| **TÍTULO:** Programming face detection in scratch |
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| **CENÁRIO DE APRENDIZAGEM** | | | |
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| ***Escola:*** | | ***Duração (minutos):*** | 90 |
| ***Professor:*** |  | ***Alunos***  ***idade:*** | 13-14 |

| ***Questão Essencial*** | How to program face detection in Scratch |
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| ***Topics:*** |
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| * Programming face detection in scratch |
| ***Aims:*** |
| * Learn to program face detection with uploaded examples |
| ***Outcomes:*** |
| * Know how to write a program for face detection using scratch |
| ***Formas de trabalho:***   * trabalho individual, trabalho a pares, trabalho de grupo   ***Métodos:*** |
| * apresentação, palestra, debate, exercício interativo |

| **ARTICULATION** |
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| **Course of action (duration, minutes)** |
| **INTRODUCTION**  The teacher leads a student to program face detection in scratch.  Let's walk through a few simple examples of face detection programming in Scratch and Scratch based applications. You’ve probably noticed that some applications on your smartphone draw a rectangle around the face as a result of face detection. It is also possible to do that in Scratch.  **Announcement of the goal of the lesson:**  Understanding of face detection program and its usage through examples. |
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| **MAIN PART**  **First project - SCRATCH (ML4KIDS):**  Step 1: Open your Chrome web browser and go to: <https://machinelearningforkids.co.uk/scratch3/>  Step 2: Load Video Sensing and face detection extensions and plug in your web camera (if you don't have built in one)  Graphical user interface, application, website  Description automatically generated Graphical user interface, application, website  Description automatically generated  Step 3: **Delete Cat sprite** by clicking on trashcan icon (upper right corner) and choose the option to **Paint** a new sprite   Graphical user interface, application, Word  Description automatically generated Step 4: Draw a rectangle (it will be used as a bounding box) with no fill and set the outline to red (4) as in picture below  Step 5: Switch to Code tab and start programming. First, we turn on the video and set the transparency to 0 (non-transparent).  Graphical user interface, application, Word  Description automatically generated  Step 6: Next, there is a loop (forever) with 3 blocks in it to set the size of a rectangle (nose size multiplied by 4) and its x and y coordinates. You may want to adjust the value of a multiplicator from 4 to some other number, especially if you switch to a bigger stage (1.5 is better).  Graphical user interface, application, Word  Description automatically generatedGraphical user interface, application, Word, PowerPoint  Description automatically generated  **Second project - face detection combined with augmented reality**  Step 1: open scratch at <https://machinelearningforkids.co.uk/scratch3/>  Step 2: Add extension “Face detection”  Step 3: Add extension “Video sensing” and plug in your web camera (if you don't have built in one)  Step 4: Delete Cat sprite  Step 5: download picture from link <https://toppng.com/transparent-glasses-PNG-free-PNG-Images_110945>  Step 6: Upload picture to Scratch as sprite, rename it to “glasses”  Step 7: Sprite code:    Step 8: Start the program and move your head  Step 9: Discuss the accuracy of the algorithm and how to improve it.    **Third project with PICTOBLOX (Desktop application):**  Step 1a: Since there is no online GUI available you have to install PictoBlox from: <https://thestempedia.com/product/pictoblox/download-pictoblox/> (427 Mb)  Step 2a: Open PictoBlox and choose Face detection expansion  Graphical user interface, website  Description automatically generated  Step 3a: Use blocks as in the picture below and it’s very simple to figure out how it works. Now we have a bounding box as a block and no need to draw a rectangle. But the main feature is that **it can detect multiple faces**. Call someone to join you in front of the camera to see how it works. Check the reporter type block get # faces to see how many faces are detected .  Graphical user interface, text, application, Teams  Description automatically generated  Step 4a: And let’s spice it up using join operator to display person’s face expression. You can further explore how it works with multiple faces.  Graphical user interface, application  Description automatically generated |
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| **CONCLUSION**  Nowadays face detection software is used in almost every field from mobile devices to snap chat face filters to various security applications. Face detection helps you recognize faces, their age, expressions, gender, location, and many other features. |
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| ***Methods*** | ***Work forms*** |
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| ***presentation***  ***interactive exercise /simulation on the computer*** | ***individual work***  ***work in pairs***  ***group work*** |

| ***Material:*** |
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| * <https://machinelearningforkids.co.uk/scratch3/> * <https://toppng.com/transparent-glasses-PNG-free-PNG-Images_110945> * <https://thestempedia.com/product/pictoblox/download-pictoblox/> |

| ***Literature*** |
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| **PERSONAL OBSERVATIONS, COMMENTS AND NOTES** |
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