

The viola-jones algorithm

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# The Viola-Jones Algorithm

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## The Viola-Jones Algorithm

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Paul Viola



Michael Jones

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## Training

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Training      Detection

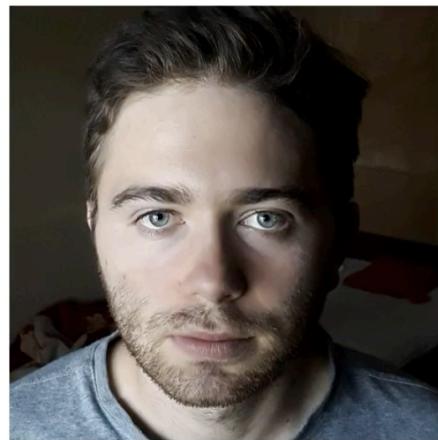
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Training      Detection

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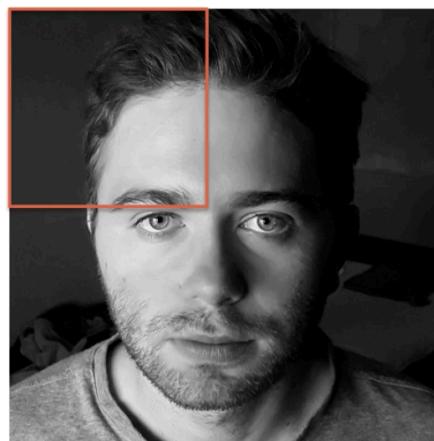
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At the start, the background will change to the black and white. This will happen on the back-end and you won't actually see this.

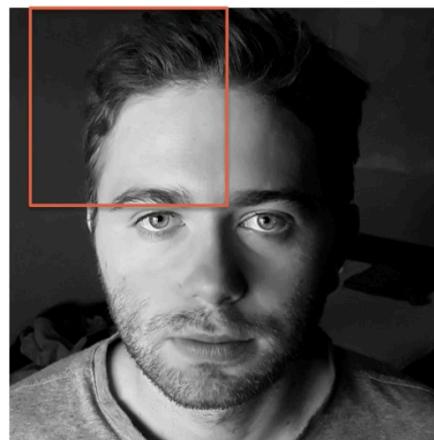
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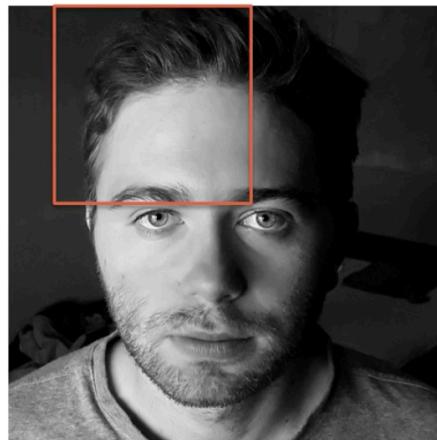
Afterward the algorithm will look for the features in a face. For example, now the eyebrow has been detected which is a feature. After detecting this the algorithm will look for more features in the face. So...

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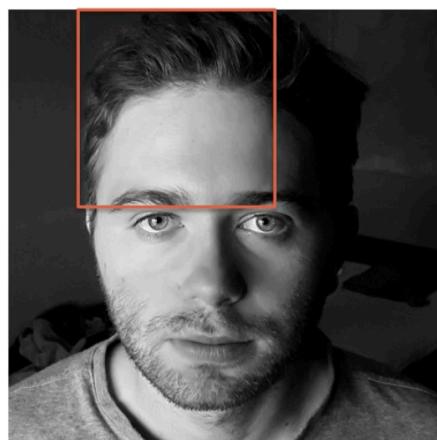


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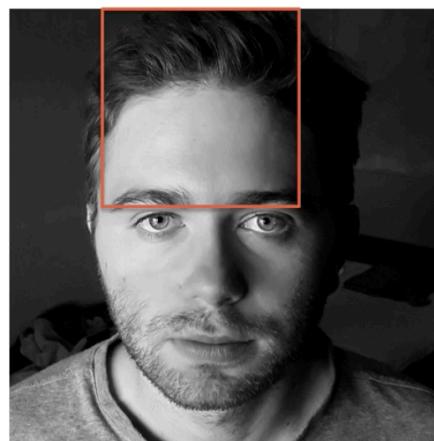


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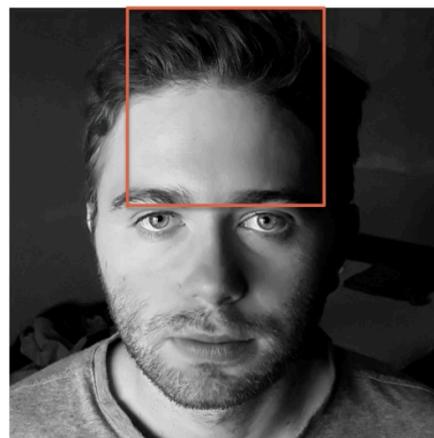
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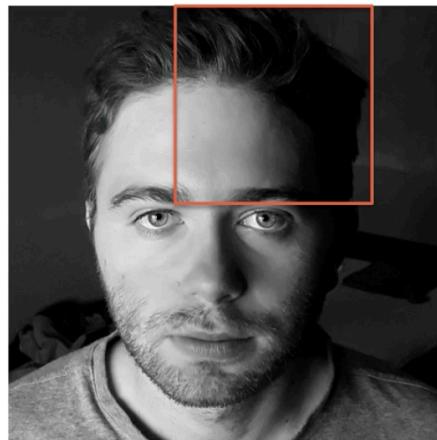
Now, it detects two eyebrow but since there is no enough features then it keeps moving.

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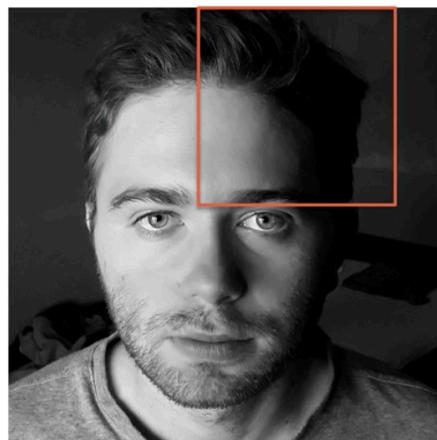
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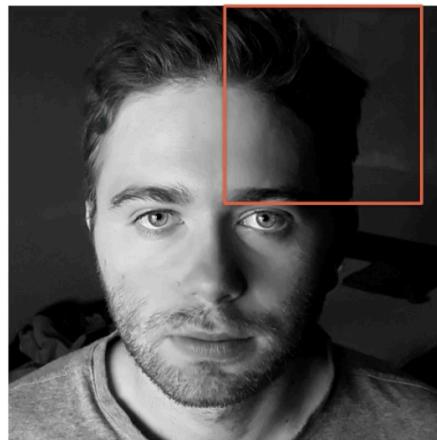
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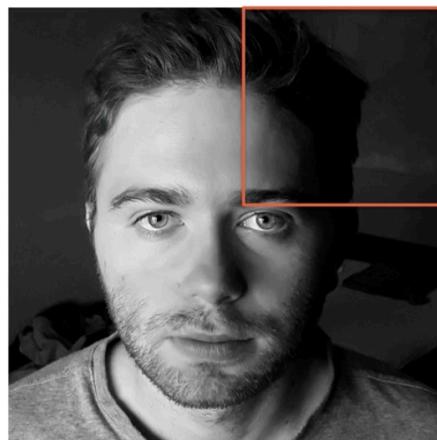
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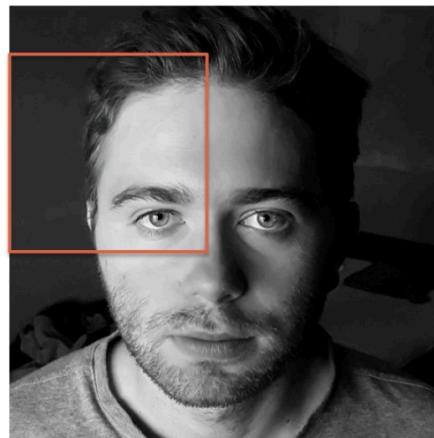
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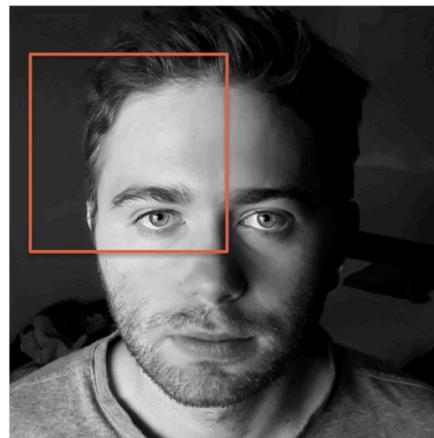
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Now it detects an eye and eyebrow.

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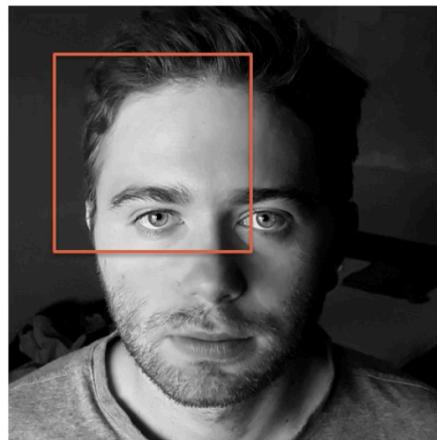


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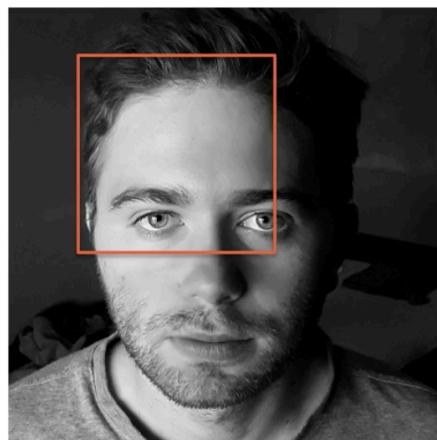


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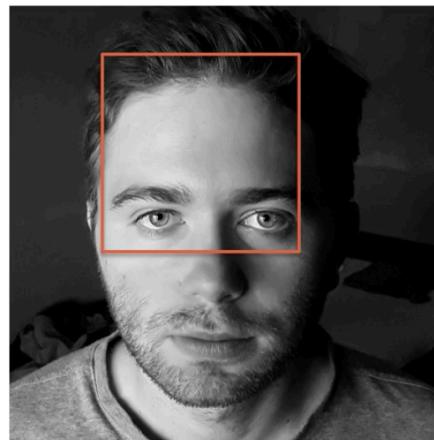


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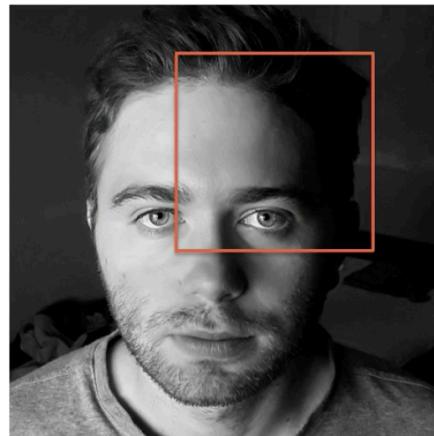
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Now it detects both eyes and eyebrows and a small part of nose but it doesn't see a mouth or other features so..

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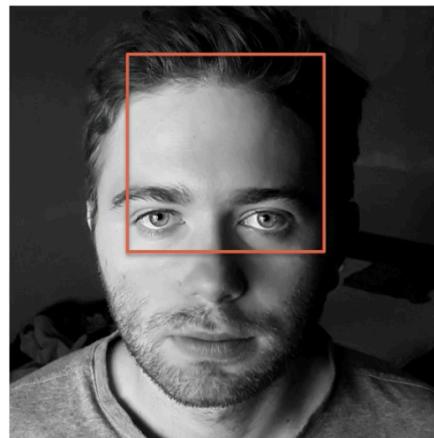


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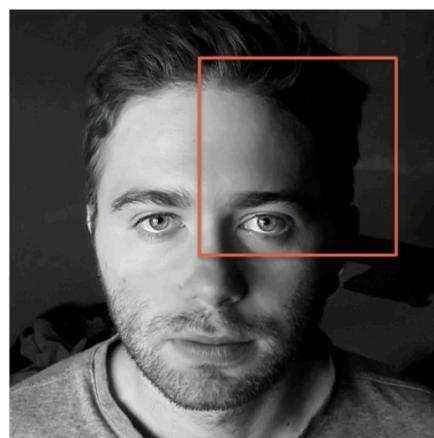


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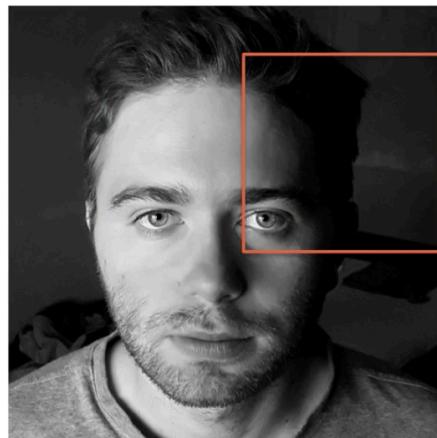


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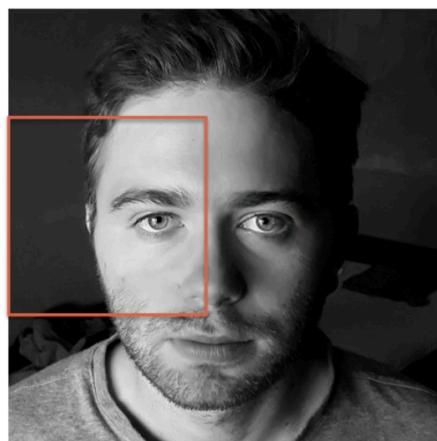
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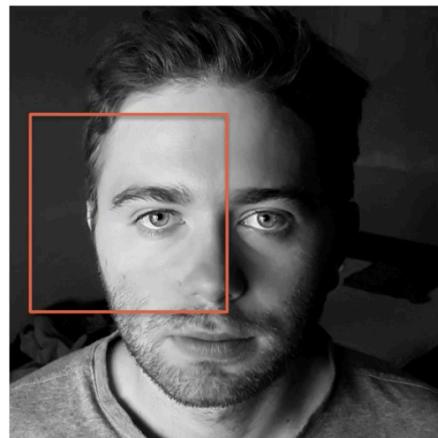
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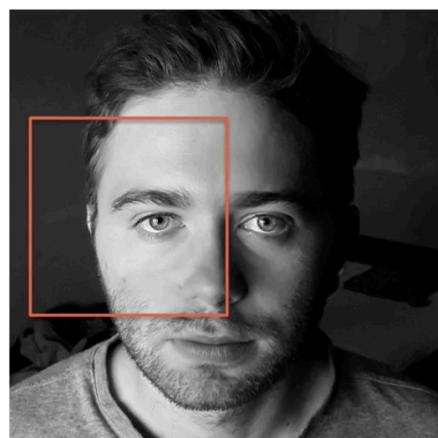


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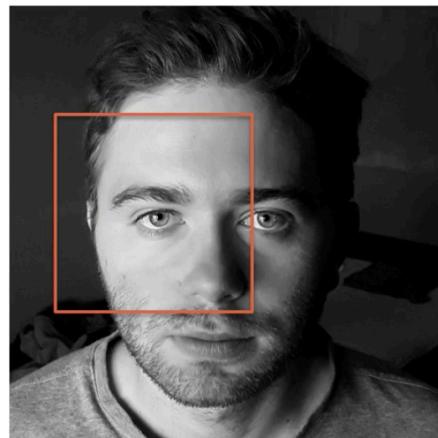


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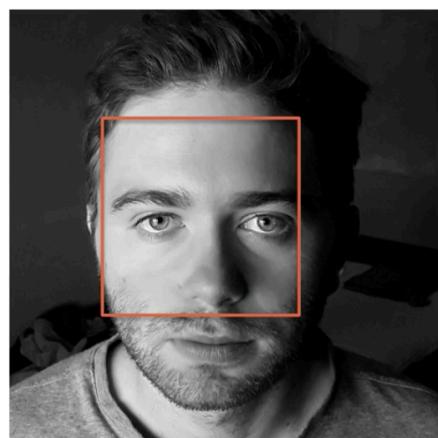


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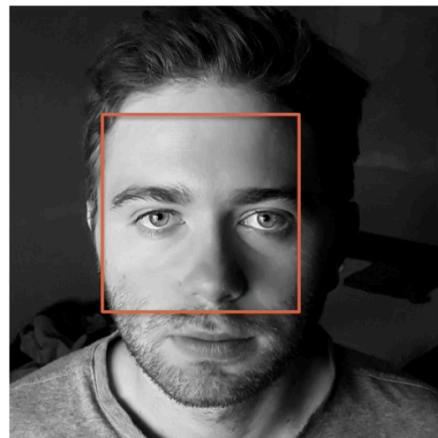


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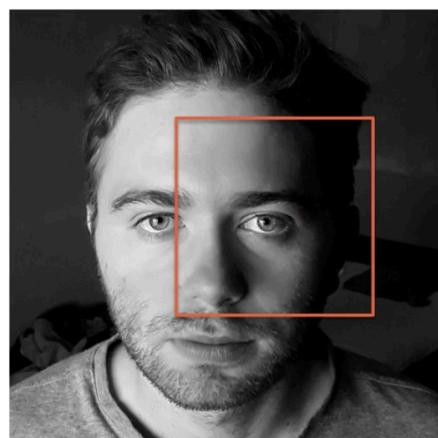


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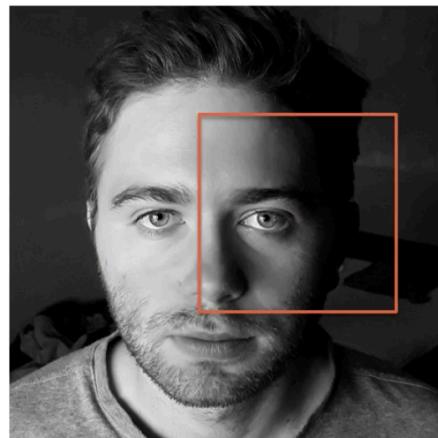


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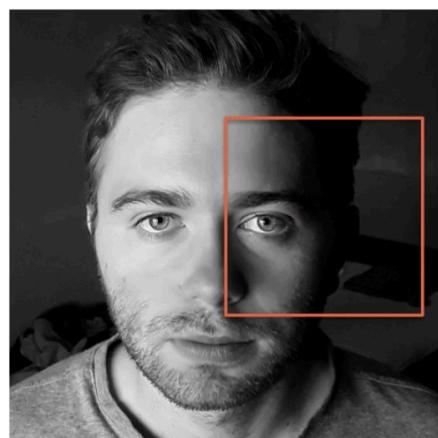


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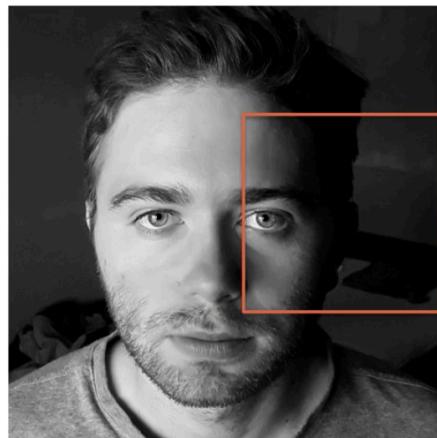


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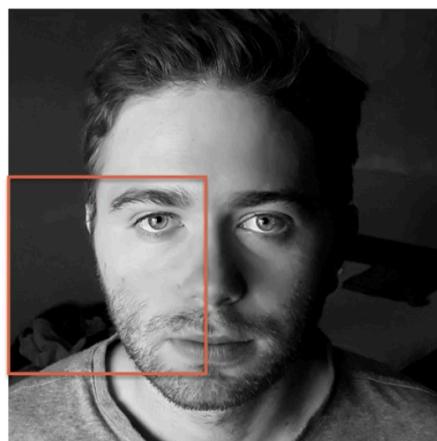
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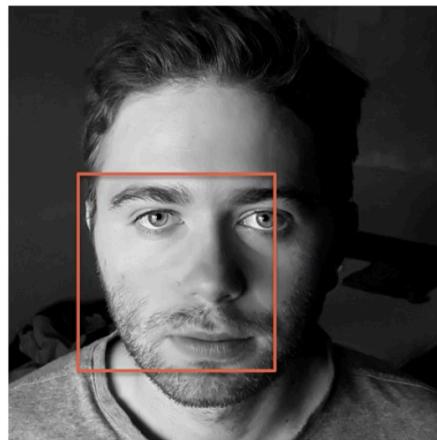
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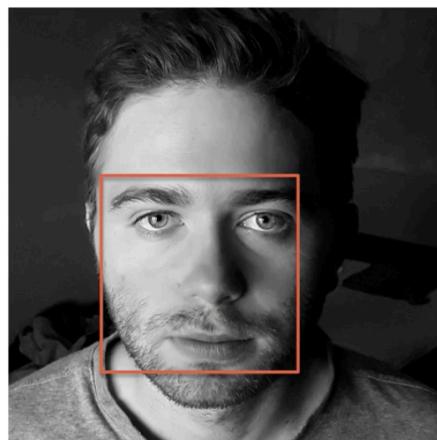


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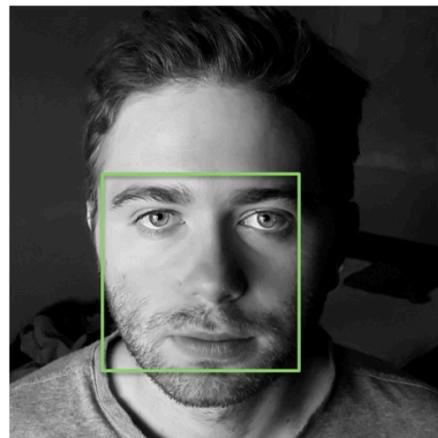


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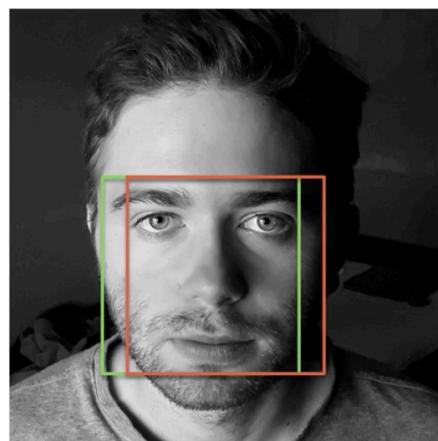
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Now the algorithm recognizes this as a very high potential for the face

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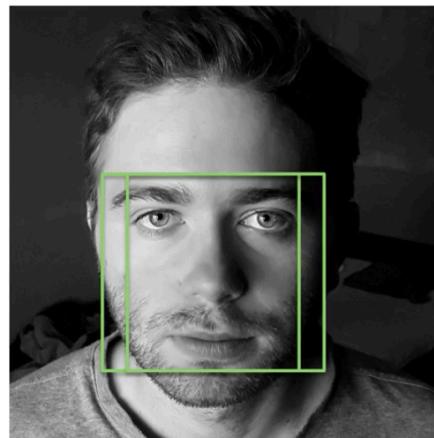


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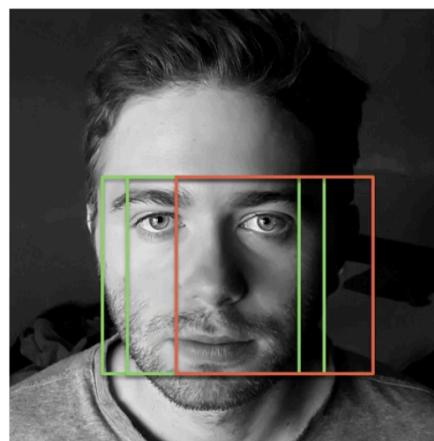
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The algorithm recognize this as a high potential of face as well

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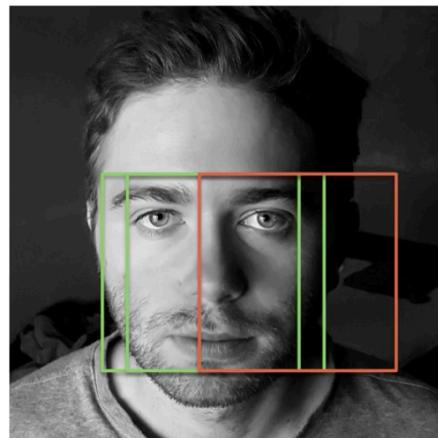


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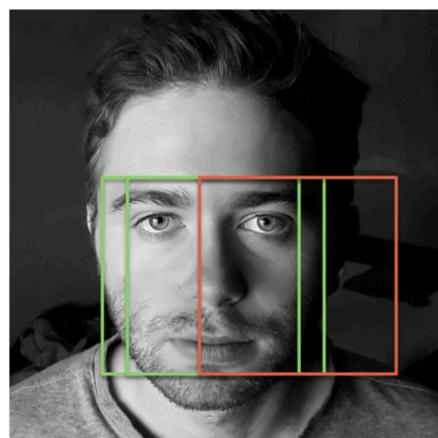


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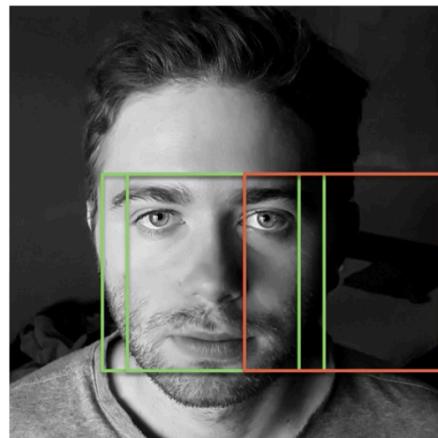


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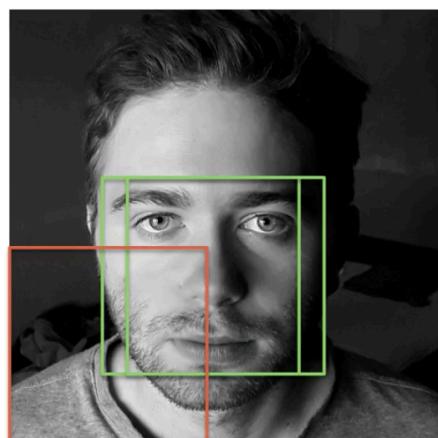


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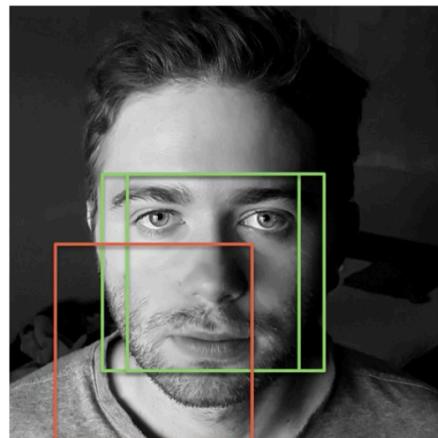


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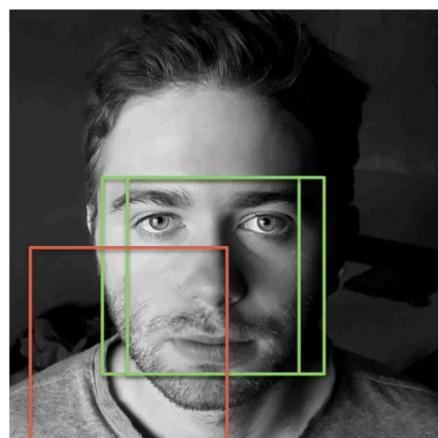


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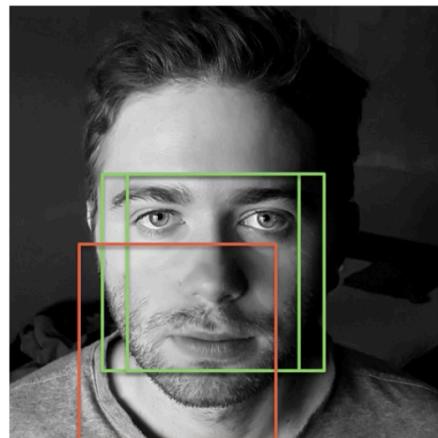


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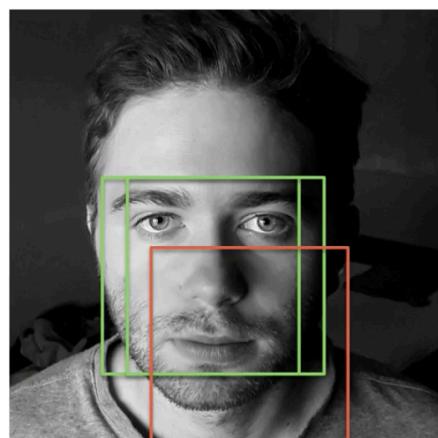


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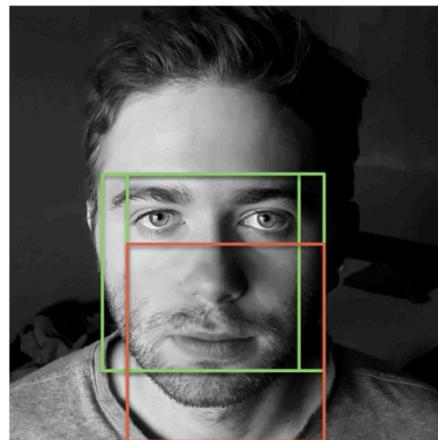


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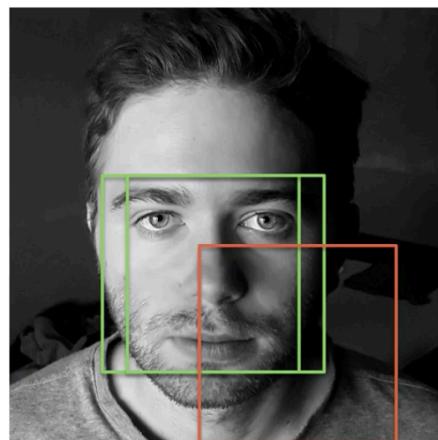


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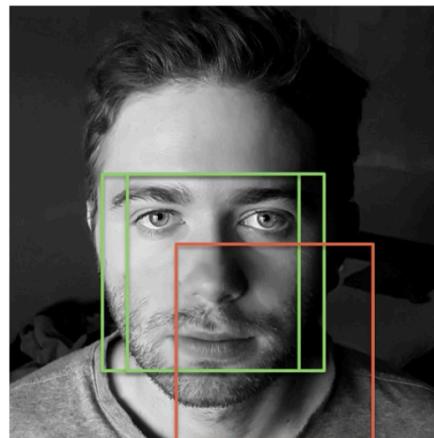


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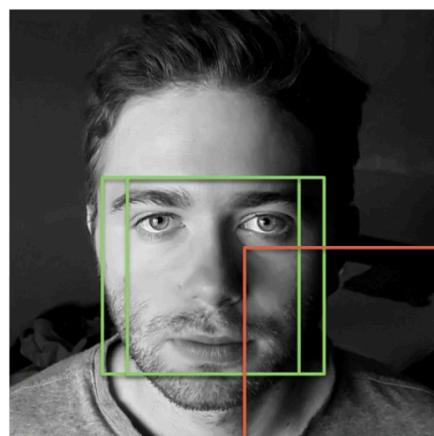
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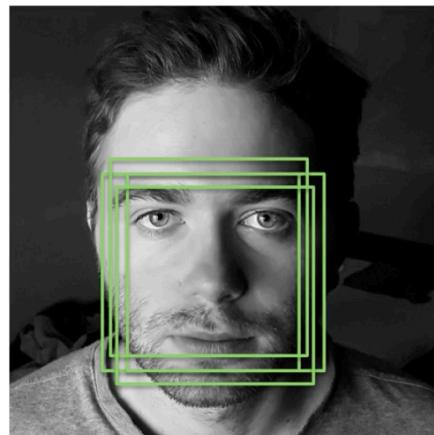
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The size of box is vary and it more depends on the picture for example if the faces are close like this or it's more far away.

In here we took large steps, even tough in reality the steps are quite small. So the reality is something like this..

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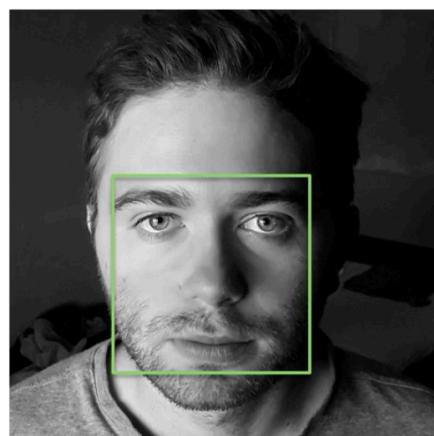


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# Additional Reading

Additional Reading:

*Rapid Object Detection using a  
Boosted Cascade of Simple Features*

Paul Viola & Michael Jones (2001)

Link:

<http://citeseerx.ist.psu.edu/viewdoc/download?doi=10.1.1.10.6807&rep=rep1&type=pdf>

