QLS Breakfast

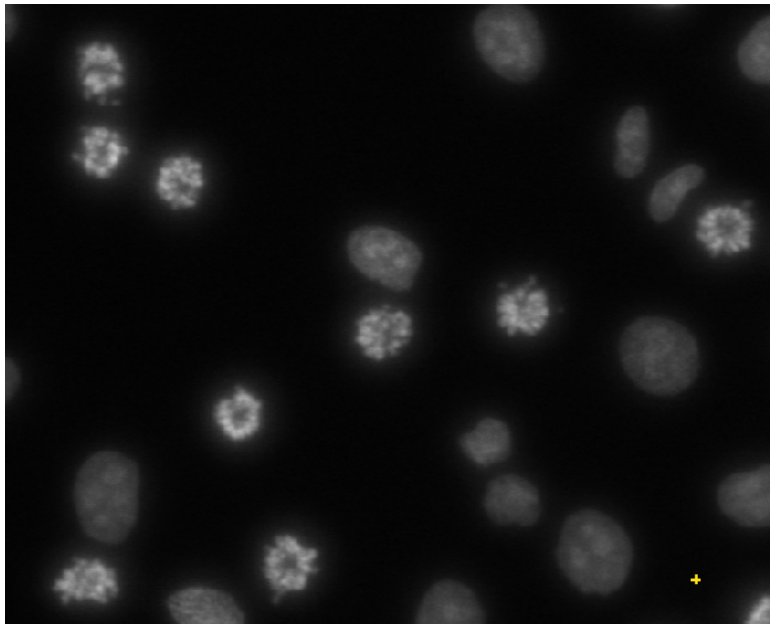
Alvin(Ziqi) Lu

Di Talia lab

02/21/2024

qlscenter@duke.edu

Goal of Biological Image Processing



	Cell type	Position	Size	Intensity_C1	Intensity_C2	…
Cell1						
Cell2						
…						

Goal of Biological Image Processing

	Cell type	Position	Size	Intensity_C1	Intensity_C2	…
Cell1						
Cell2						
…						

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ilastik the interactive learning and segmentation toolkit

Leverage machine learning algorithms to easily segment, classify, track and count your cells or other experimental data. Most operations are interactive, even on large datasets: you just draw the labels and immediately see the result.
No machine learning expertise required.

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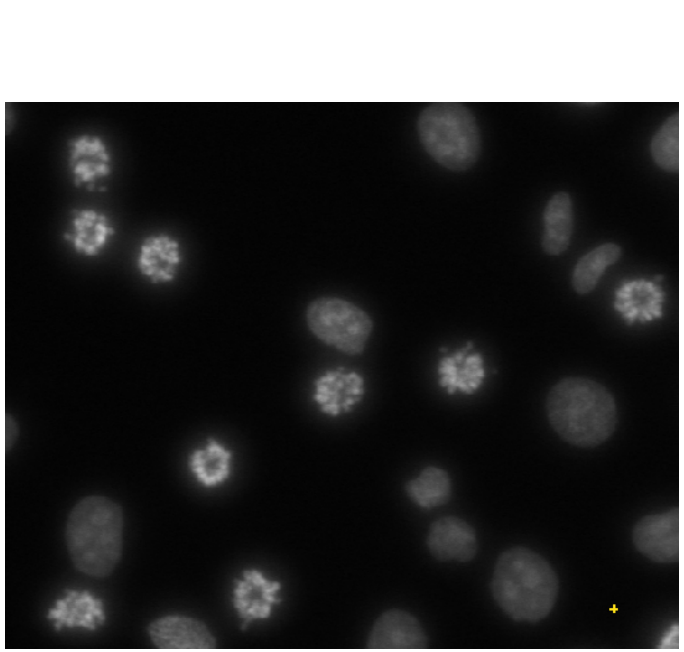
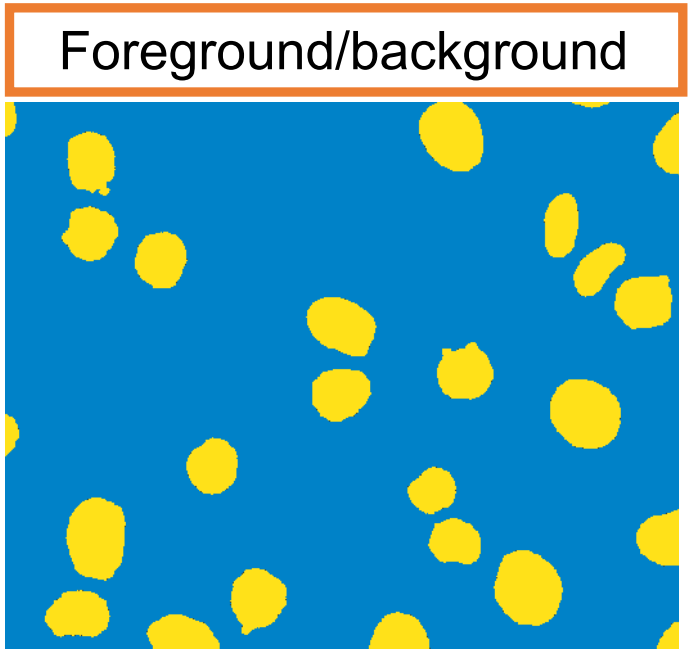
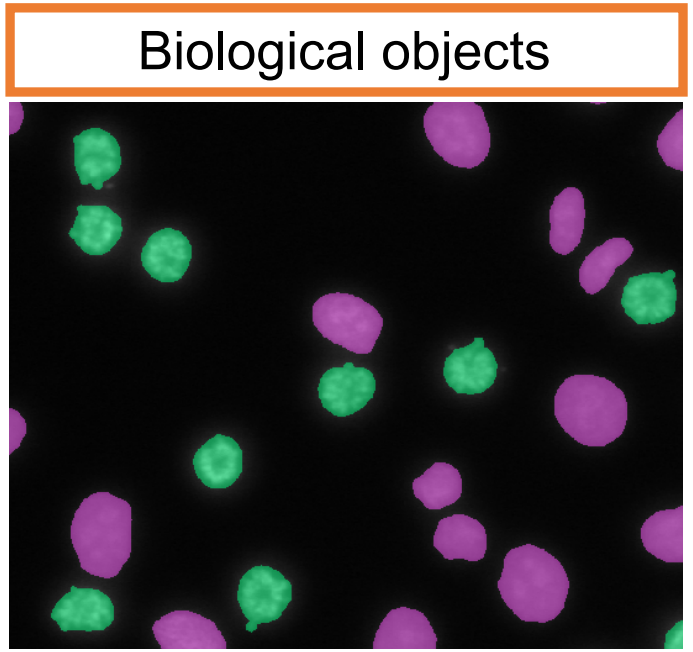
What does Ilastik do?







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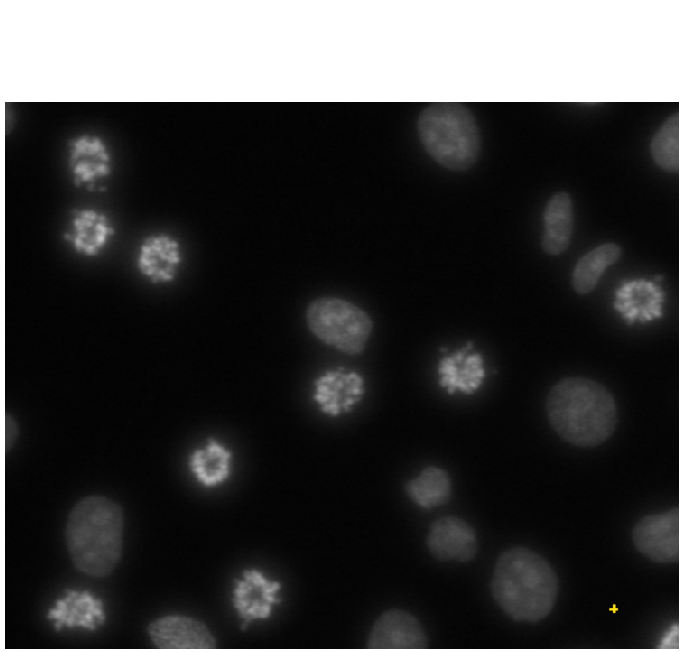

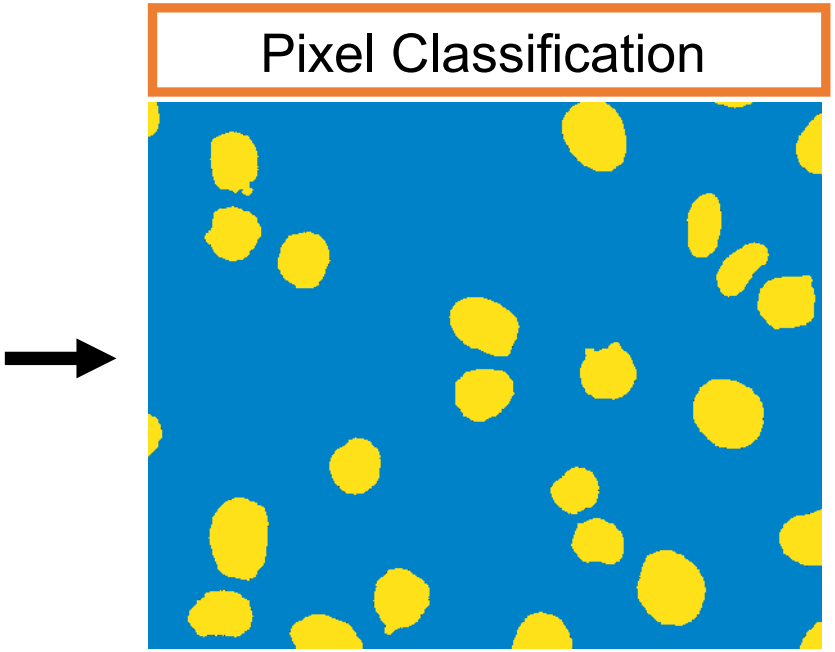

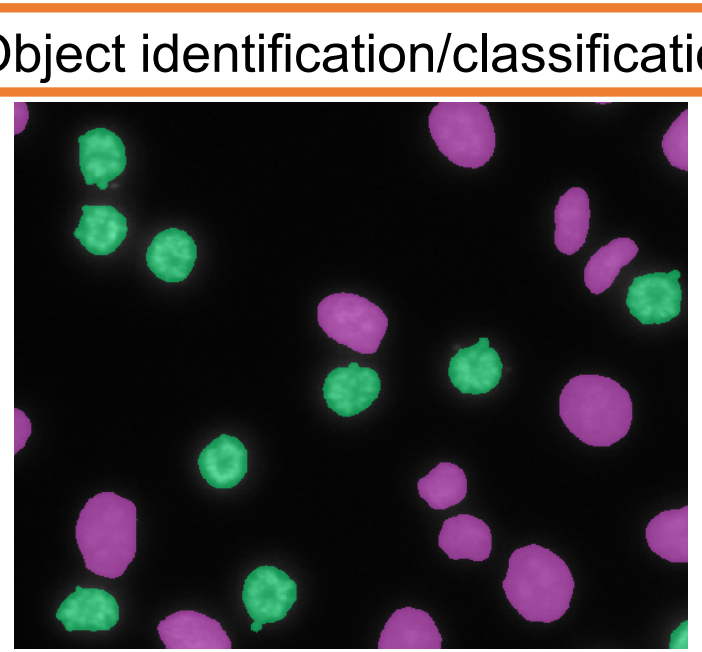

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…						

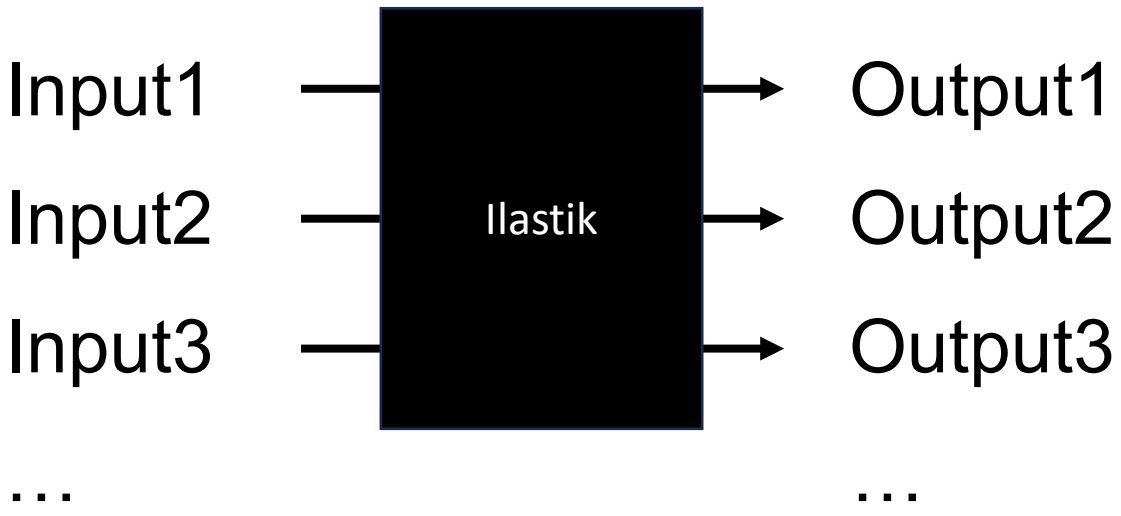
What does Ilastik do?

Documentati

How does Ilastik do it?

Pixel Classification

Object Classification



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Pixel Classification

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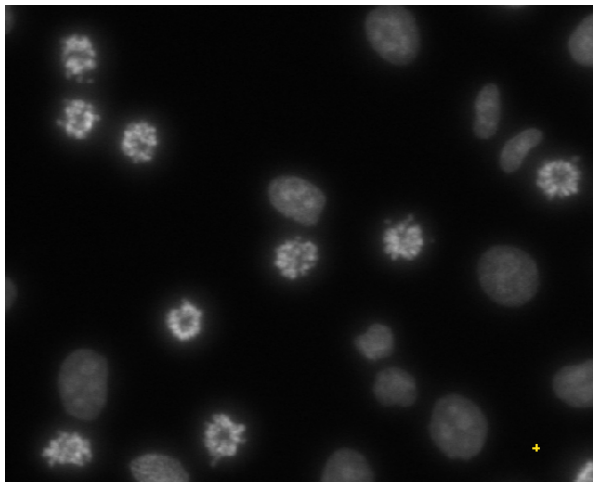
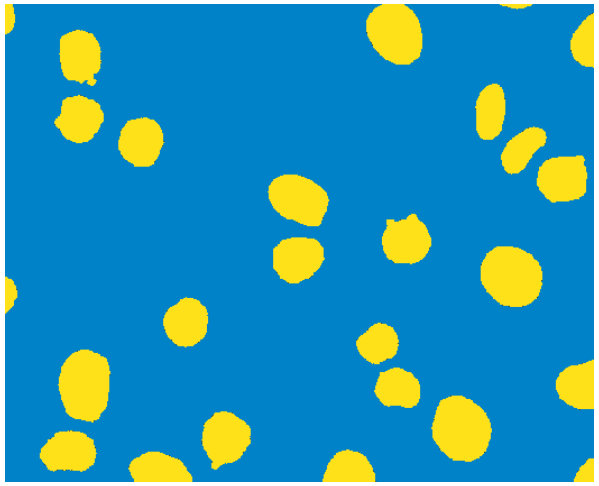


Pixel1
Pixel2
Pixel3
…

Ilastik

Foreground
Background
Background
…



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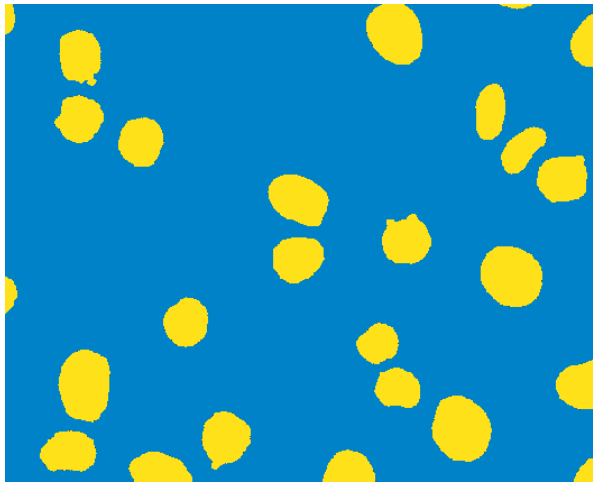
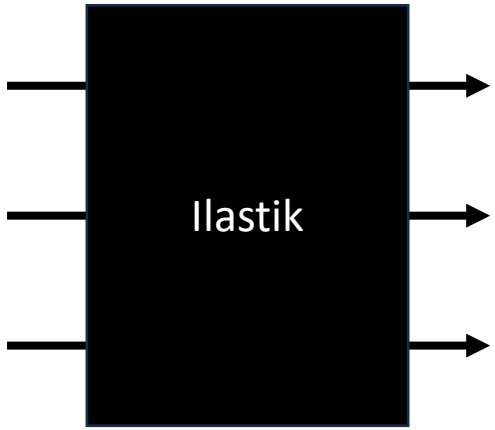


Cell1

Cell2

Cell3

…

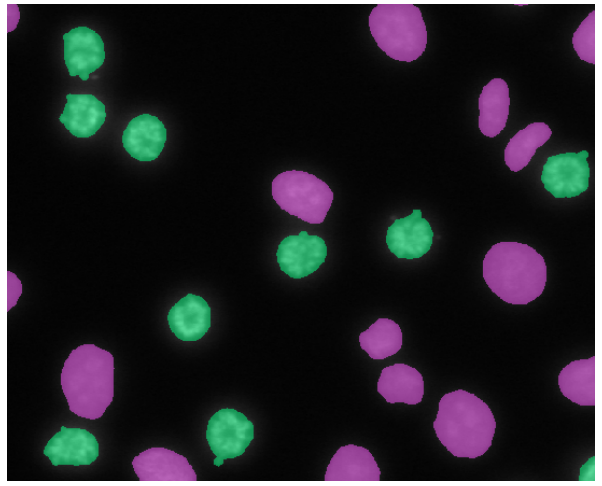


Cell type1

Cell type2

Cell type1

…



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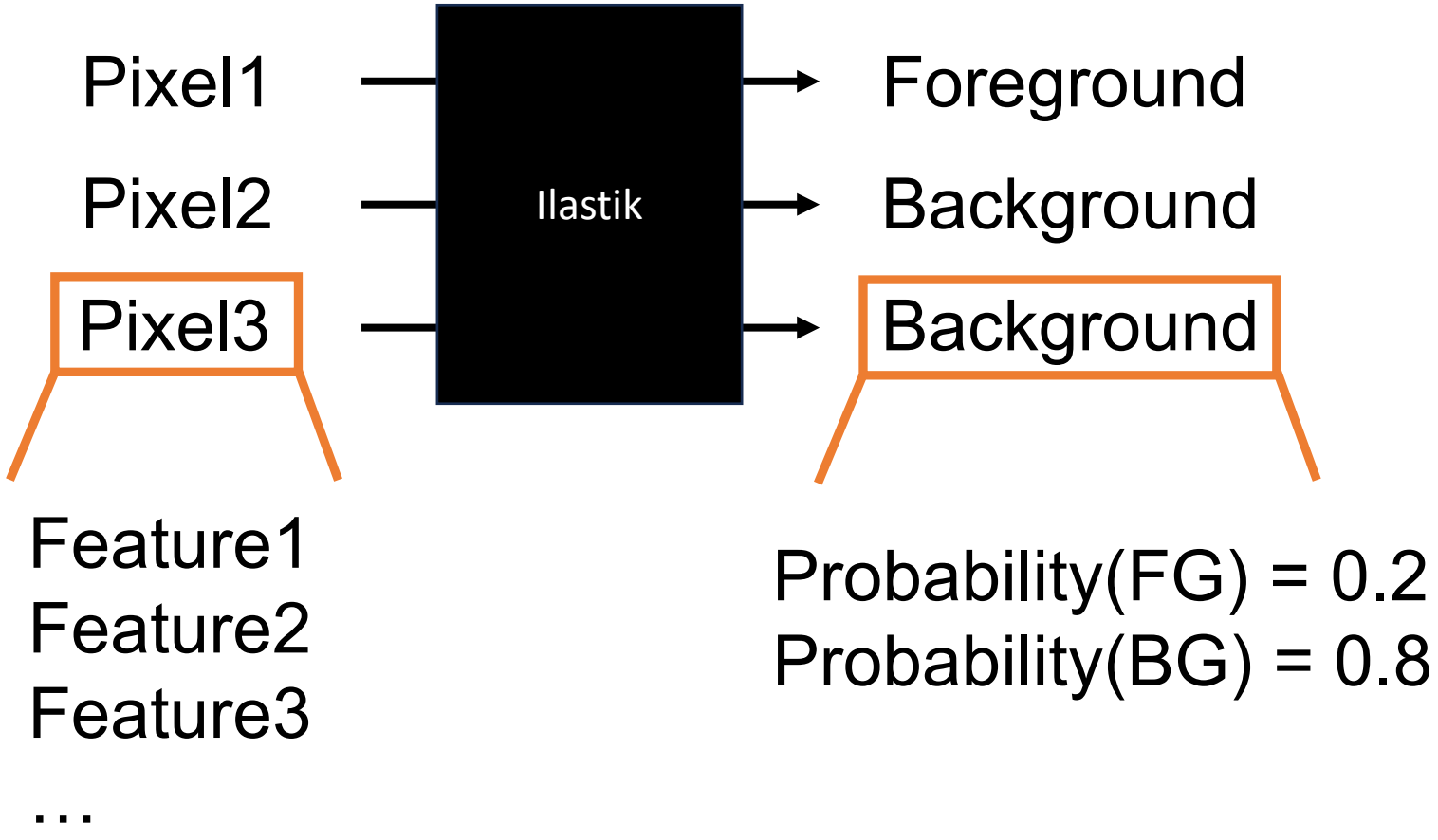

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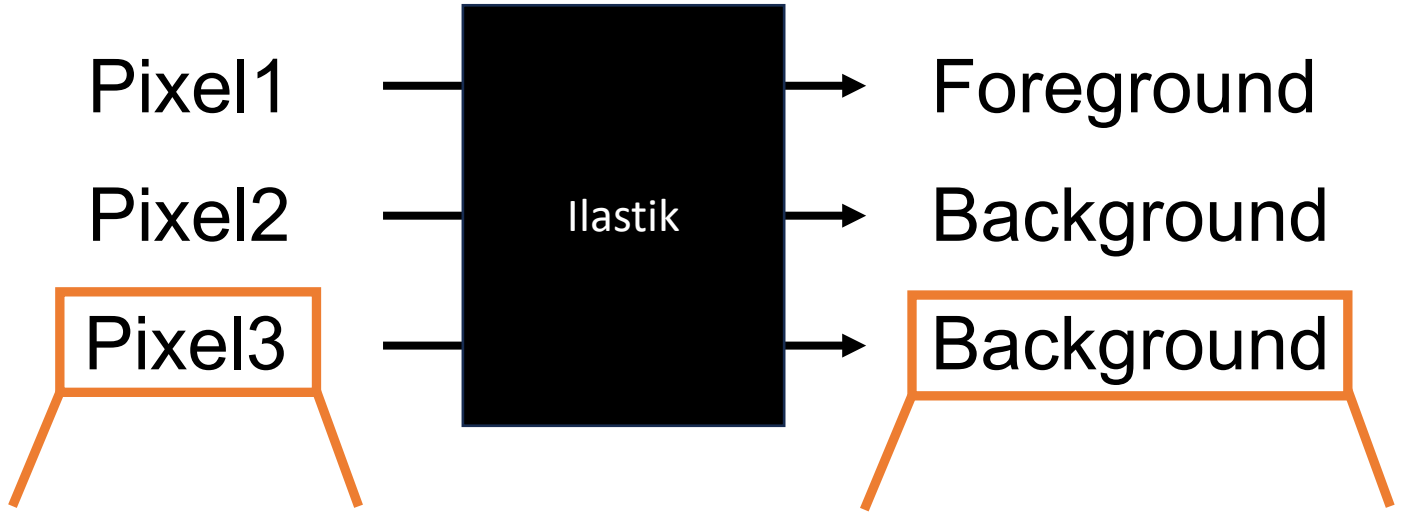

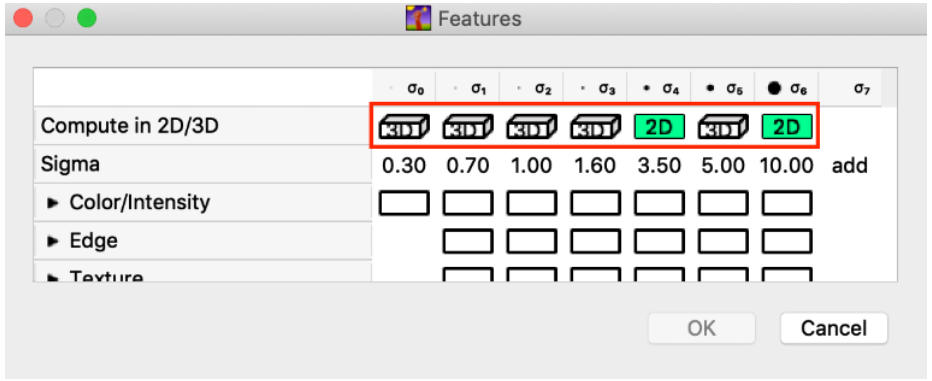

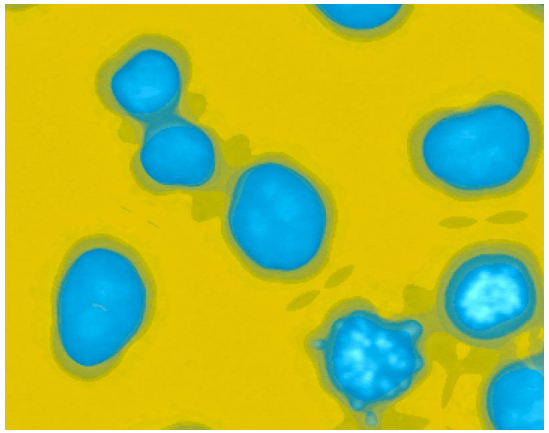

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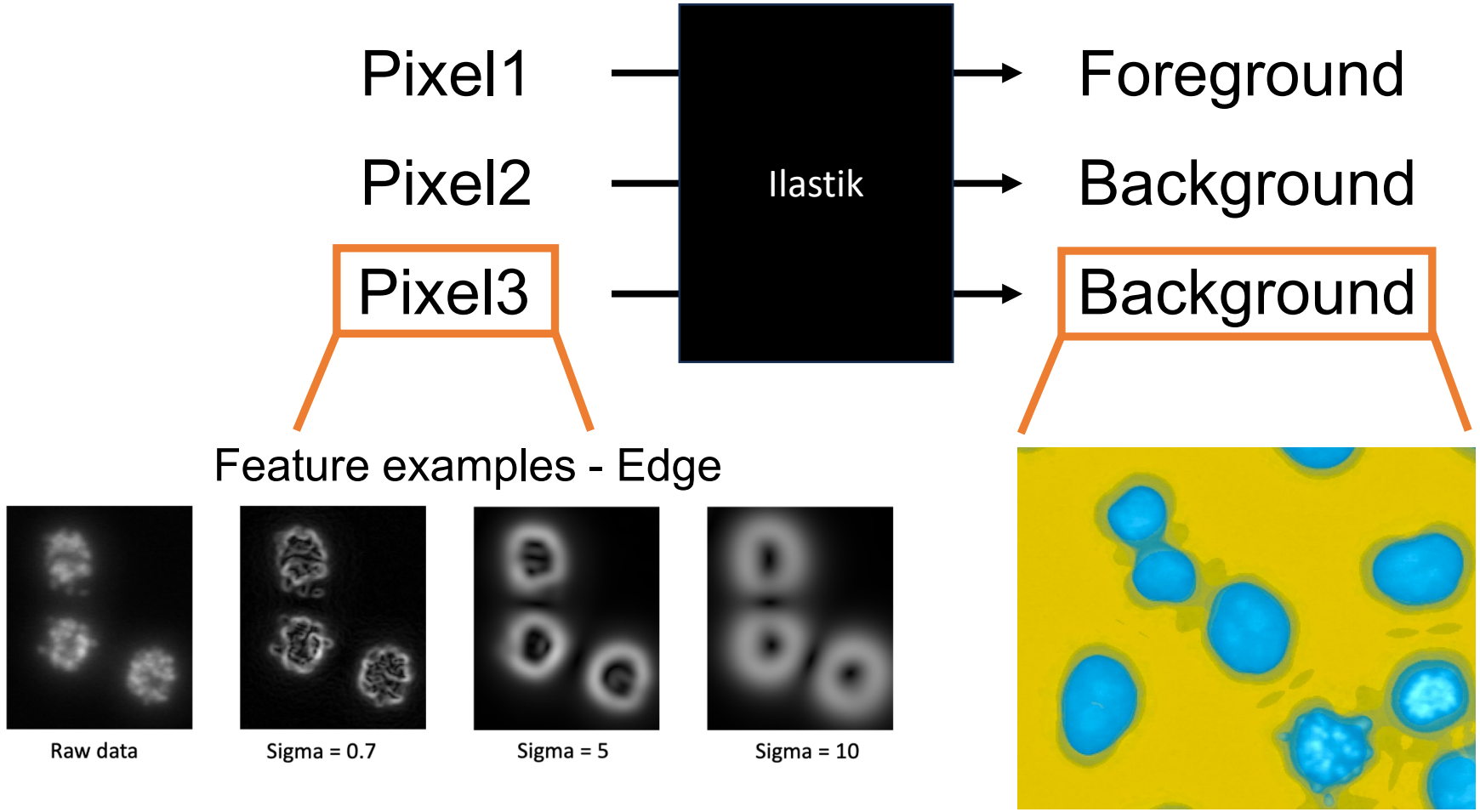

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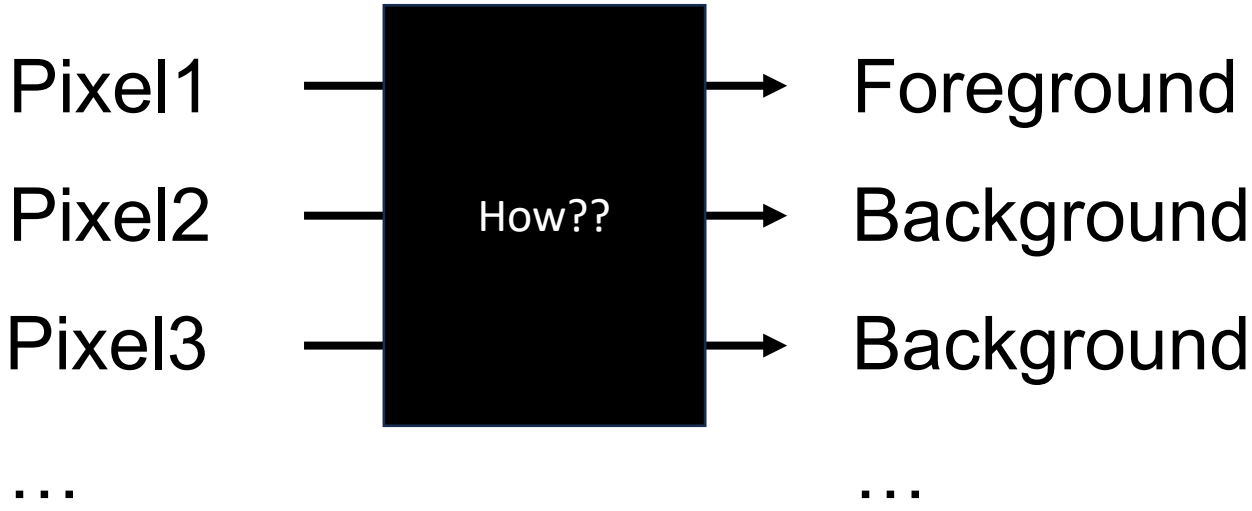

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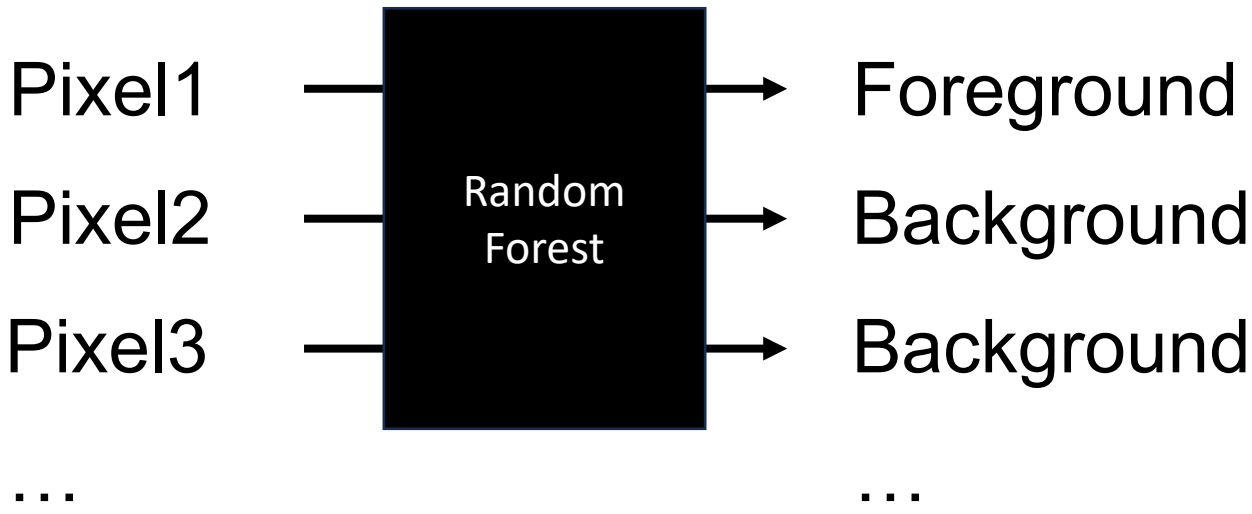
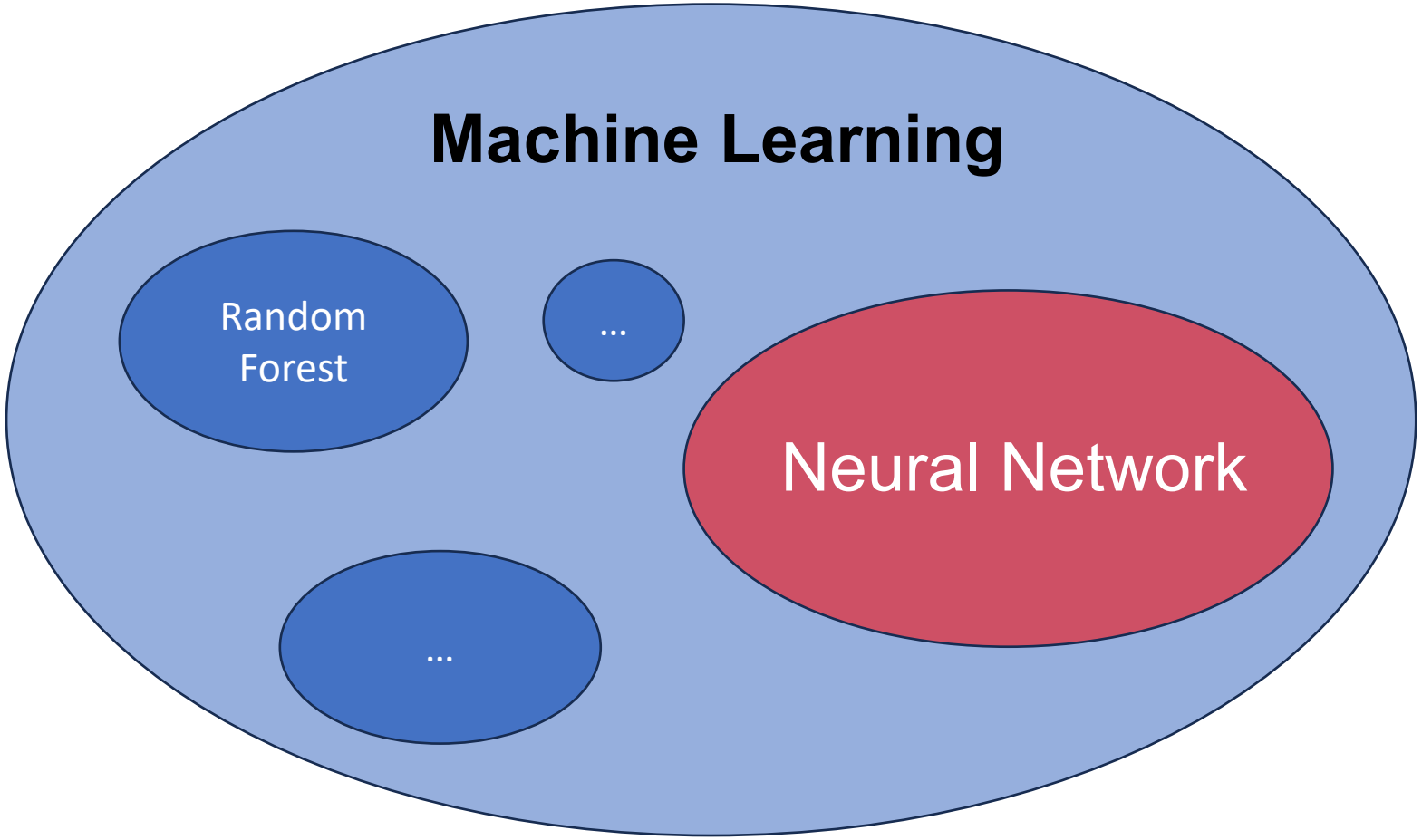
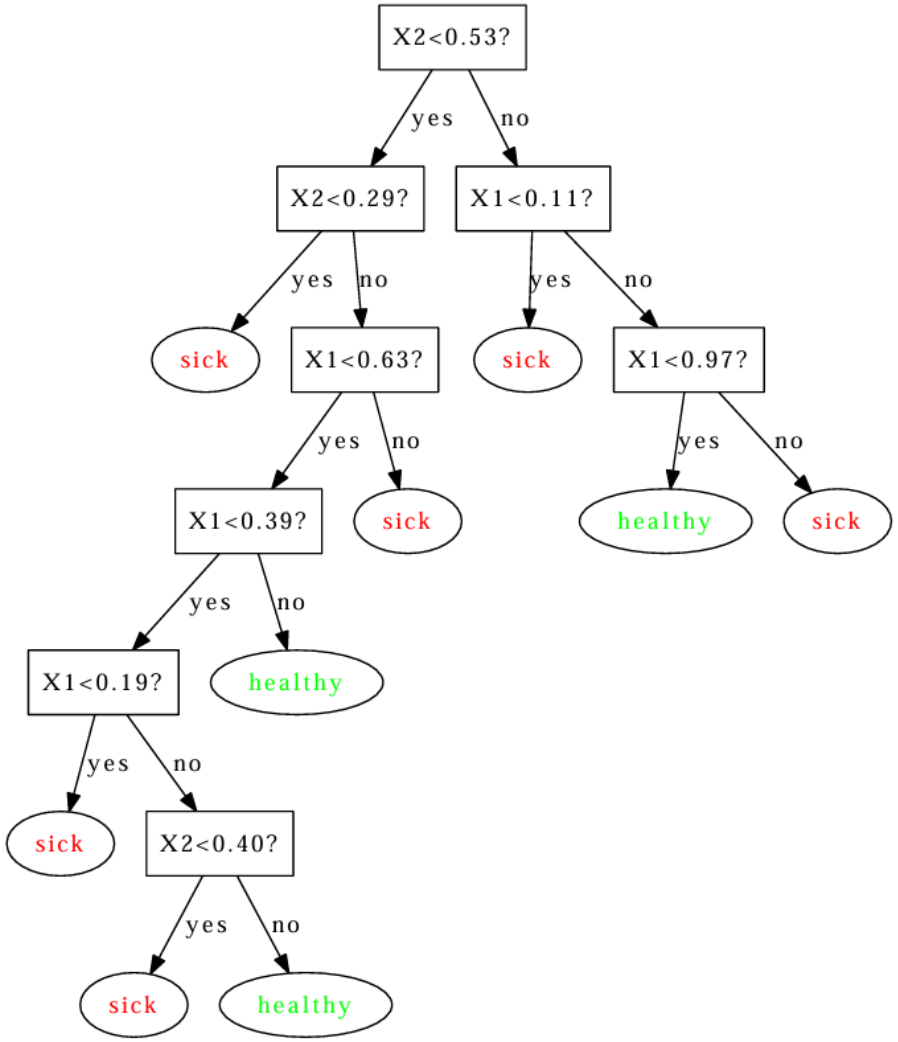


How does Ilastik do it? – Random Forest



Random Forest is made of Decision Trees



Input features:
X1: Intensity of Channel1
X2: Intensity of Channel2

Output classes:
Healthy Cells
Sick Cells

Geurts P et al., 2009, *Mol Biosyst*

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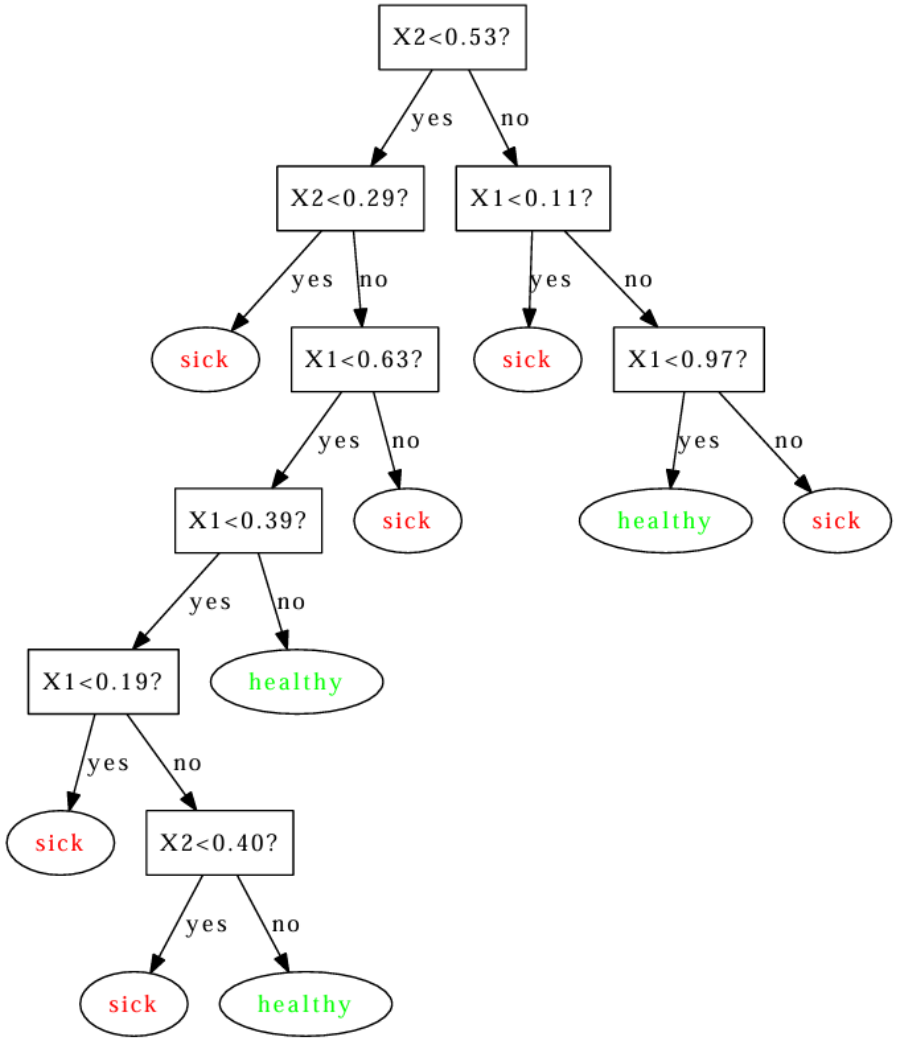

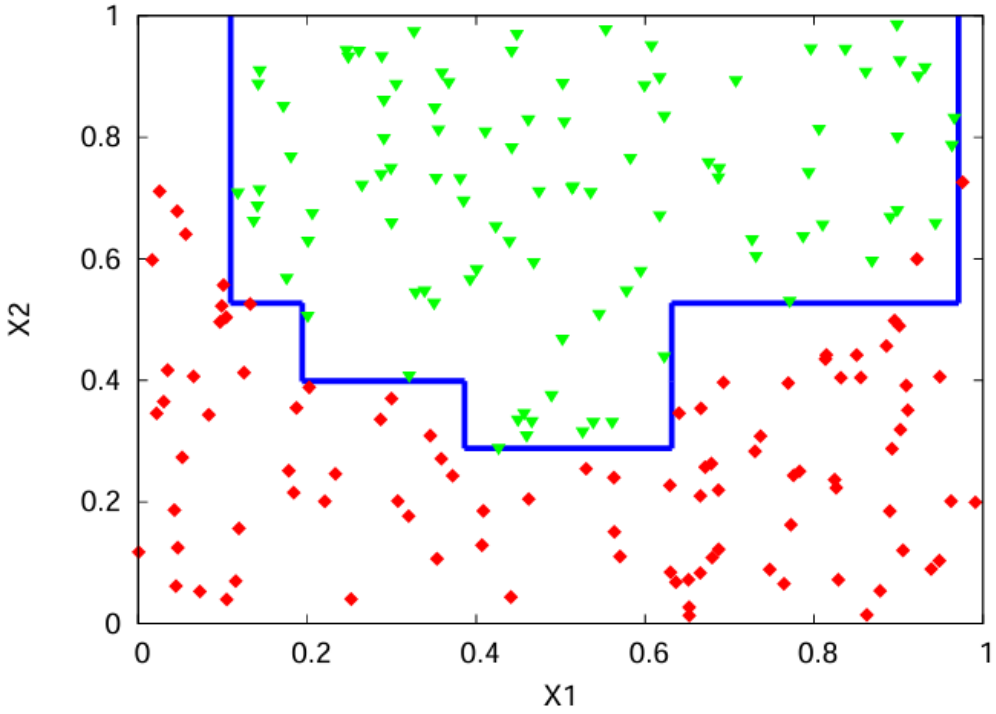

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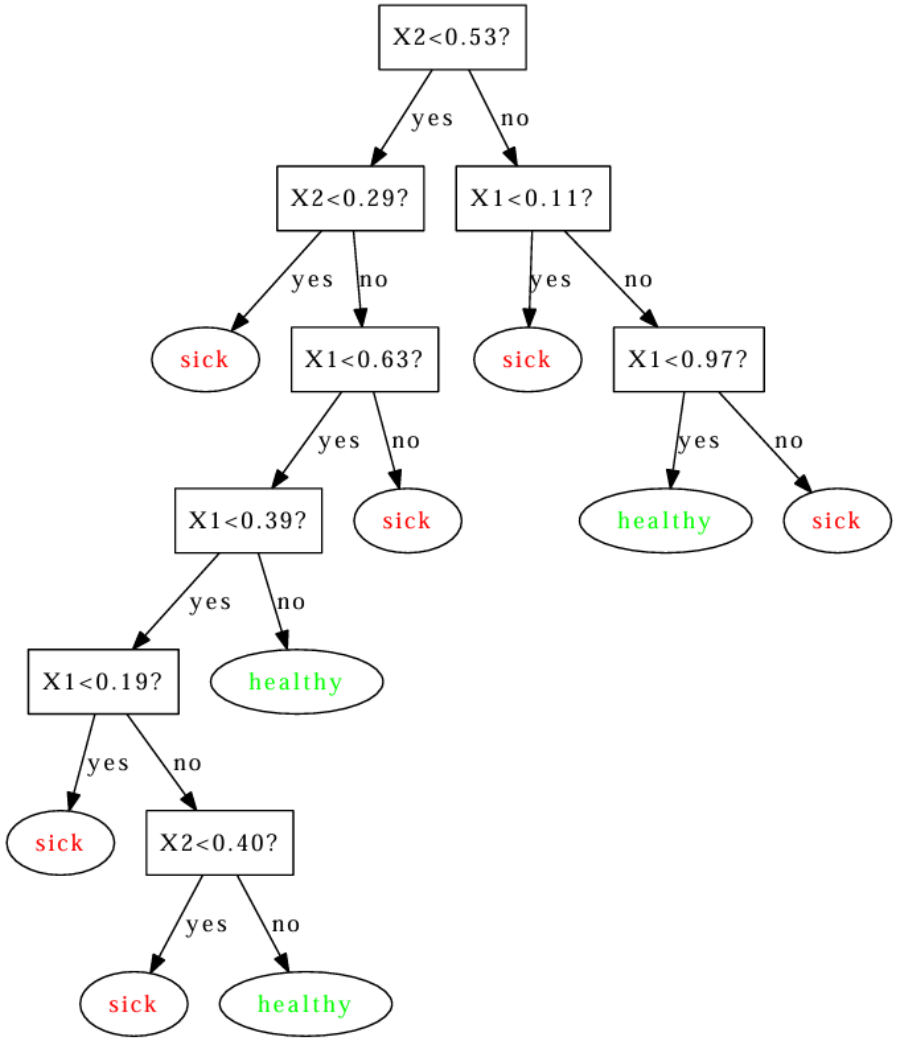

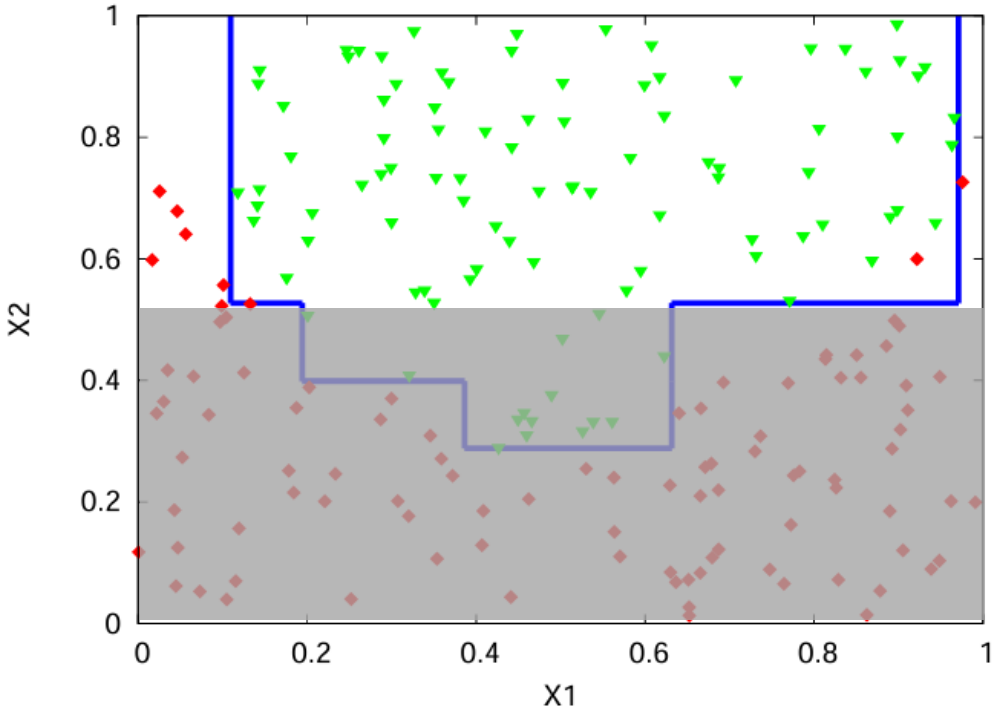

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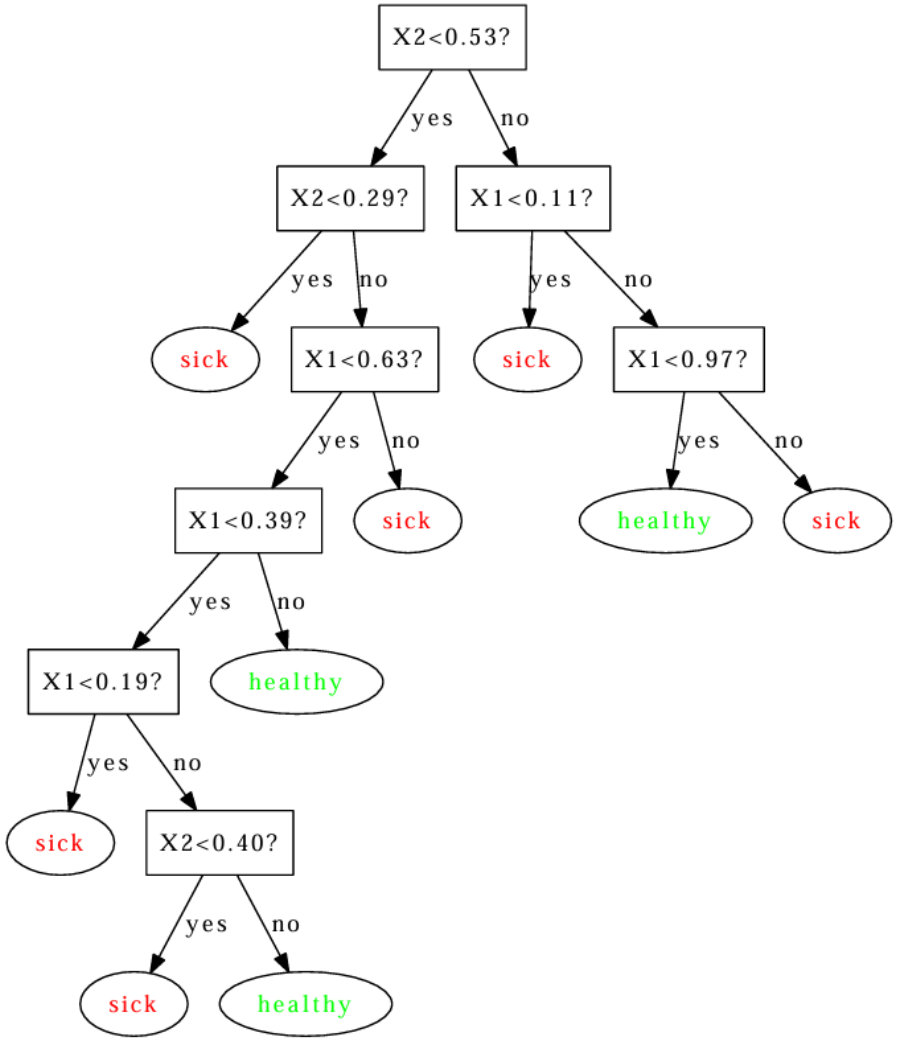

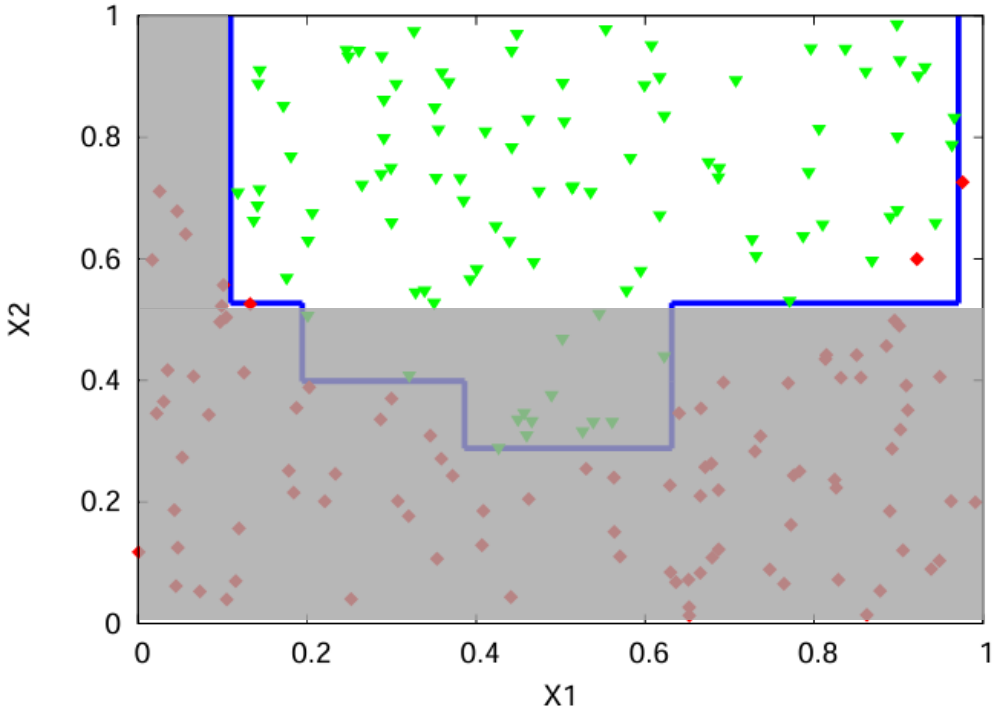

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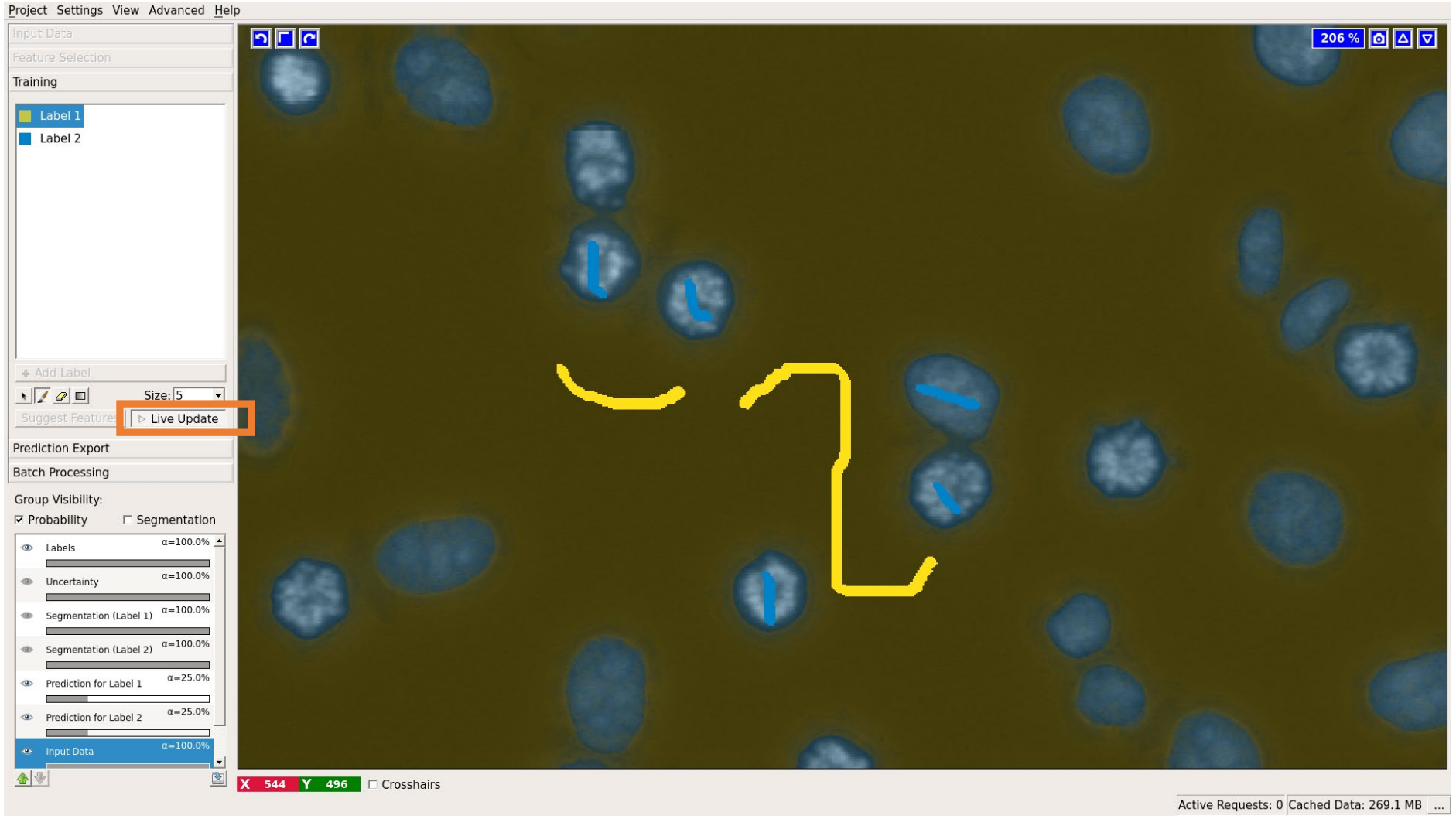
Machine learning requires training data



Thank you!
And Demo time

qlscenter@duke.edu
ziqi.lu@duke.edu