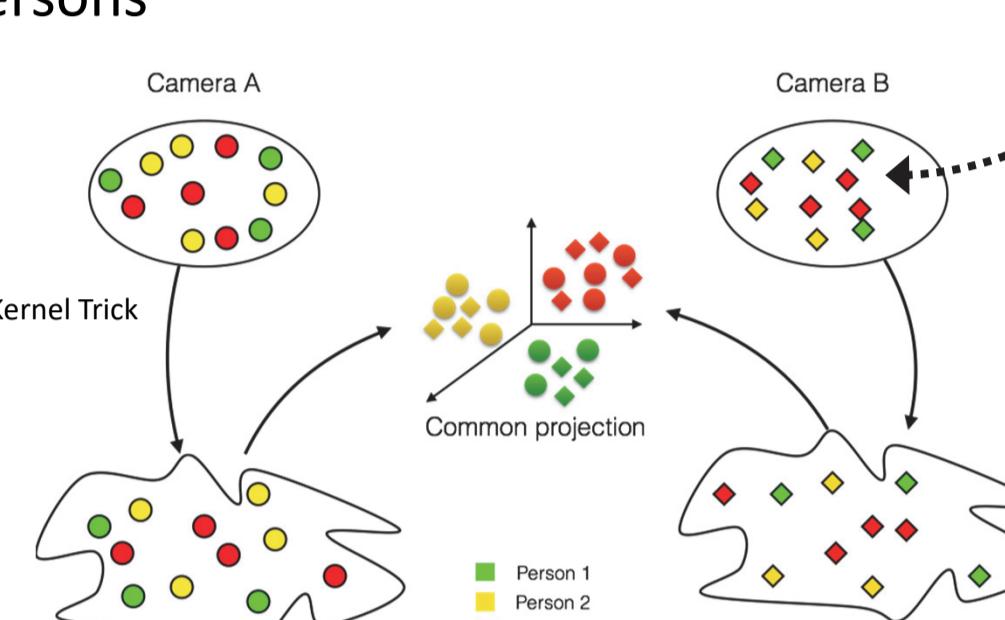
Recognizing an individual in diverse locations over different camera views:



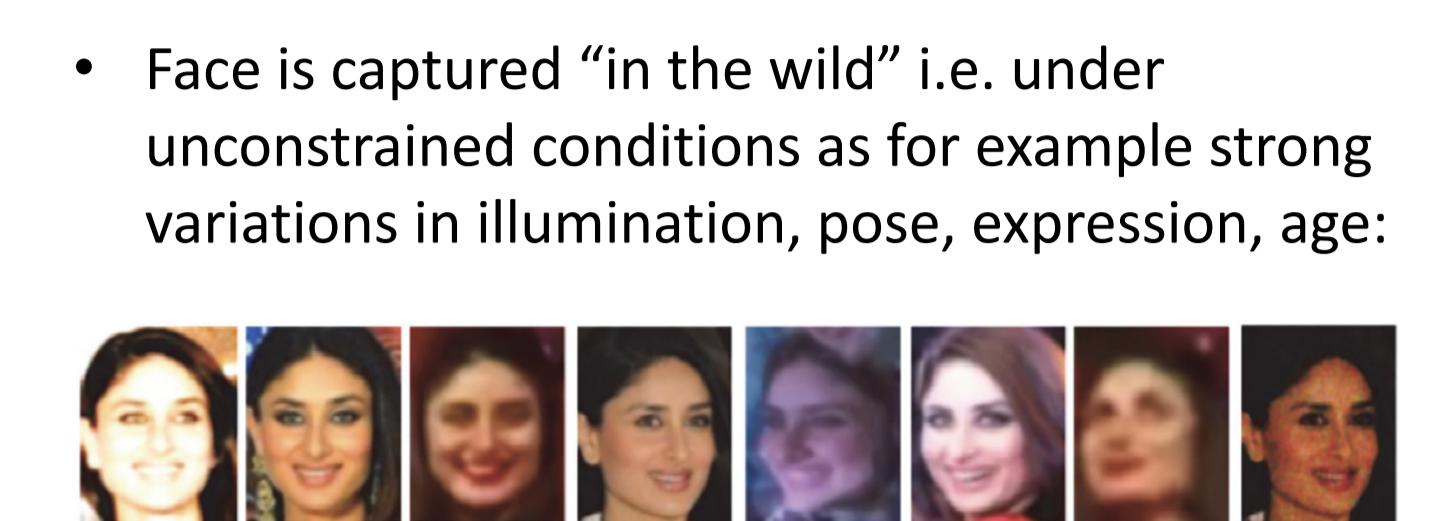
1. Design a robust model to describe a person



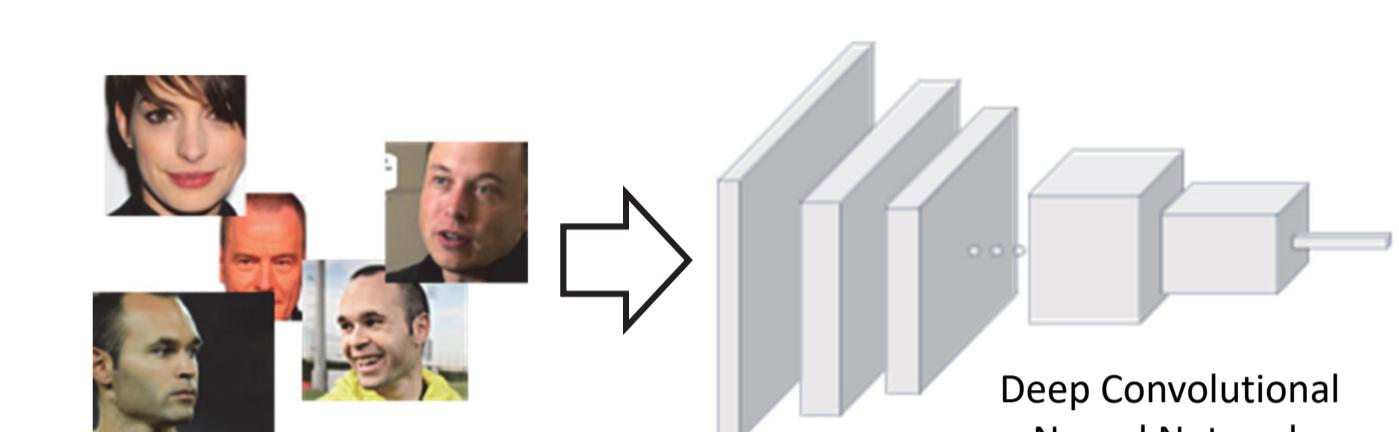
2. Learn a discriminative model to recognize persons



Given still images or videos, identify or verify a person's identity using a stored database of faces:



- Face is captured "in the wild" i.e. under unconstrained conditions as for example strong variations in illumination, pose, expression, age:

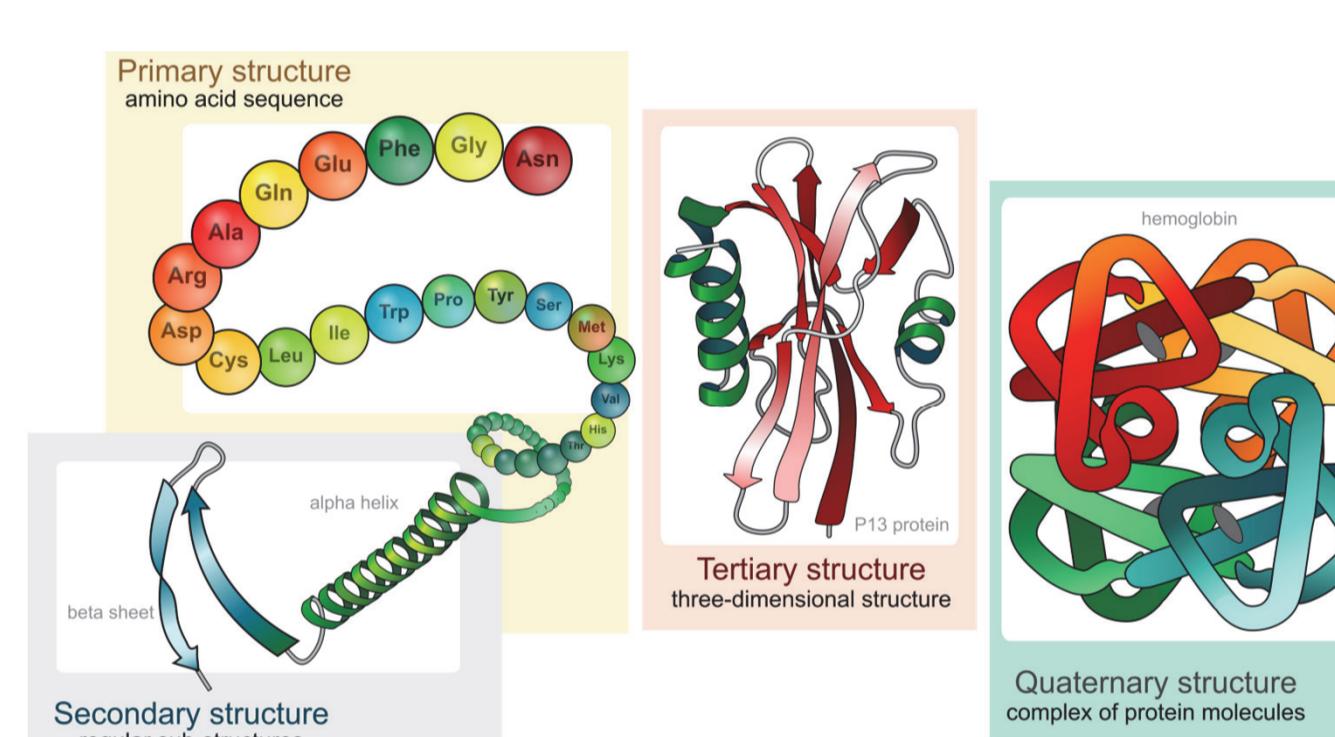


- Data driven approach: collect thousands face images for thousands persons and train a deep neural network
- Consistency between train and test data is fundamental.
- Including background is better than sacrificing content.
- The source of the data plays an important role.

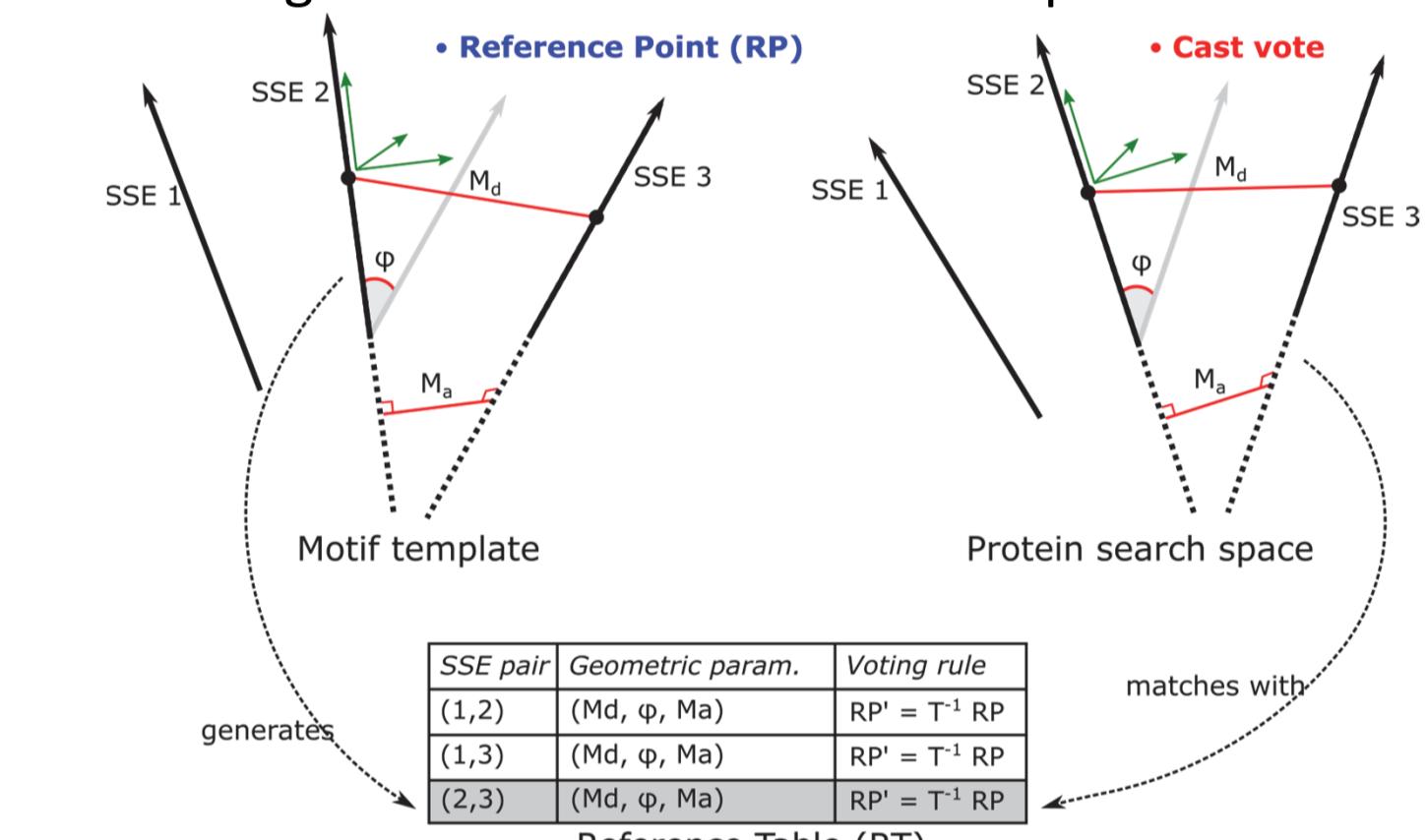
## Proteomics

Geometrical motif extraction in the secondary structure of proteins

Protein structure define its biological behavior.  
We work at second level to identify recurrent motifs.

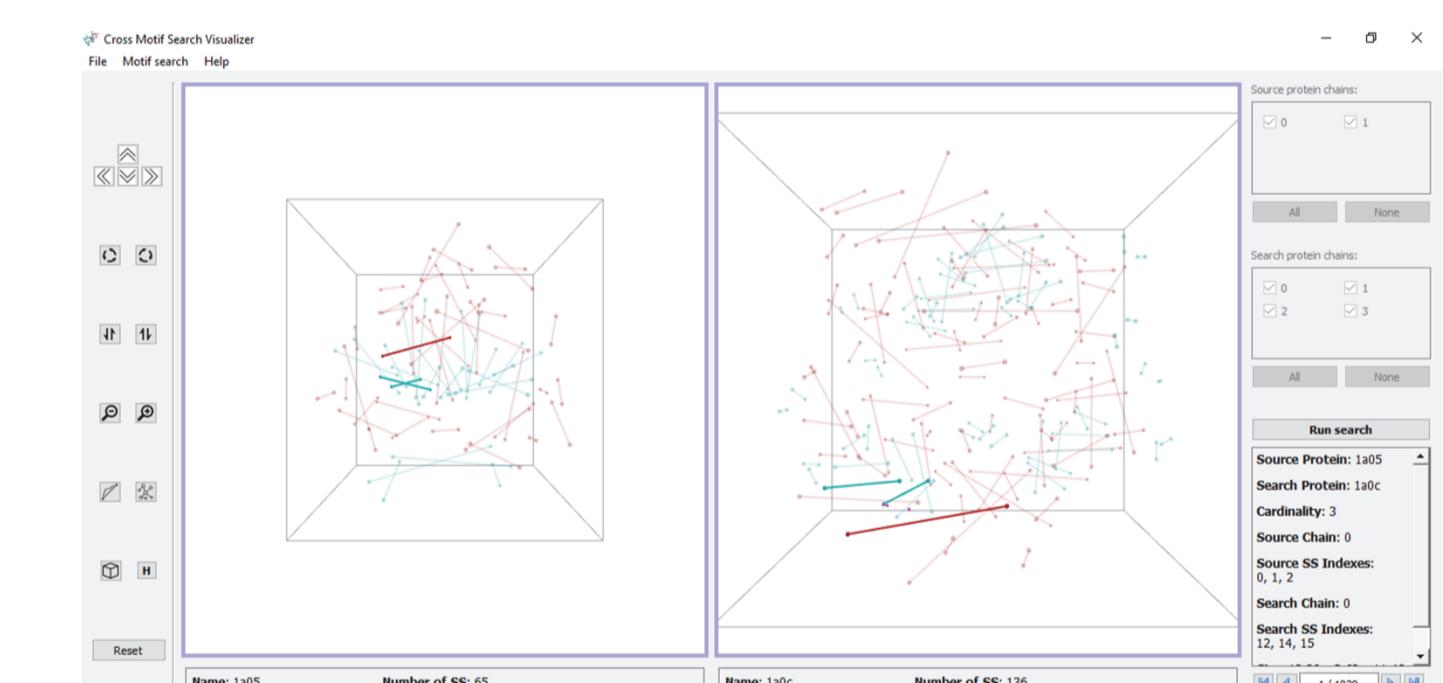


Using Hough Transform we developed the Cross Motif Search algorithm with MP and MPI for parallelism.



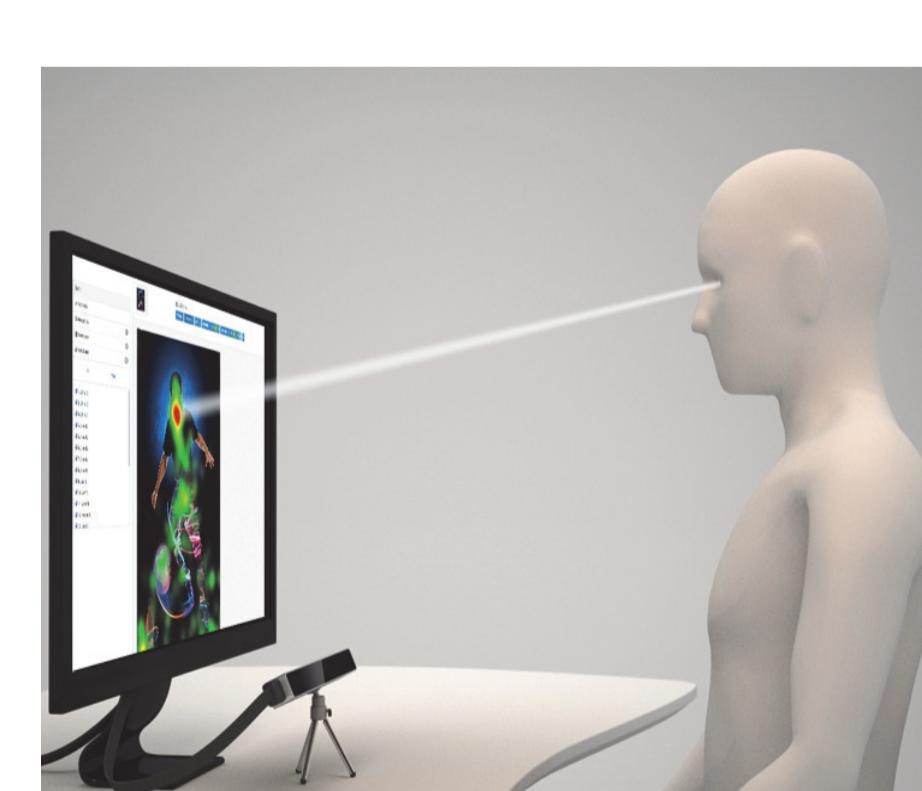
Motif Visualizer: Open Source OpenGL GUI to improve usability  
Collaboration and validation with biologists.

We view proteins as a cloud of segments, we expect big data. Goal: discover new motifs with an innovative geometrical method.



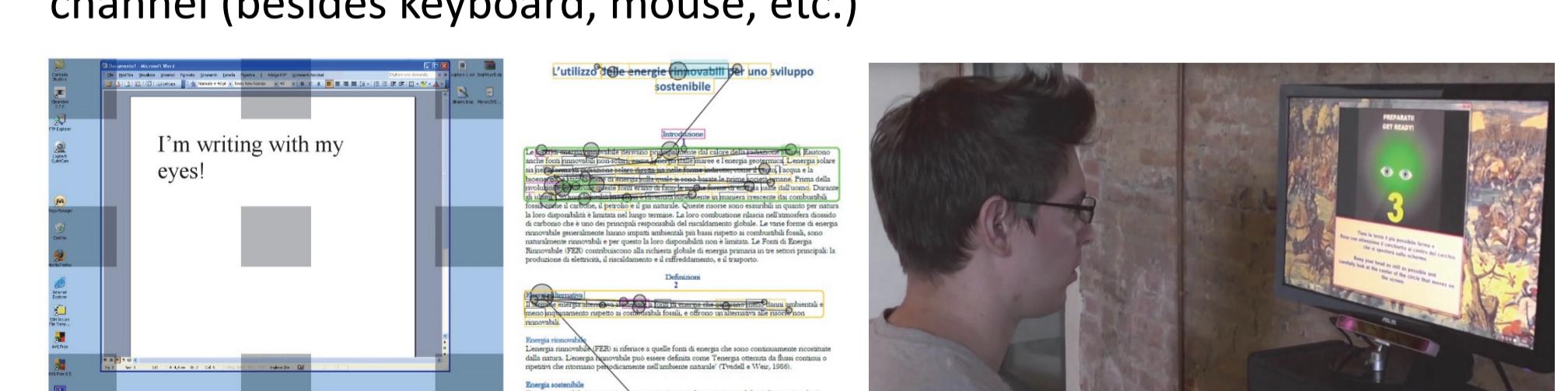
## Eye Tracking

Explicit and Implicit Gaze-Based Communication



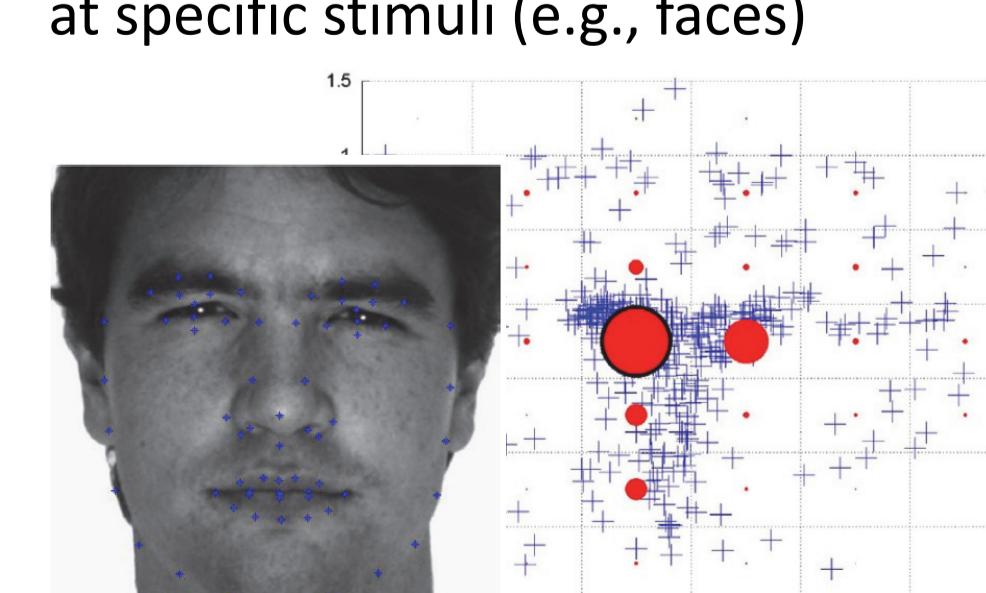
### Gaze Input

Using eye tracking as an assistive technology or as an additional input channel (besides keyboard, mouse, etc.)



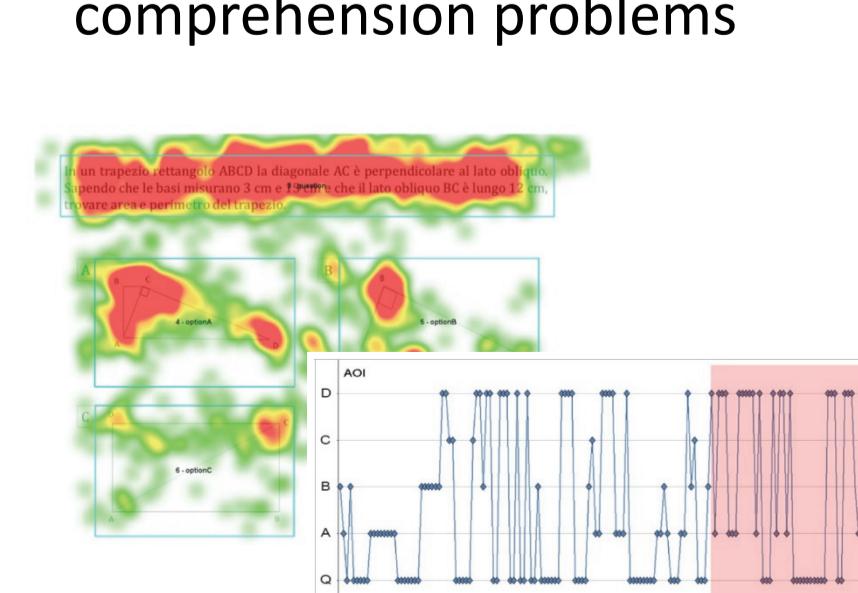
### Soft Biometrics

Identifying or verifying the identity of persons from the way they look at specific stimuli (e.g., faces)



### E-Learning

Understanding learners' behavior and detecting possible comprehension problems



### Automotive

Studying the driver's performance through cheap eye tracking solutions

