



Towards understandable computer assistance in medical domain



Student:
Sebastijan Dumančić

Promotor:
Hendrik Blockeel

Advisor:
Antoine Adam

Academic year 2013 - 2014

MOTIVATION

CONTEXT

Many diagnostics procedures rely on a **fluorescence microscopy imaging**

CAD systems can provide a **great help** to doctors, if they **can explain the result**

PROBLEM

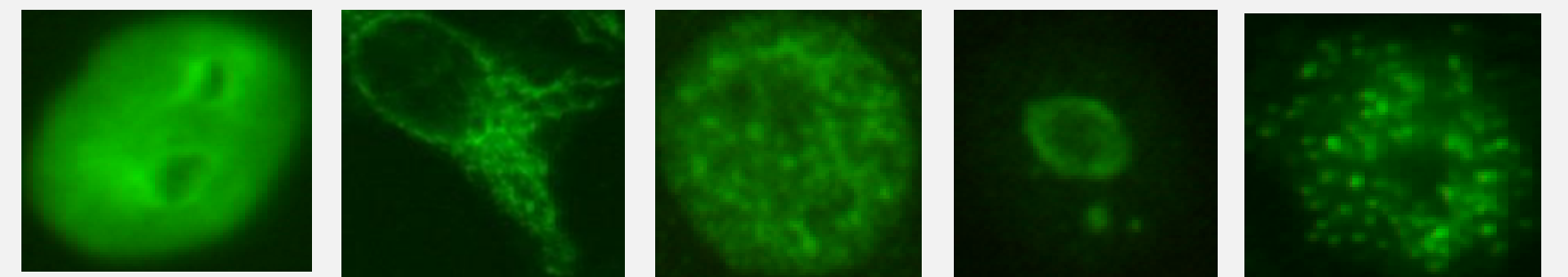
ANA test is the *golden standard* in autoimmune disease diagnostics

- ❌ Labor intensive
- ❌ Lacks standardization

GOAL

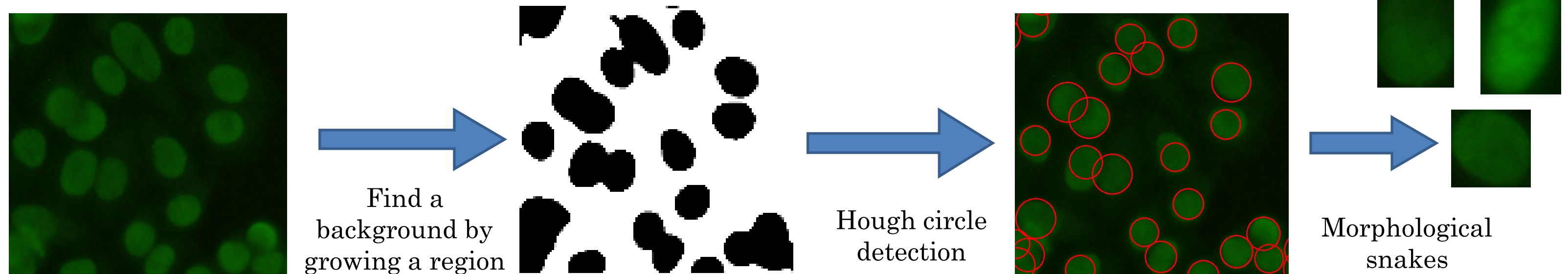
A rule-based system for staining pattern classification in microscopy diagnostics based on human interpretable models

Target patterns:

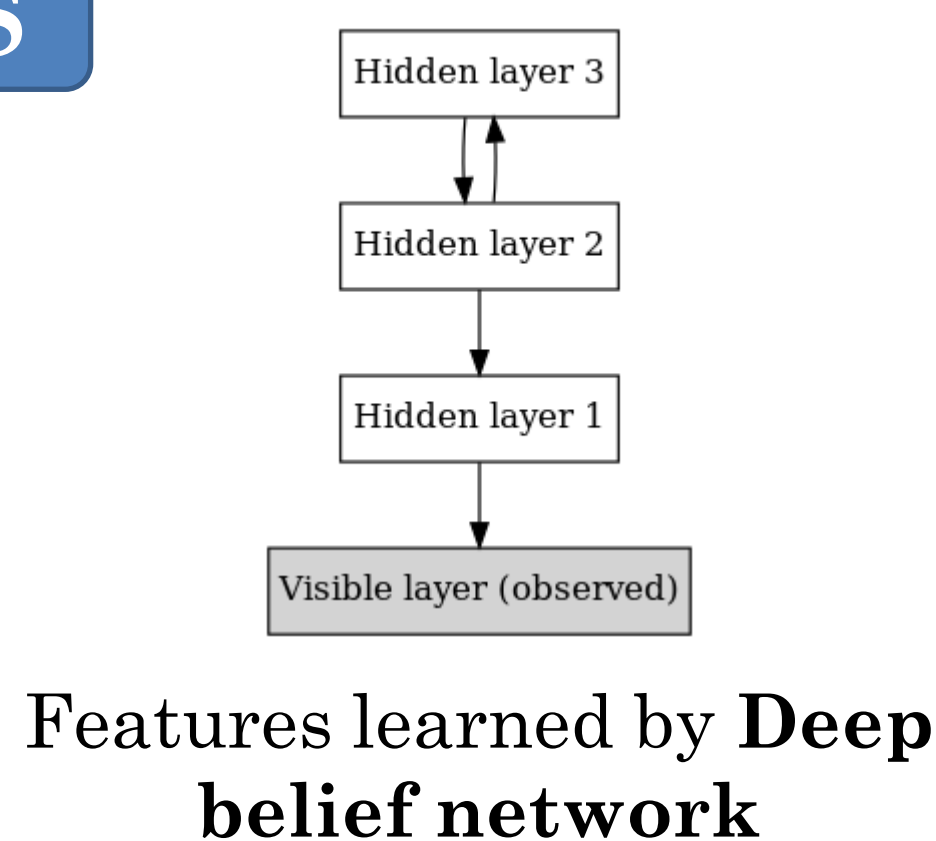
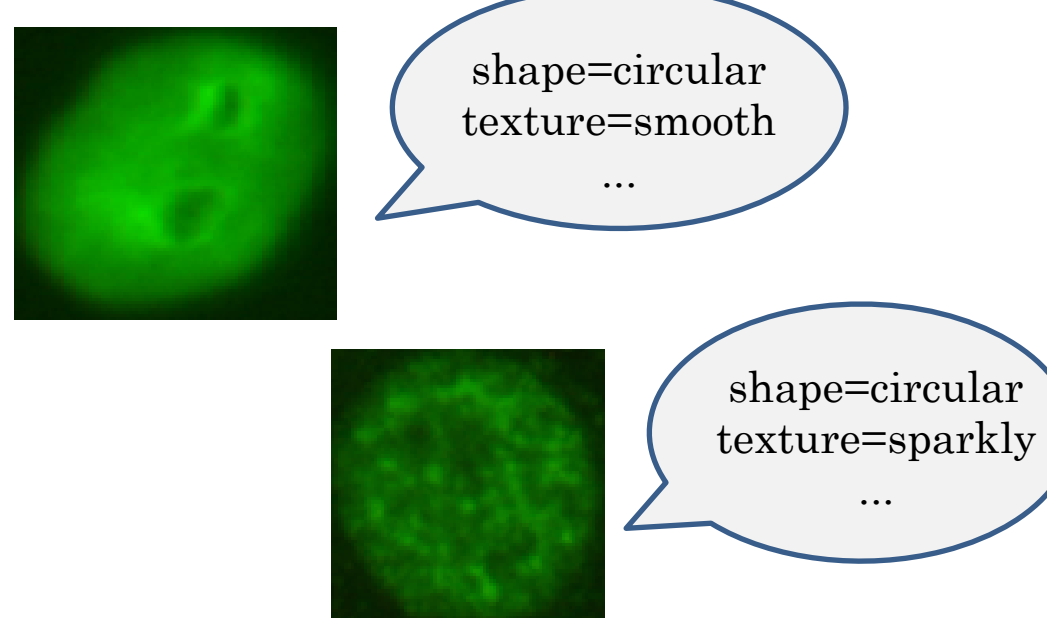


SYSTEM PIPELINE

SEGMENTATION



DESCRIBING CELLS



FEATURES

- shape
- texture
- number of organelles
- speckles
- type of organelles
- mitotic cells

INDUCE RULES

Cell id	Shape
1	circular
2	irregular
...	...

Cell id	Organelles
1	None
2	Few
...	...

Inductive Logic Programming

Class(X) <- shape(X, circular)...

Class(Y) <- texture(Y, smooth)...

Class(Z) <- OrgType(Z, dark)...