Other approaches to attempt Object Detection

Naïve Approach

Naïve Approach

Pro:

Naïve Approach

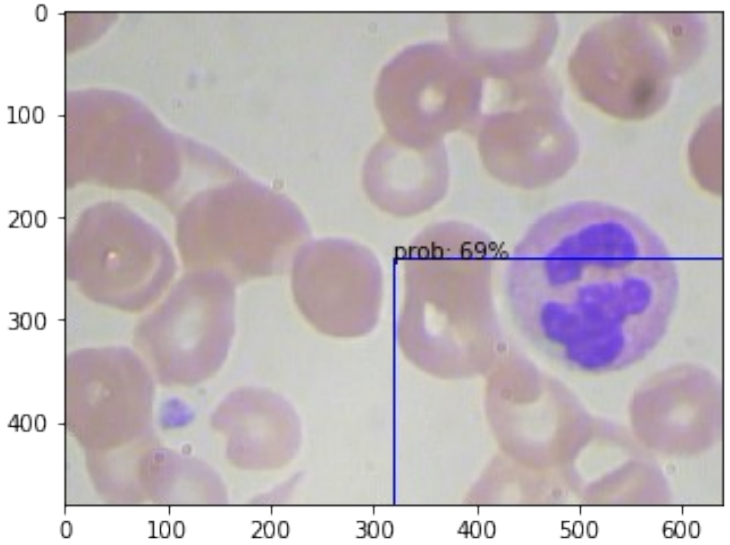
Pro:

- It is easy to implement

Naïve Approach

Pro:

- It is easy to implement
- Worked well



Naïve Approach

Pro:

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Cons:

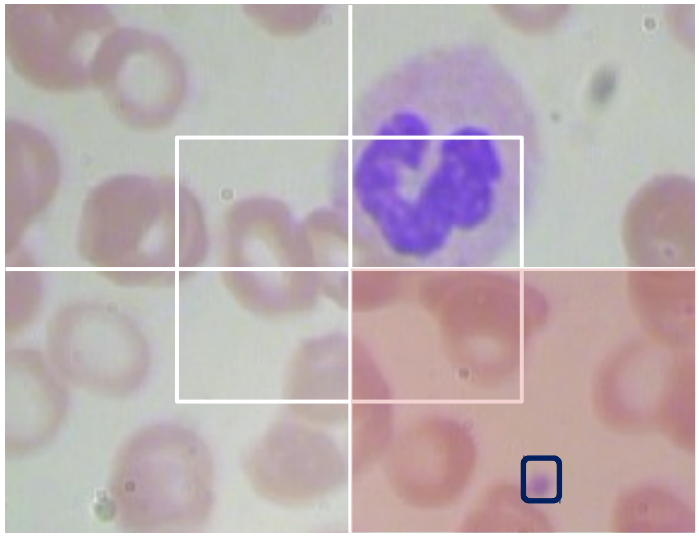
Naïve Approach

Pro:

- It is easy to implement
- Worked well

Cons:

- Have patches of incorrect aspect ratio



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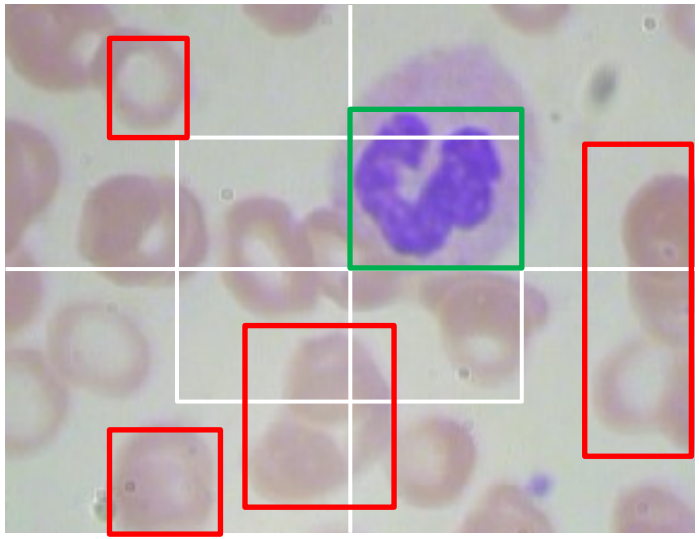

Naïve Approach

Pro:

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Cons:

- Have patches of incorrect aspect ratio
- Fails for Multiple Object – Mutiple Class

Naïve Approach

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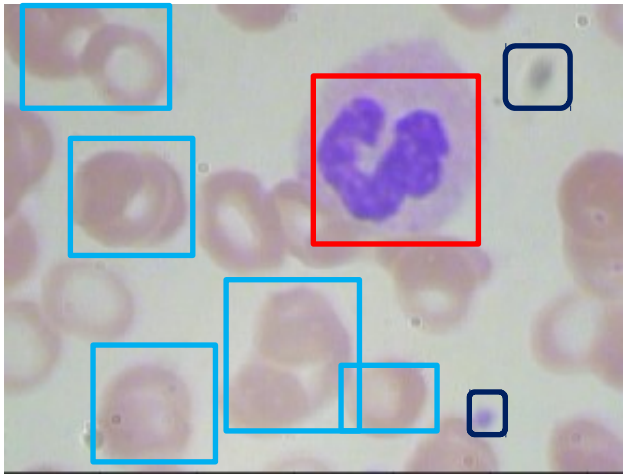

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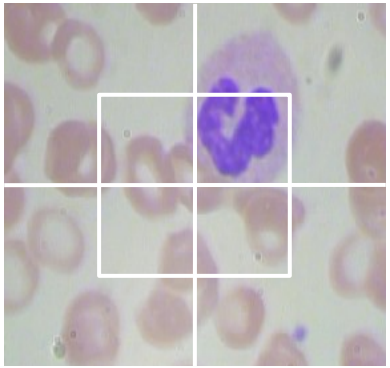
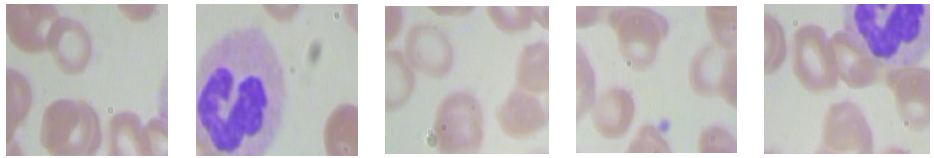


Cons:

- Have patches of incorrect aspect ratio
- Fails for Multiple Object – Mutiple Class
- Increased prediction iteration per image



Naïve Approach

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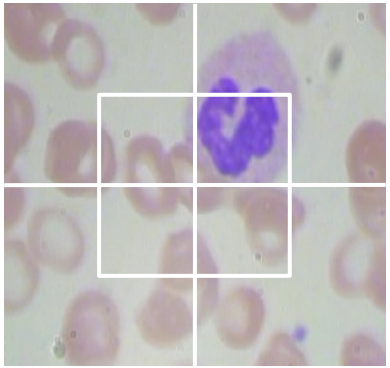
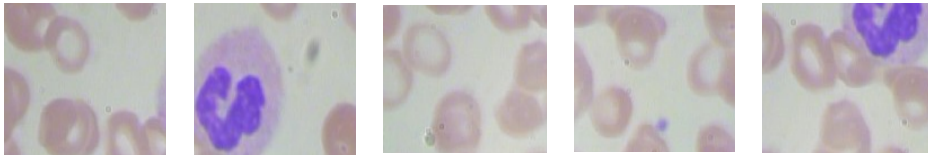


Cons:

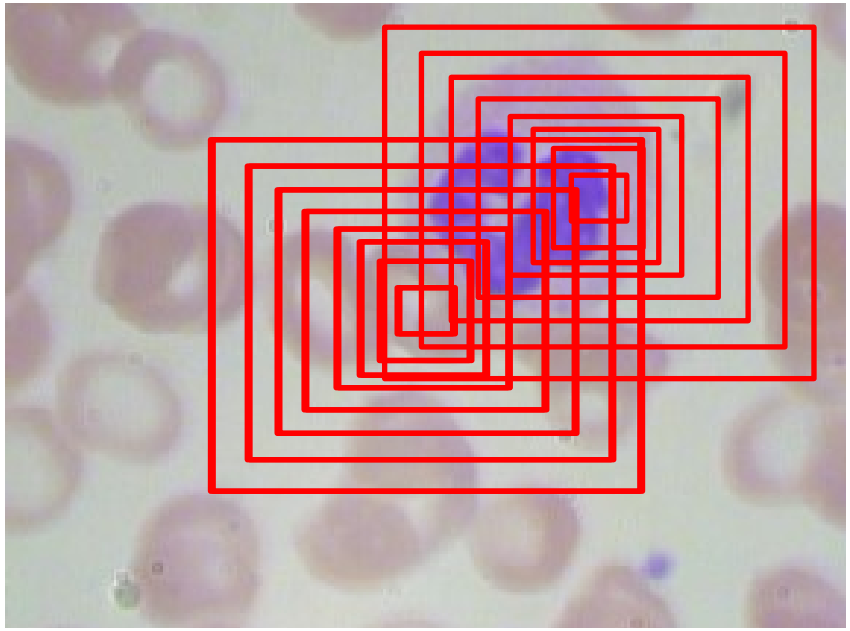
- Have patches of incorrect aspect ratio
- Fails for Multiple Object – Mutiple Class
- Increased prediction iteration per image
- Have increased the noise in the data



Other Approaches

Approach 2 :
Increase the number of patches

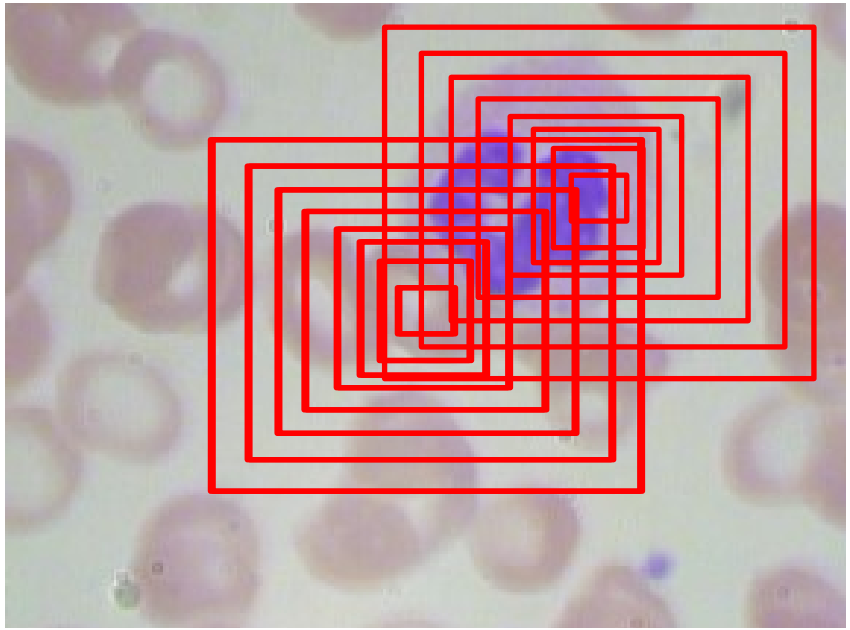
Increase the number of patches



Increase the number of patches

Cons:

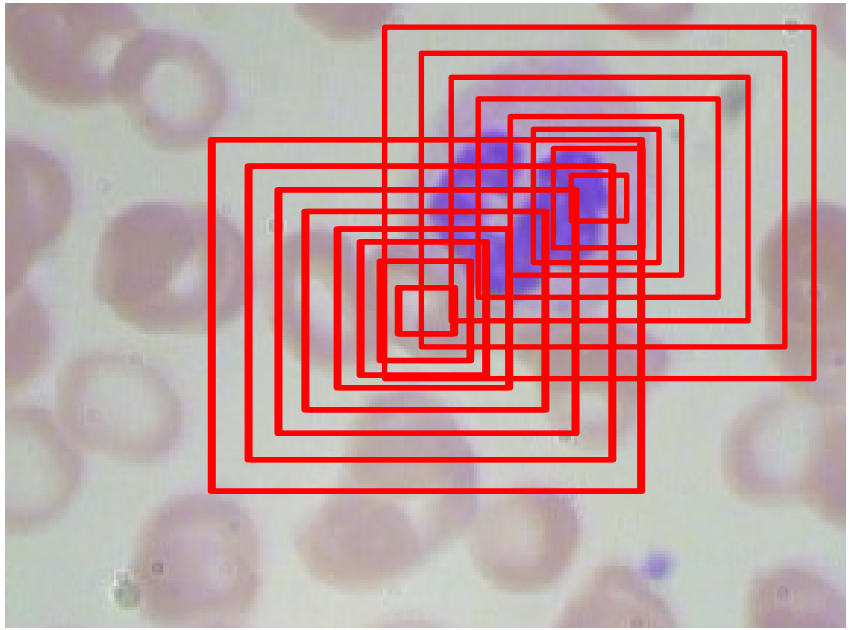
- Having more divisions leads to more prediction iterations



Increase the number of patches

Cons:

- Having more divisions leads to more prediction iterations
- Many bounding boxes are approximating the same thing

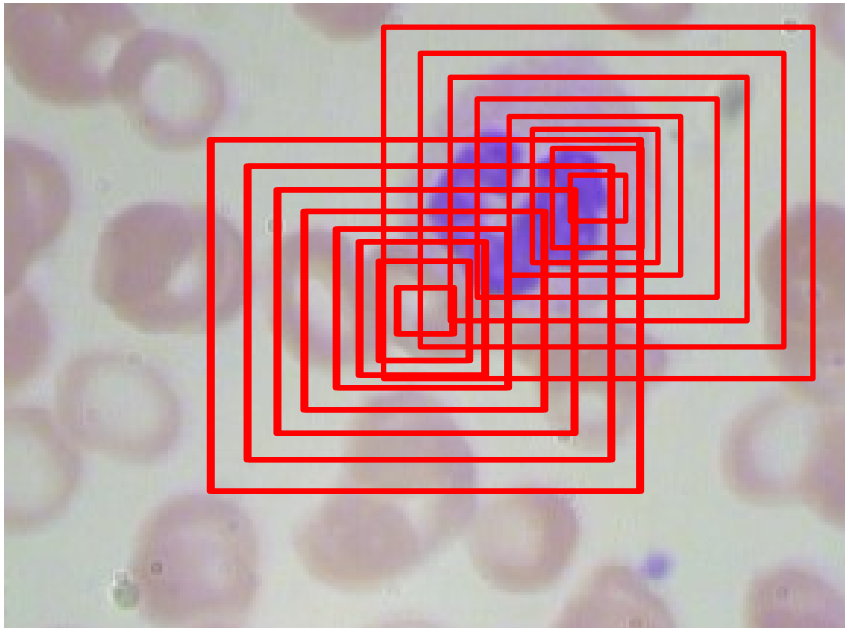


Increase the number of patches

Cons:

- Having more divisions leads to more prediction iterations
- Many bounding boxes are approximating the same thing

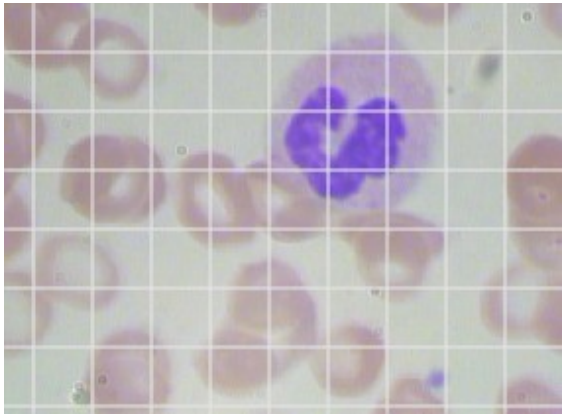
Solution: Perform Structured Divisions



Approach 3 :
Perform Structured divisions

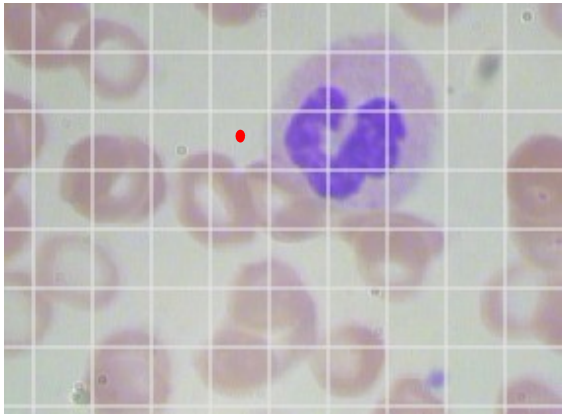
Perform Structured divisions

- Divide the image into a 10 X 10 grid



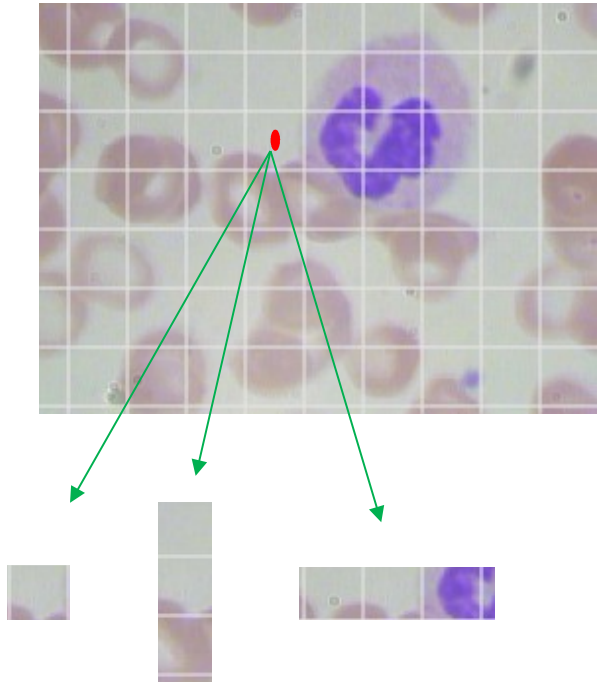
Perform Structured divisions

- Divide the image into a 10 X 10 grid
- Define centroid of each grid cell



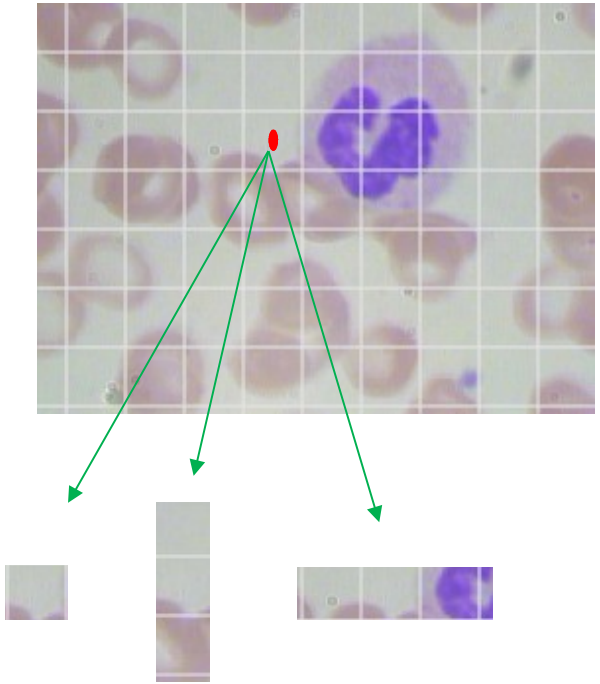
Perform Structured divisions

- Divide the image into a 10 X 10 grid
- Define centroid of each grid cell
- Take three different patches of different aspect ratio for defined centroids
- Start training model based on these derived (structured) patches



Perform Structured divisions

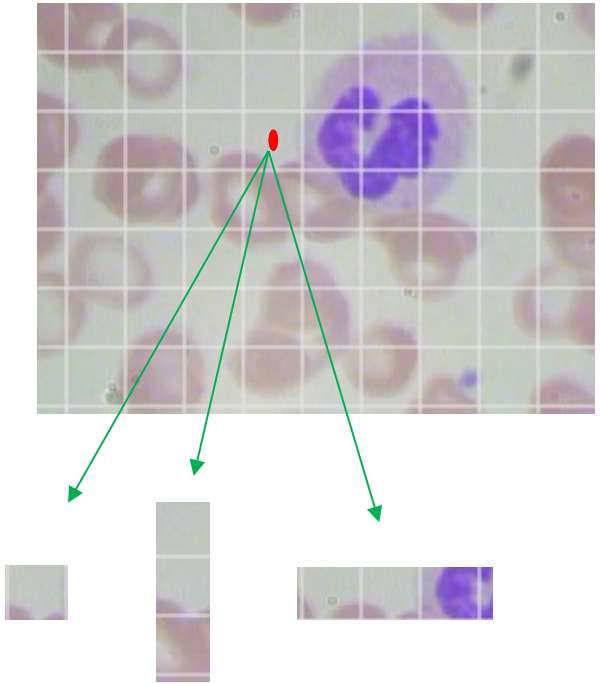
- Have defined patches of three different aspect ratio
- Have increased the patches from 5 to 300



Approach 4 :
Becoming more efficient

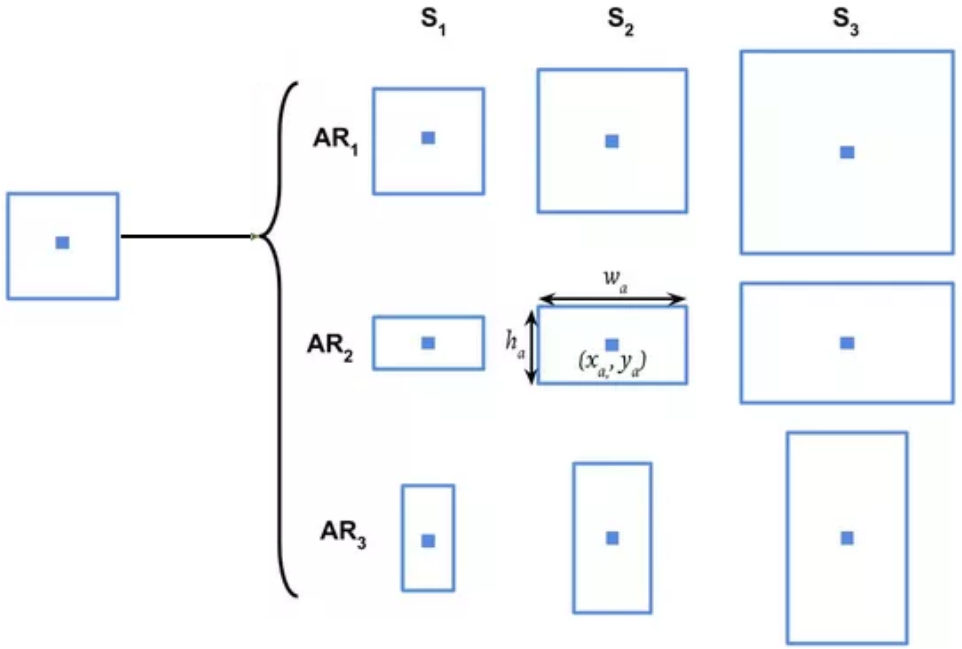
Becoming more efficient

- Focus on covering different aspect ratio



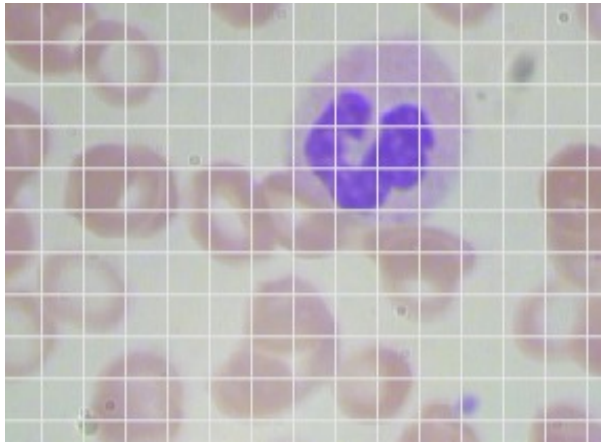
Becoming more efficient

- Focus on covering different aspect ratio



Becoming more efficient

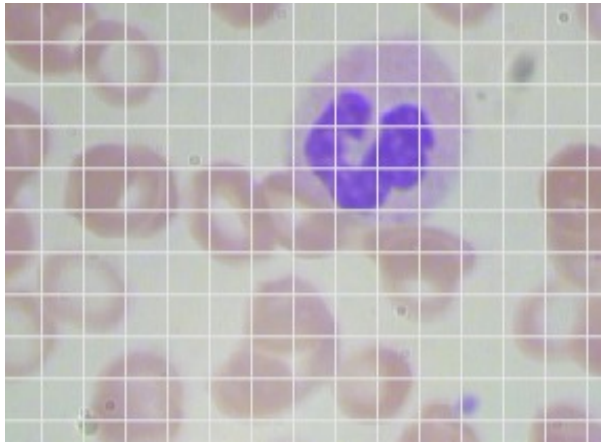
- Focus on covering different aspect ratio
- Increase anchor boxes and take more patches



20x20 Grid

Becoming more efficient

- Focus on covering different aspect ratio
- Increase anchor boxes and take more patches
- Issue : Drastic increase in number of patches

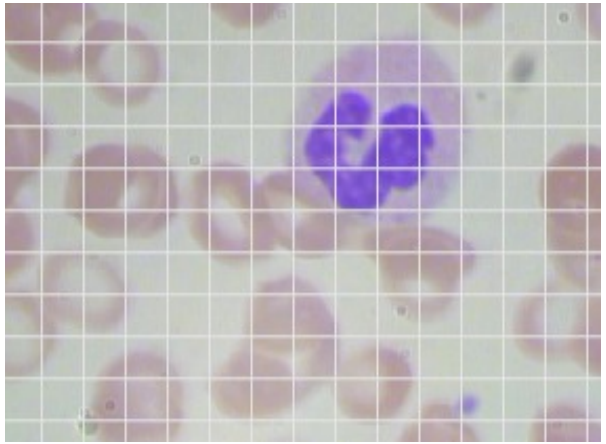


20x20 Grid

Becoming more efficient

- Focus on covering different aspect ratio
- Increase anchor boxes and take more patches

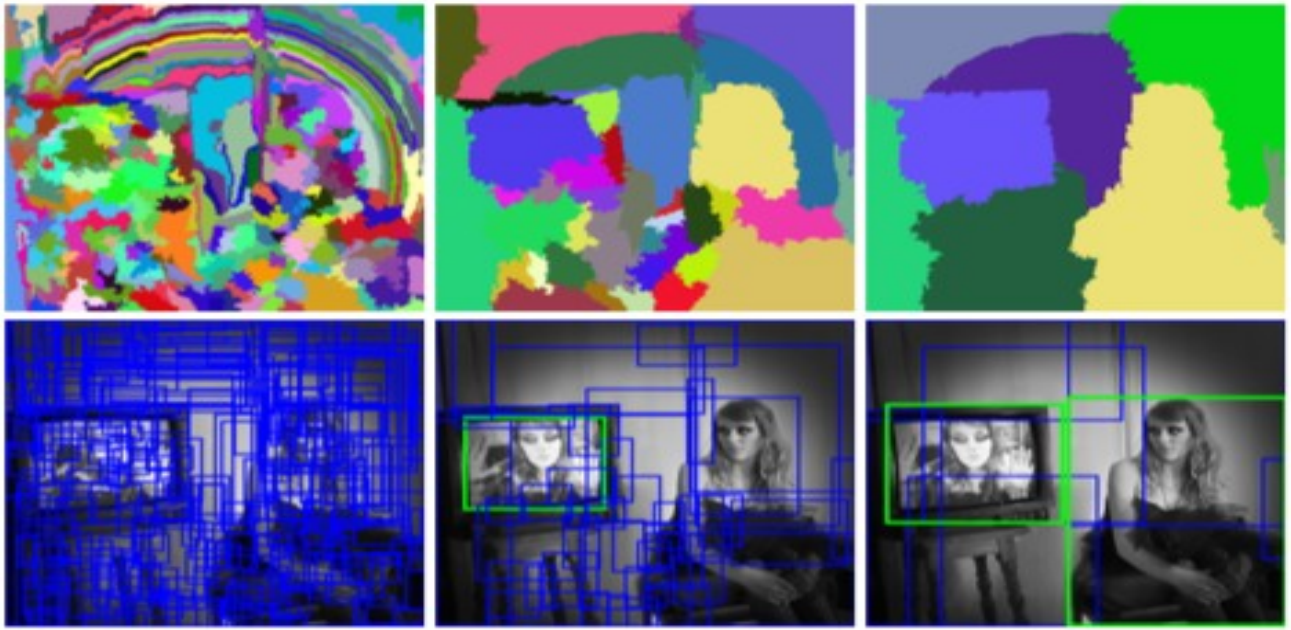
- Issue : Drastic increase in number of patches
- Solution : Patch Selection



20x20 Grid

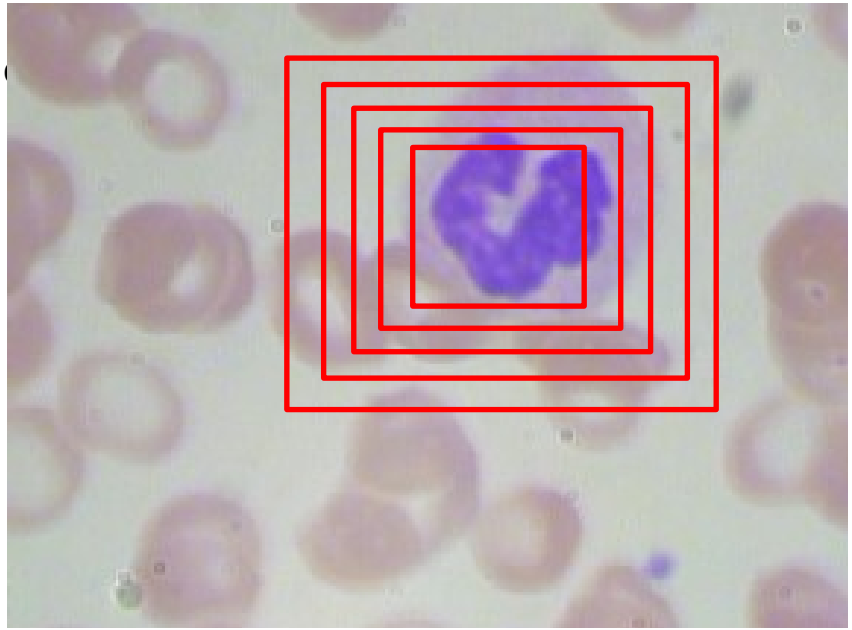
Becoming more efficient

- Solution : Patch Selection



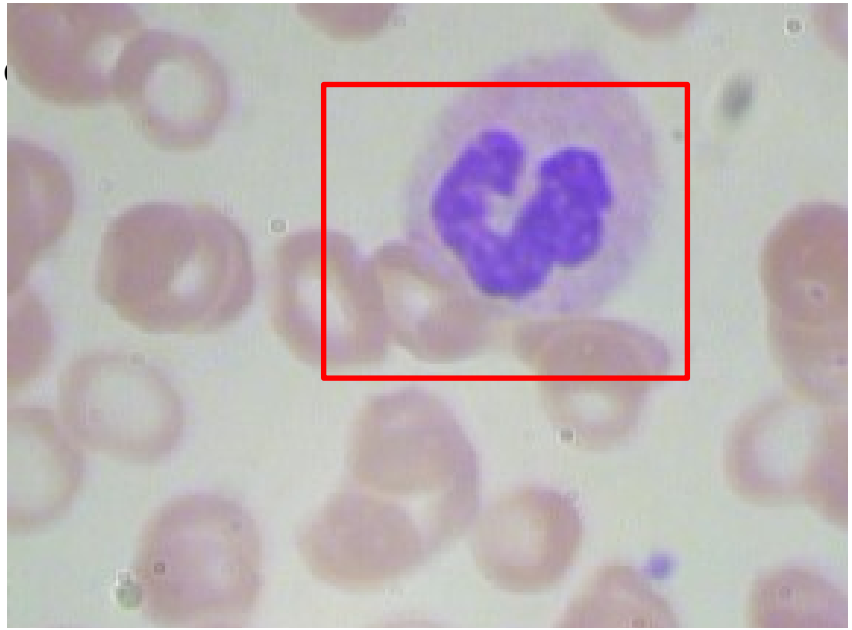
Becoming more efficient

- Focus on covering different aspect rati
- Increase anchor boxes and take more patches
- Patch Selection
- Issue : Multiple Predictions of same object



Becoming more efficient

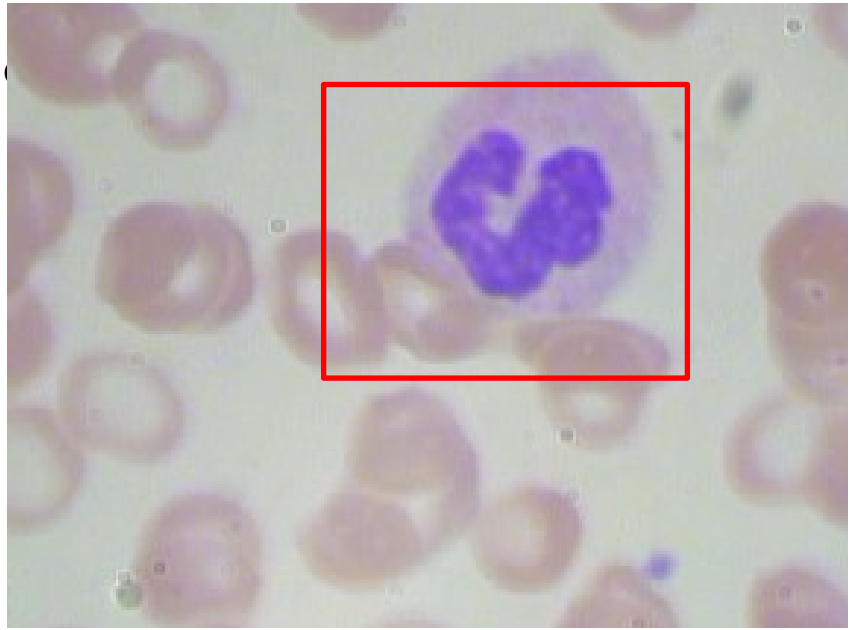
- Focus on covering different aspect rati
- Increase anchor boxes and take more patches
- Patch Selection



- Issue : Multiple Predictions of same object
- Solution : Pick only one patch out of the many which say the “same thing”

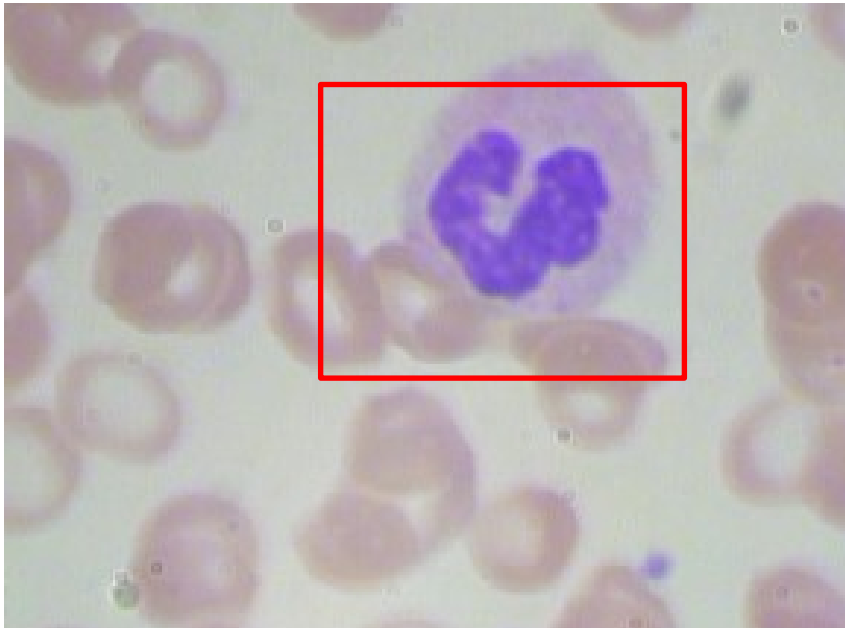
Becoming more efficient

- Focus on covering different aspect rati
- Increase anchor boxes and take more patches
- Patch Selection
- Pick only one patch out of the many which say the “same thing”
- Train a multiclass classifier instead of binary



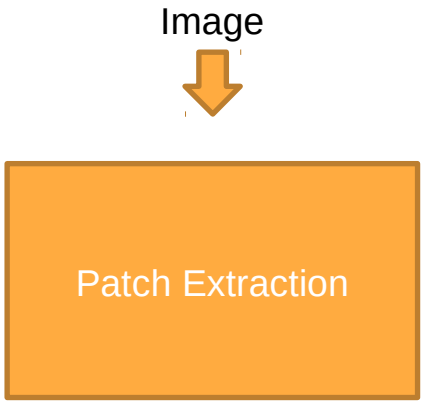
Becoming more efficient

- Result - Our performance is pretty decent

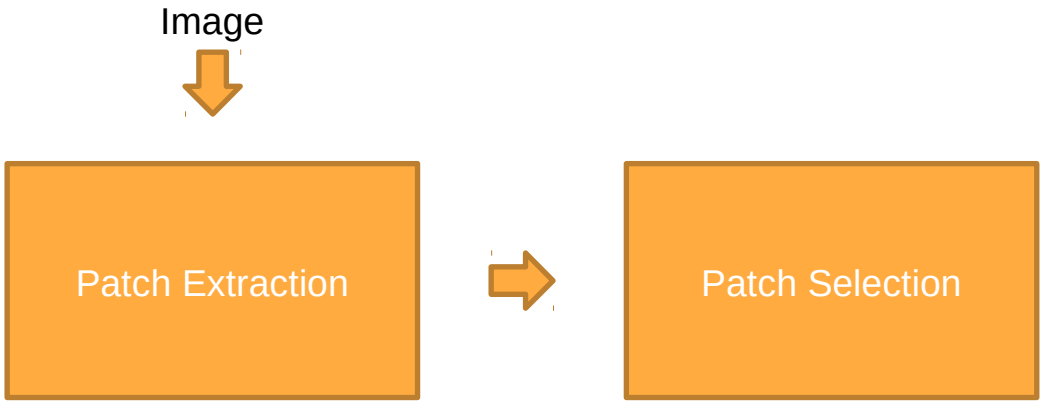


Approach 5 :
Using End-to-End Deep Learning

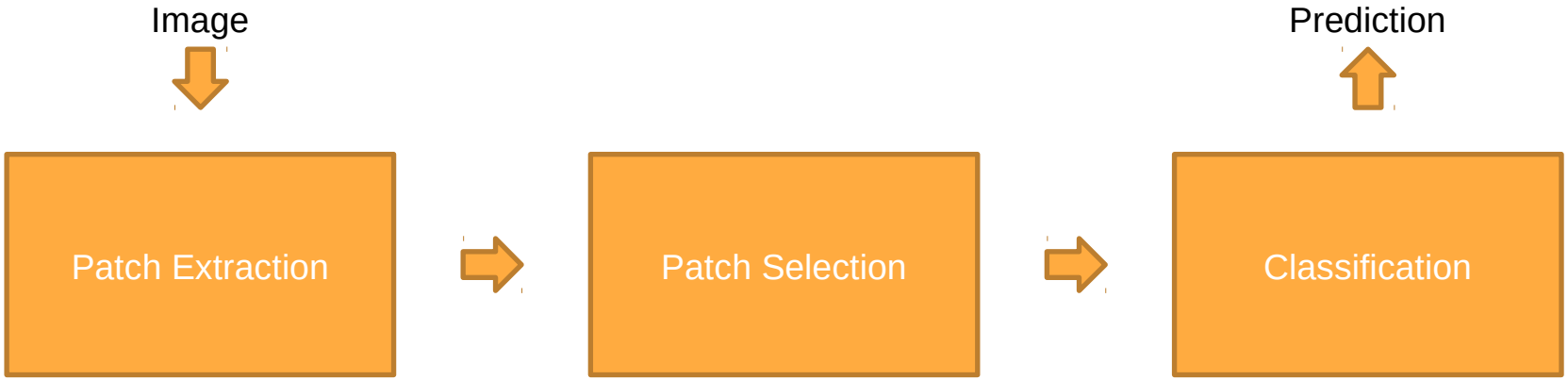
Using End-to-End Deep Learning



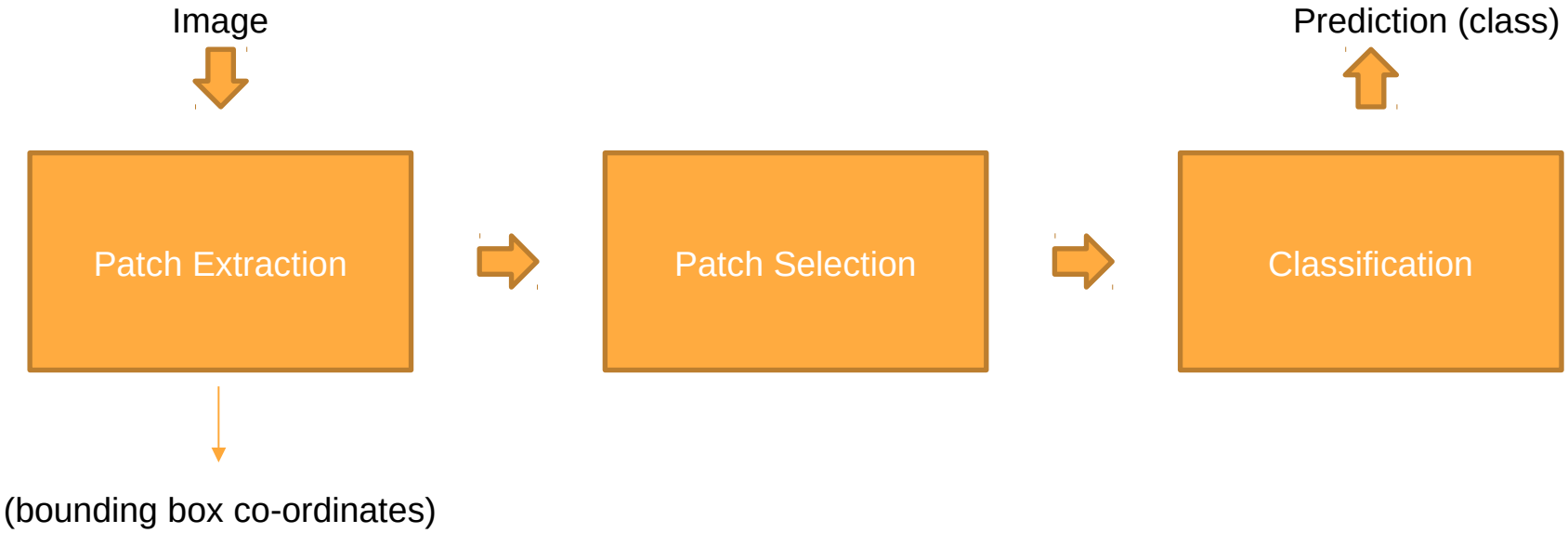
Using End-to-End Deep Learning



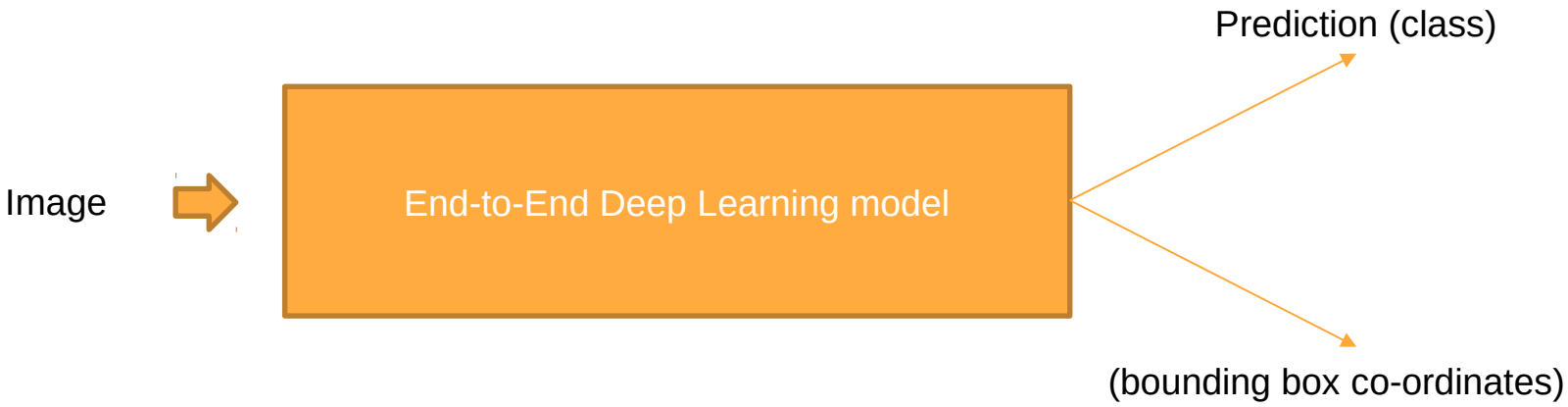
Using End-to-End Deep Learning



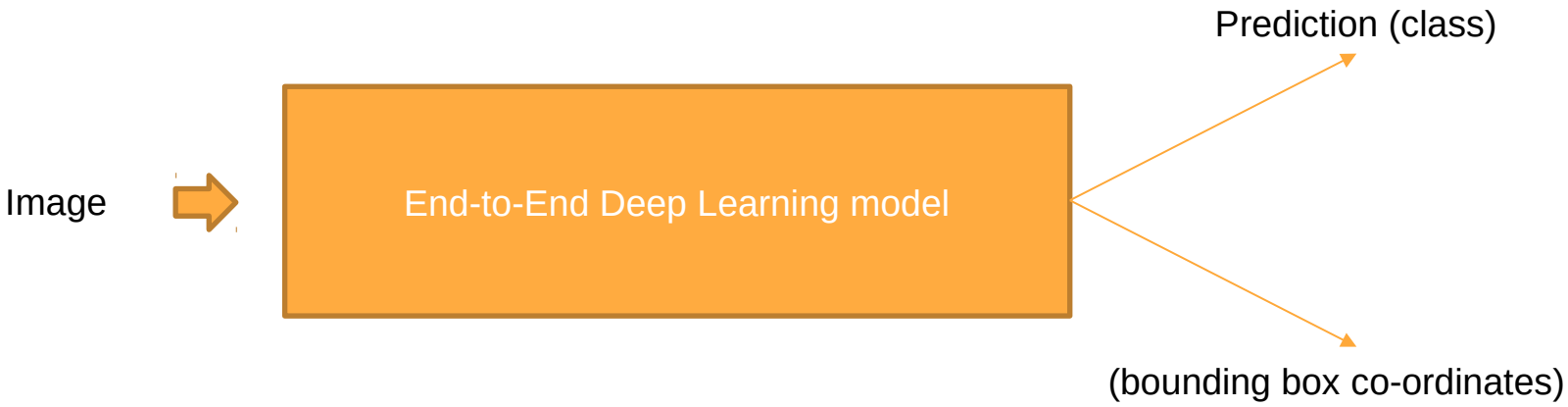
Using End-to-End Deep Learning



Using End-to-End Deep Learning



Using End-to-End Deep Learning



Using End-to-End Deep Learning