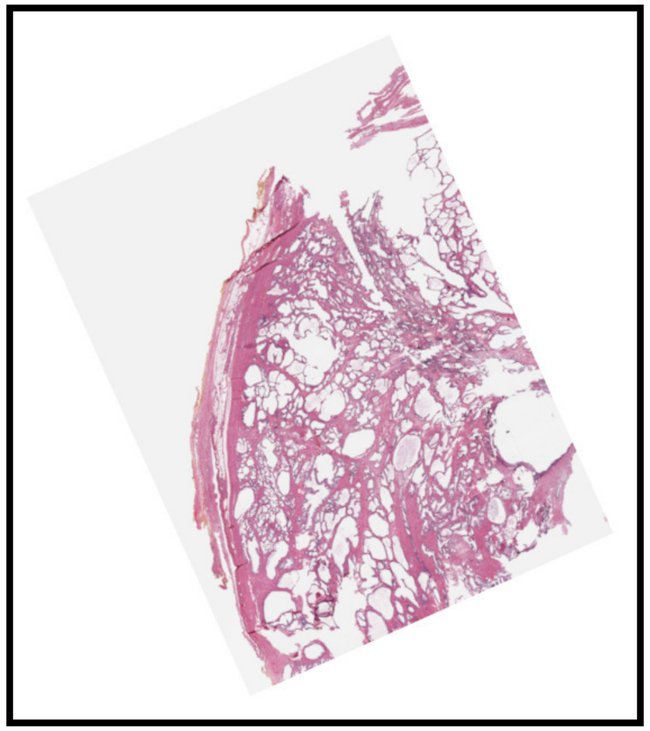
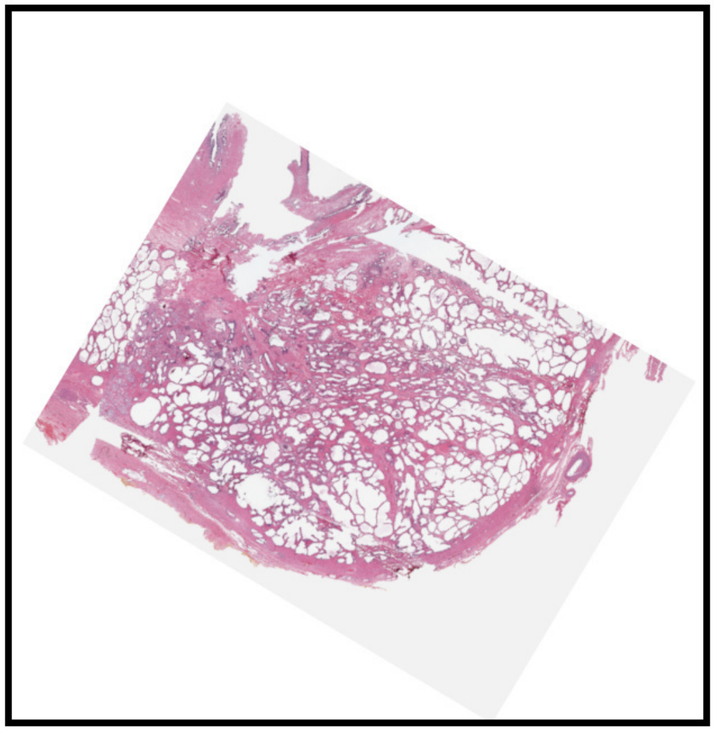
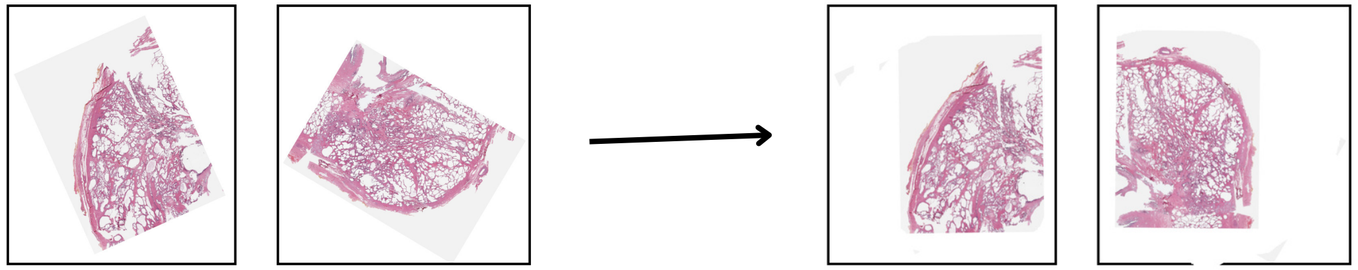
Input: Two separate images





1st step:
rough alignment



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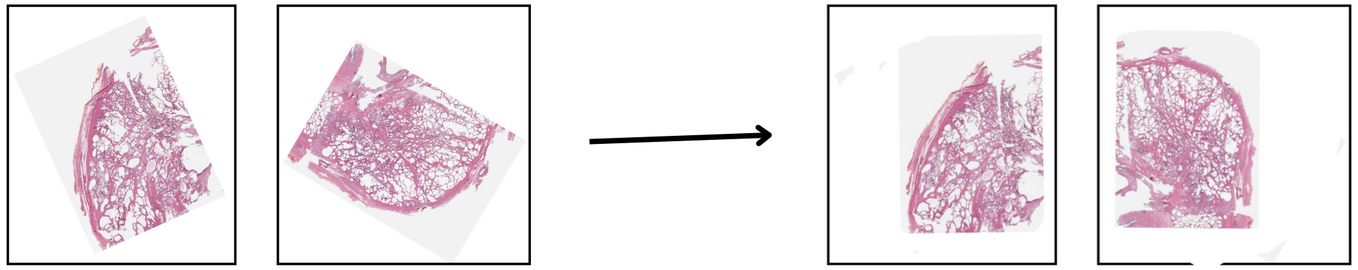
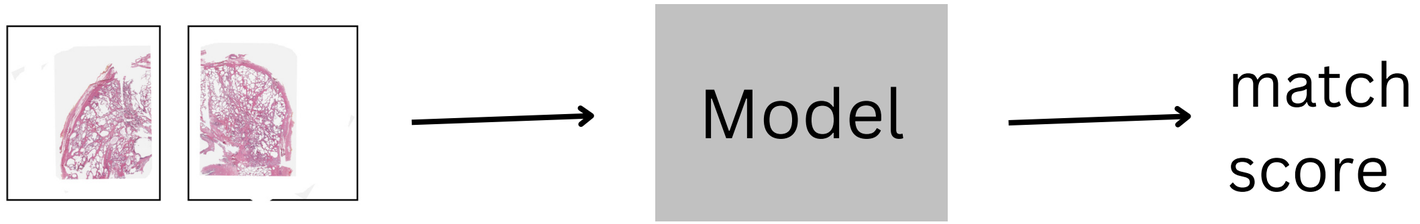


2nd step:
match detection



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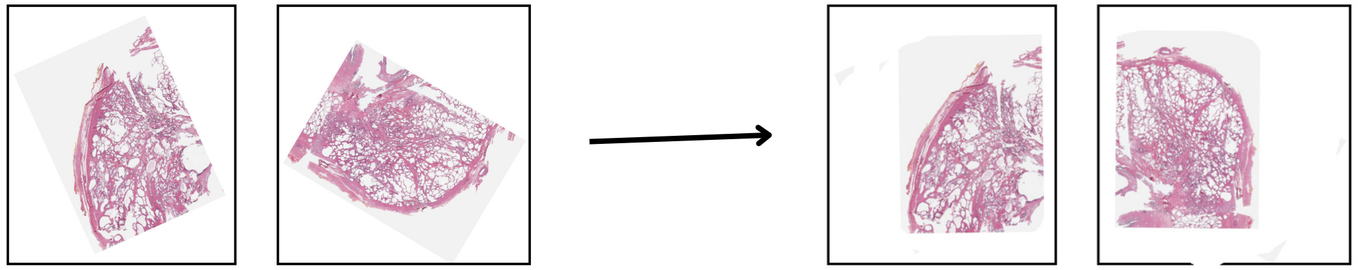
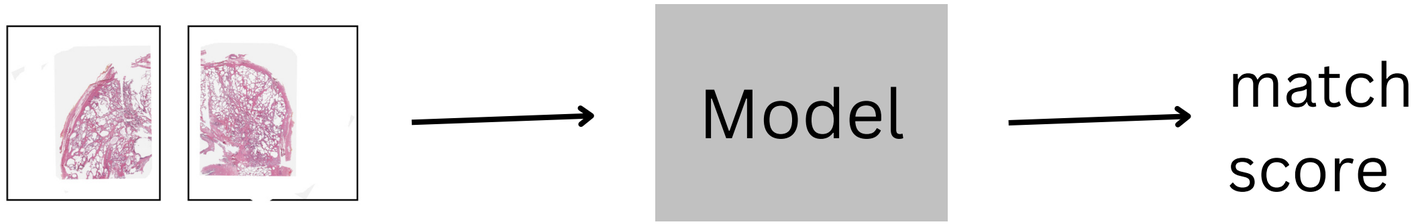
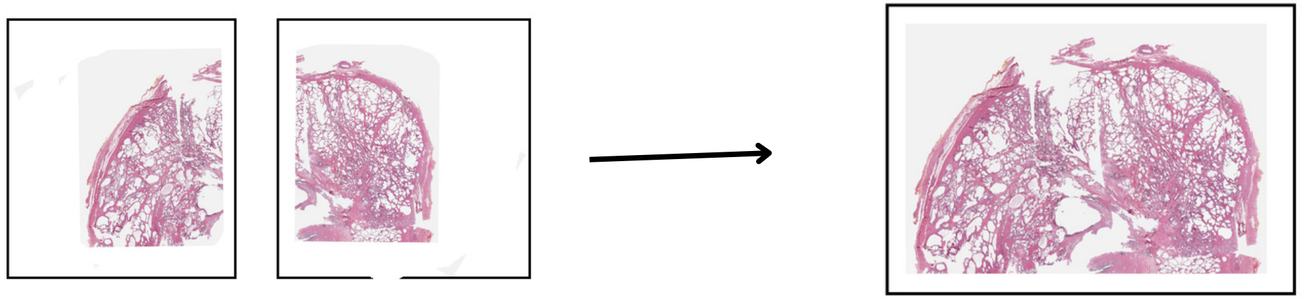
rough alignment



2nd step:
match detection



3rd step:
fine alignment

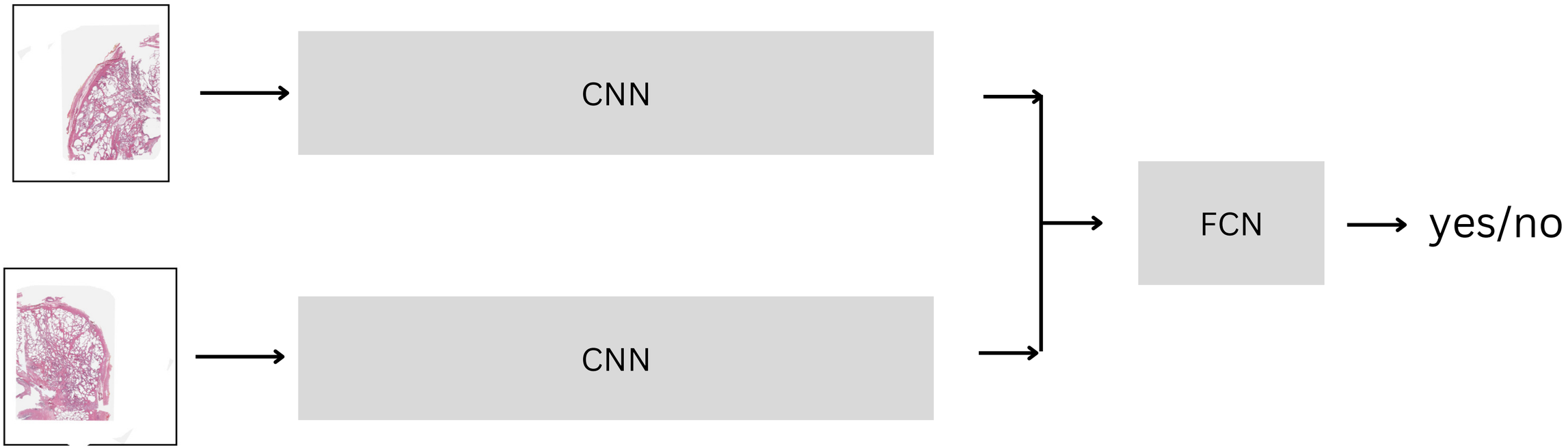


Why rough alignment before classification?

- Makes the task easier by constraining input space
- Model doesn't have to learn rotation and translation by itself
- Task with randomly rotated quarters would be much more difficult for humans as well

Model

- Two CNNs that feed into a joint FCN
- Two separated deep CNNs force the model to extract high level features most relevant for matching
- Take low resolution images to learn matches only via high level structure



Training

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- Computers don't have this intrinsically and need to learn from large amounts of data

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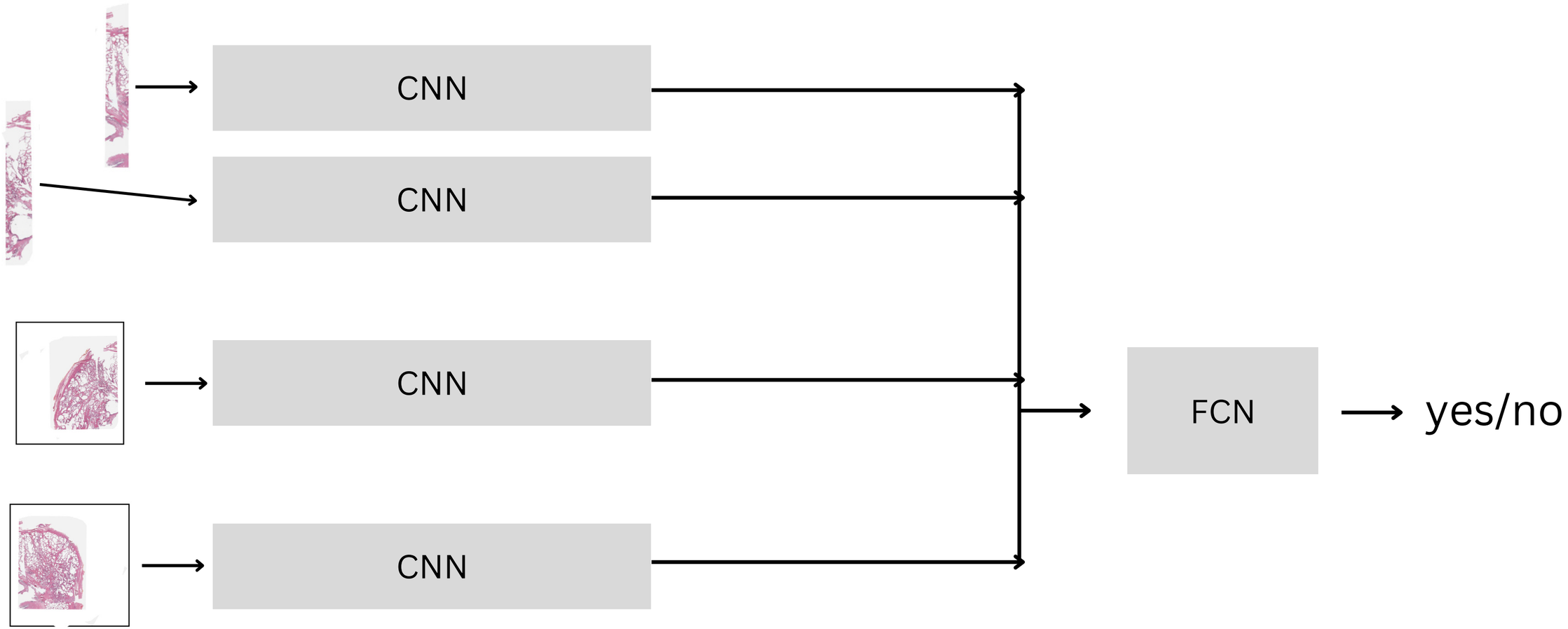
- Goal: Model with intrinsic concept of "continuity" and that is invariant to degraded borders, slight shifts, rotations

Possible extension

- Explicitly feed high resolution border information into the model as well



Last step: Fine alignment

- Once we know the quarters belong together, we can align via classical methods (e.g. borrowed from AutoStitcher)