# Background removal

## 1. Introduction

Background removal (also known as background subtraction, or salient object detection) generates a mask that separates the foreground from the background of an image. You can use it to replace or blur the background (similar to video conferencing applications), or it can help preprocess other vision DNNs such as object detection/tracking or motion detection. The model used is a fully convolutional network U²-Net.

The backgroundNet object takes the image and outputs the foreground mask. backgroundNet is available from Python and C++. As an example of using the backgroundNet class, there are sample programs in C++ and Python:

## 2. Run the example

Here is an example of removing and replacing an image background:

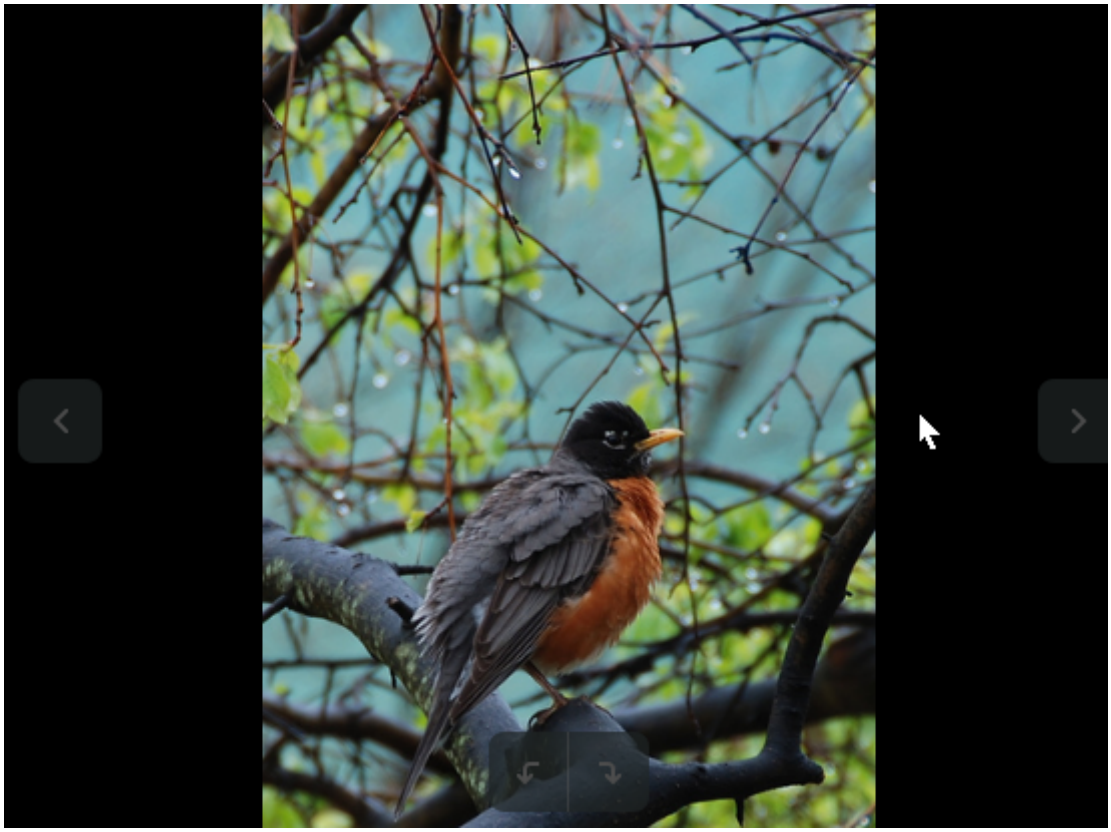
After building the project, make sure your terminal is in the aarch64/bin directory:

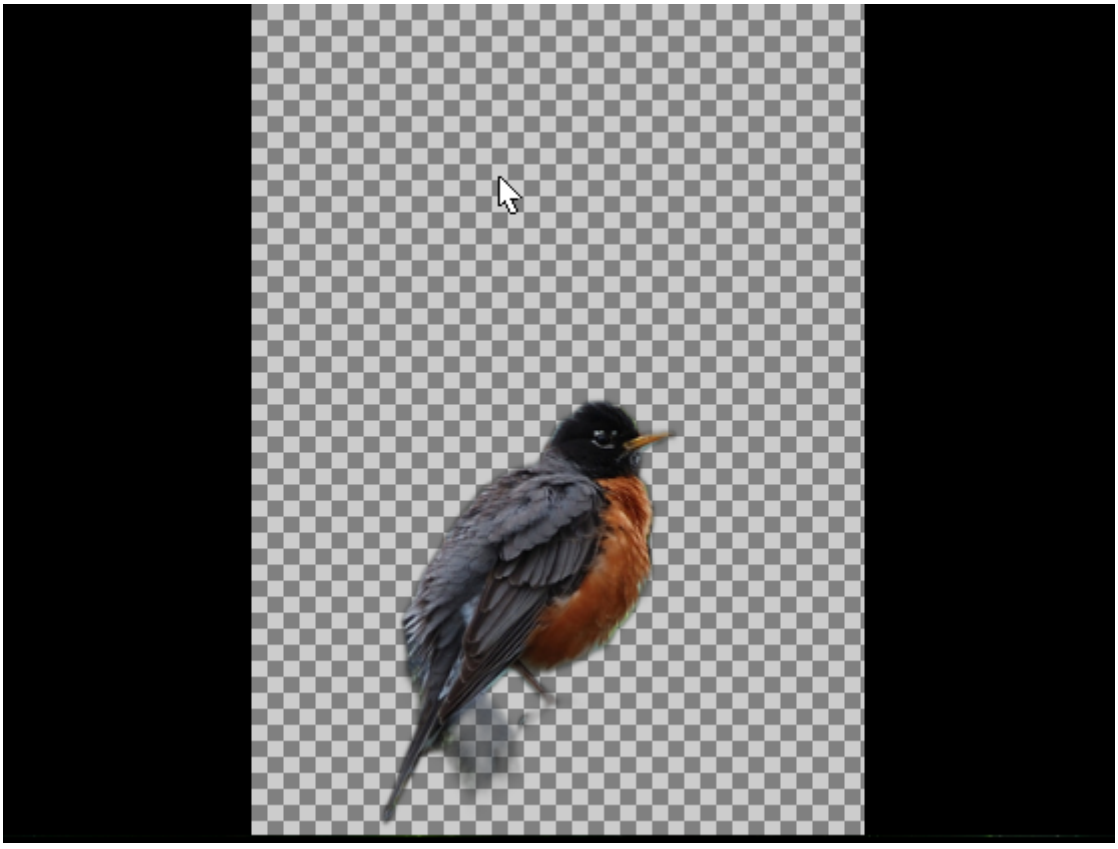
```
cd jetson-inference/build/aarch64/bin
```

```
#C++
$ ./backgroundnet images/bird_0.jpg images/test/bird_mask.png # remove the
background (with alpha)
$ ./backgroundnet --replace=images/snow.jpg images/bird_0.jpg
images/test/bird_replace.jpg # replace the background

#Python
$ ./backgroundnet.py images/bird_0.jpg images/test/bird_mask.png # remove the
background (with alpha)
$ ./backgroundnet.py --replace=images/snow.jpg images/bird_0.jpg
images/test/bird_replace.jpg # replace the background
```

The --replace command line argument accepts the filename of an image to be used to replace the background. It will be rescaled to the same resolution as the input





## 3. Real-time video

To run background removal or replacement on a live camera stream, pass in the device from the Camera Streams and Multimedia page:

```
#C++
$ ./backgroundnet /dev/video0 # remove the background
$ ./backgroundnet --replace=images/coral.jpg /dev/video0 # replace the
background

#Python
$ ./backgroundnet /dev/video0 # remove the background
$ ./backgroundnet --replace=images/coral.jpg /dev/video0 # replace the
background
```

By specifying the output stream, you can view it on a monitor (default setting), over the network (similar to WebRTC), or save it to a video file