# GIMP

Creating a new selection tool

**Interaction design for the real world**


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## 1. Vision

We wanted to create a new selection tool which is intuitive to use, increases the working speed and has more functions than the former wand, scissor, color, and foreground selection tool.

## 2. Functionality

Before we could start with creating a new tool, we had to document all the important functions the old tools do, which we want to replace. We started to try out the different functions of the tools.

### 2.1 Magic Wand

– selects one area in the same color
– closing of the selection - automatically when mouse released
– redefining selection - set threshold by dragging mouse left (less) and right (more)

tool options:
– Mode
– Antialiasing
– Feather edges
– Select transparent areas
– Sample merged
– Threshold
– Select by

### 2.2 Select by color

– selects one range of colors in the whole picture
– closing of the selection - automatically when mouse released
– redefining selection - click on different pixels;
tool options:
– Mode
– Antialiasing
– Feather edges
– Select transparent areas
– Sample merged
– Threshold
– Select by

### 2.3 Intelligent scissors

– makes control points by clicks, you have to close selection by clicking on starting point; – draws a line between points on the edge of most contrast/color difference
– closing of the selection - press enter or click
– redefining selection - drag and drop the control points
+ „auto edge off“, which doesn‘t work
tool options:
– Mode
– Antialiasing
– Feather edges
– Interactive boundary

## 2.4 Foreground selection tool

2 steps:
1: select background with a free selection tool
2: select foreground with a brush tool

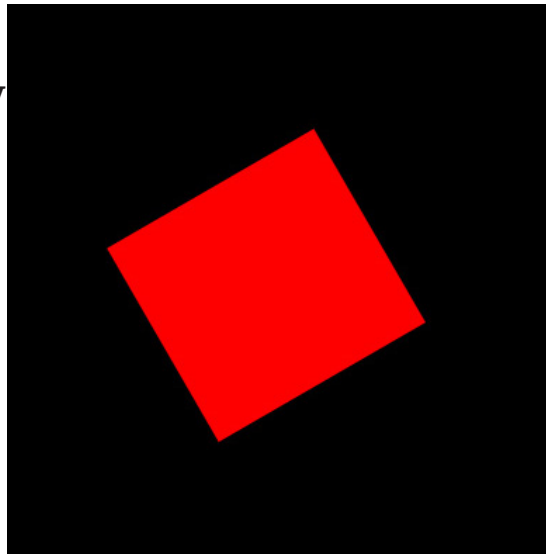
– closing of the selection - press enter
– redefining selection - select background or foreground and paint the area that has to be in selection
tool options:
– Mode
– Antialiasing
– Feather edges
– Contigous
– Interactive refringement
– Smoothing
– Preview color
– Color sensitivity

## 3. Expert evaluation

Now we tried the different tools in different scenarios to get a feeling, which tool is the best for each situation. Sometimes, it was necessary to combine several selection tools, to get a satisfying result.

### 3.1 Scenario 0:

select simple, rotated red square



magic wand
It was very easy to select the rotated square, it only needed one click in the square.

select by color
As easy as with the magic wand.

intelligent scissors
While using the intelligent scissors, we found it very annoying, that there is no possibility to switch to straight lines. After four clicks we had selected the square, but the selection was very unaccurate because the „intelligent“ wayfinding of the scissors was jumping around the black and red area.

foreground selection tool
It was not possible to select the square with the foreground selection tool.

**3.2 Scenario 1:**
select complex content out of a photo image

magic wand
The problem with the magic wand was, that the yellow car is standing in front of a red-yellowish wall. So with every click on the border area of the car we also had selected some pixelspots of the wall. So after the selection of the car we had to deselect areas of the wall with the lasso tool which took a lot of time.

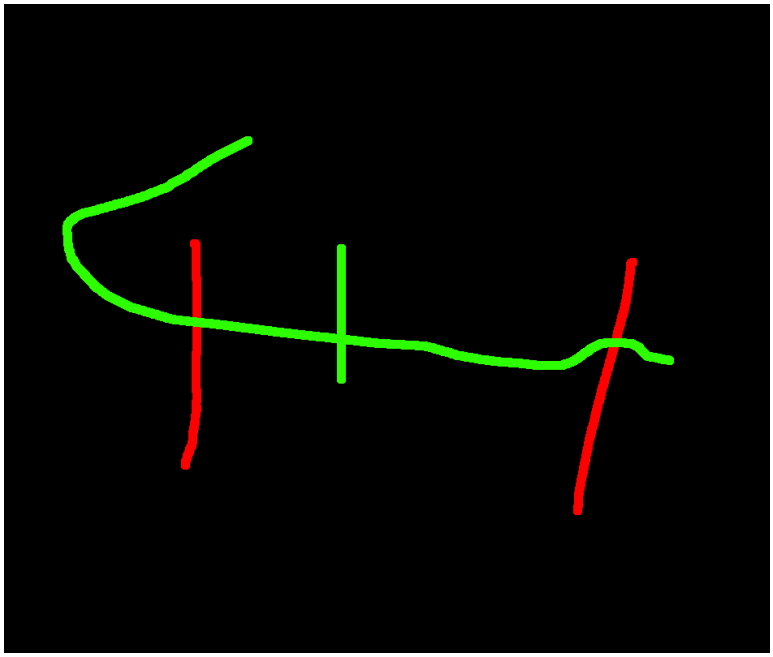
select by color
It was not possible to select the car only, because all the yellow colors in the picture got selected.

intelligent scissor
It took some time to select the main part of the car. Sometimes it was hard to see the preview line of the intelligent scissor, when there was a lot of contrast in the area to select. We also missed the possibility to make straight lines, which would have saved us some time with the redefining of the seleciton. We also missed a function to finish the selection while pressing a key, because sometimes it was not easy to findd the starting point of the selection because the waypoints look all the same.

foreground selection tool
The foreground selection tool brought us the fastest result. Even the wall had similar colors to the car, it realised the difference very well. Some retouching of the selection was needed.

### 3.3 Scenario 2:

select color on different layers



magic wand

With the magic wand it was only possible to select all colors of the same kind, if they colors were connected.

color select

With one click all the colors on the different layers where selected.

intelligent scissors

The intelligent scissor is not useful for selecting colors.

foreground selection tool

It was possible to select the color, but for each layer the color had to be selected seperatly.

## 4. Brainstorming

In our brainstorming process we really went from everywhere to nowhere. Many ideas came up during the process, but they never felt right.

Photo 1: One of our first steps was to cut down from 4 to only 2 separate tools. Through this we could already get rid of some slowing steps in the process of selecting.

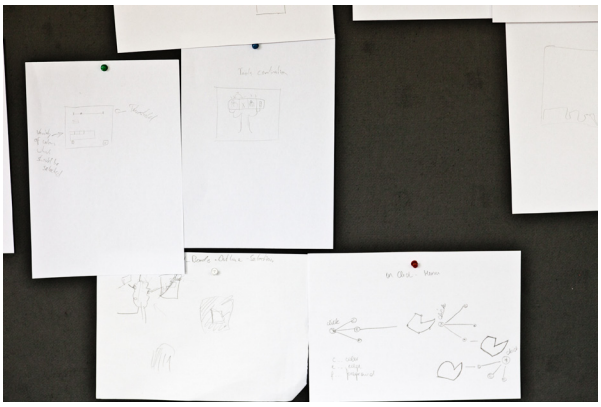


Photo 2: Also the idea came up to get a small window where you can select and combine the tools you need. Something like combining the tools and adding the advantage of one tool to another.

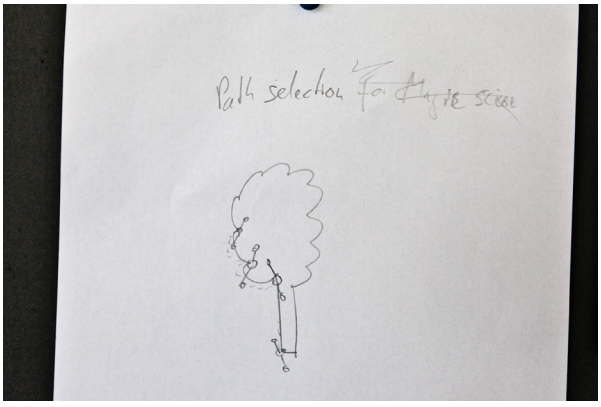



Photo 3: What also showed up during the brainstorming process was the possibility to add/delete/edit path points. Cause refining through path points is the easiest and most precise way.

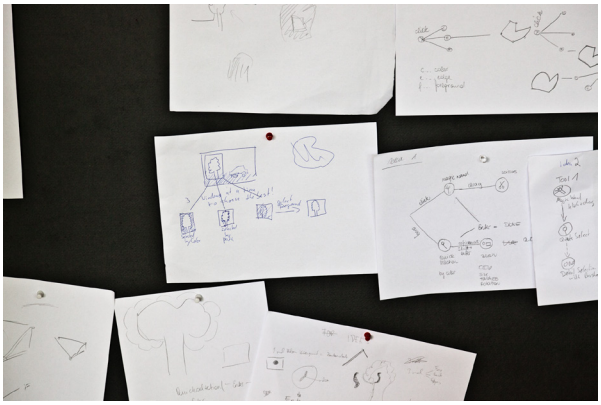


Photo 4: When making a rough selection, a window pops up and you have the possibility to choose how to go on with the selection and refine the rough selection.

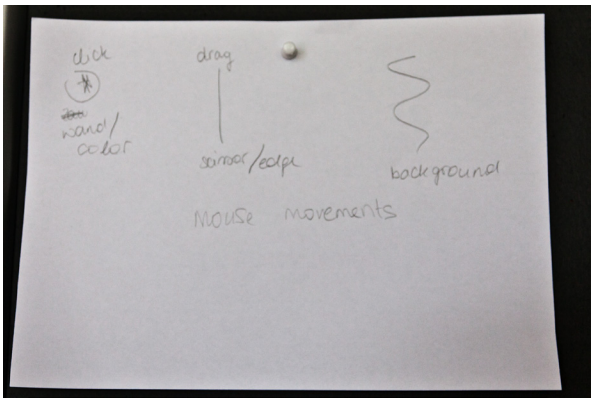
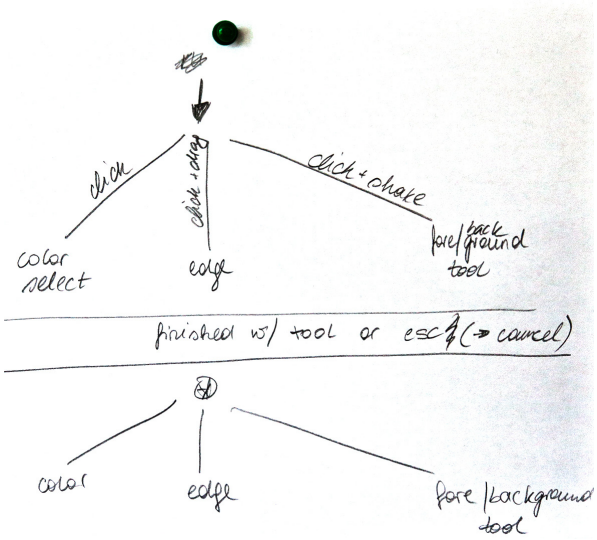


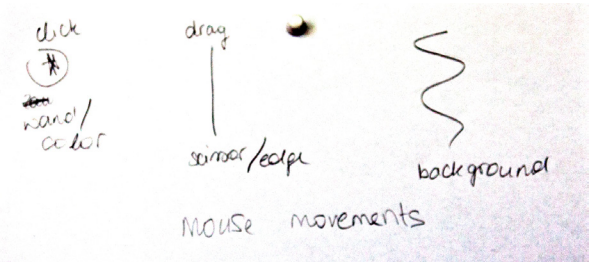

Photo 5: Our way of handling the problem was always heading into the direction of interactivity to make the switching to the different actions smooth. What we thought of, is combining the existing mouse movements that the user is already familiar with and make them to the trigger of changing the action the user wants to full-fill. Through that, the need of learning a new tool is not really necessary, cause the mouse movements are kind of the same as they were before. The only difference is that there is just one tool anymore.

# 5. Concept

After the brainstorming we created the Intelligent Select Tool. The Intelligent Select Tool implements all the selecting strategies and it offers a new strategy for refinement of the selection. The tool offers furthermore diverse possibilities to take influence on the desired selection.




Once the user has selected the Intelligent Select Tool he has three choices of how he wants to use the Tool. This is decided by the movement of the mouse. By clicking with the mouse, the tool chooses the color select strategy to mark all similar colored pixels in a specified area. By clicking and dragging the mouse, the tool chooses the edge select strategy to define the edges of the desired selection. By clicking and shaking (joggling?) the mouse the Tool uses the foreground select strategy to allow the user to extract the foreground.




### 5.1 Options

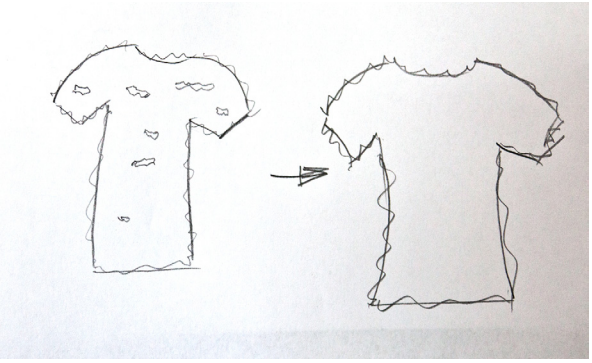
Options that all the tools have in common, to be found in the toolbox.

Selection mode
Normal, Add Selection, Subtract Selection, Intersect Selections


Antialiasing
Feather Edges (with a handle to control the radius)

Sample merged:
Looks through all layers, to select similar colors

Smoothing:
(with a hande to control the level of smoothing)
We implemented this tool for all strategies, since the user gets little holes too if he uses e.g. the color selection tool.
Options that are specific for a selection strategy are found beneath these common tools in the toolbox.



Activating one of these options will not only influence the selection the user is about to make but it also takes influence on the before made selection. So the user does not have to make a selection, and then choose an option before selecting again. That way it is less time-consuming to adjust for example the smoothing or the feathering of edges of a selection. This also allows the user to work in a more exact way.

# 6. Shortcuts

We kept the basic shortcuts, which are available in all the tools, in order to make it easier for the user to adjust to the tool, so that he doesn't have to learn everything from scratch.
SHIFT: Add mode (before clicking)
CTRL: Subtract mode
SHIFT + CTRL: Intersect mode

# 7. Tool handling

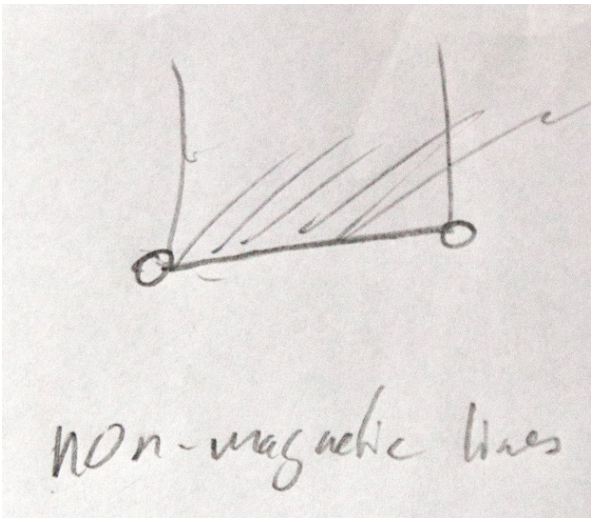
### 7.1 Click: Color select mode

With a click with the mouse, the user makes a selection. To add, subtract and intersect he can either choose a mode from the toolbox, or use one of the keyboard shortcuts.

In the toolbox the user can select the option “color scan”. That means that GIMP will not only look for similar colors outward from the selection, but it will scan the whole canvas for similar colors.

The color threshold can also be adjusted with a handle in the toolbox. We eliminated the option to adjust the threshold by clicking and dragging the mouse, because it is very imprecise. Since this option however influences the already selected parts as well, the effect is basically the same, but it will be more precise, better adjustable and less timeconsuming.

### 7.2 Click and drag: edge select mode

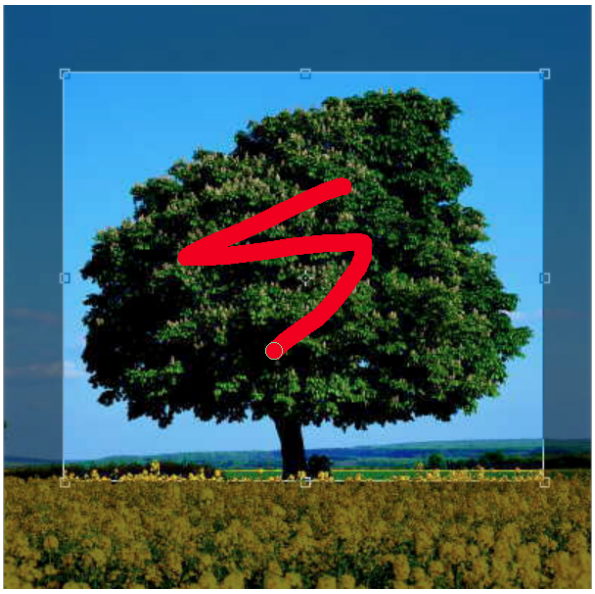



With clicking and dragging the mouse the user selects the edge select strategy to make his selection. Once the user has clicked and dragged the mouse he has chosen this strategy, and is located in it. If he chooses not to make his selection with this tool, or has chosen this strategy involuntarily, the can leave this mode by clicking the ESCAPE key. By clicking the user can set edge points and gimp will mark the edges magnetically by looking for the greatest difference in colors. If the user chooses to make a straight line he can use the SHIFT key (after clicking) to do so.

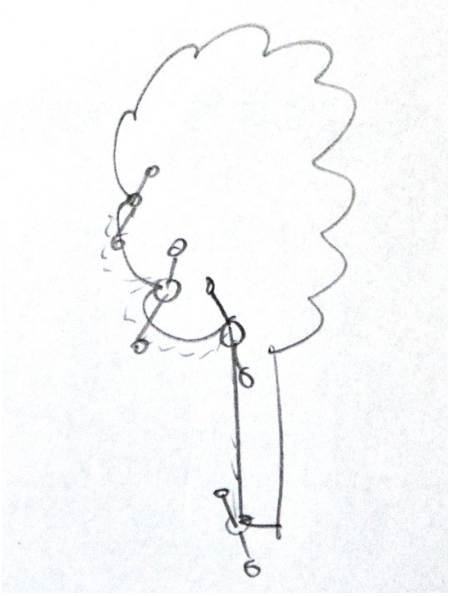
That way, the straight lines of an object can be selected in a more clear way, than with GIMP’s magnetically chosen lines. After the selection is closed the user can modify and refine the selection by adding edge points, or dragging edge points. If the user has achieved his desired selection he can press the ENTER key to leave the edge select strategy mode.
There are no mode specific tools available in the toolbox.

### 7.3 Click and shake: foreground select mode

With clicking and shaking the mouse the user enters the foreground select mode. At first the user has to mark the foreground roughly. After that he can proceed to mark the foreground with an adjustable brush to mark the foreground. GIMP will then extract the foreground. The not active part of the image will be displayed darker, than the active part (see picture). To refine the selection the user can alternatively choose between marking more of the foreground or the background. This option can either be chosen in the toolbox, or by pressing the CTRL key. GIMP will by default mark the foreground, however as long as the user presses the CTRL key while using the brush to refine, it will switch to marking the background.



To do the selection and the refinement the user can choose three different brushes from the toolbox: a round brush, an oval brush, and a square brush. The user can also adjust the size and the rotation of the brush. That way, it is possible to mark even small, thin edges with the foreground select mode.



The selection can be refined until the user chooses to press the ENTER key, with that he leaves this mode. If the user entered the mode involuntarily he can leave it with the ESCAPE key, and choose a different mode.

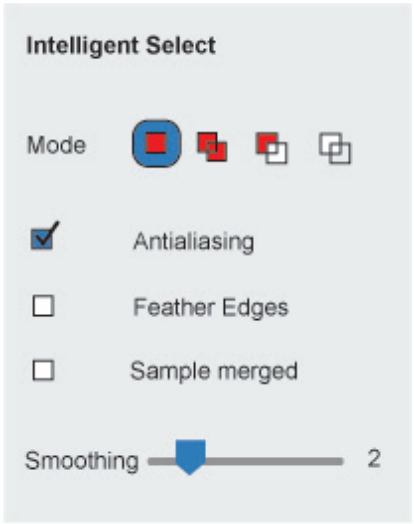
### 7.4 Additional usability

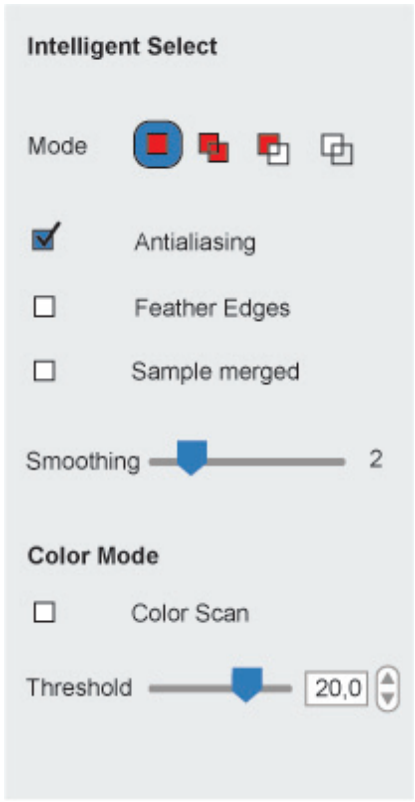
All the different selection modes are combinable in every way. After pressing the ESCAPE or the ENTER key (with edge select mode or with foreground select mode) the user can add another selection by entering the desired mode.

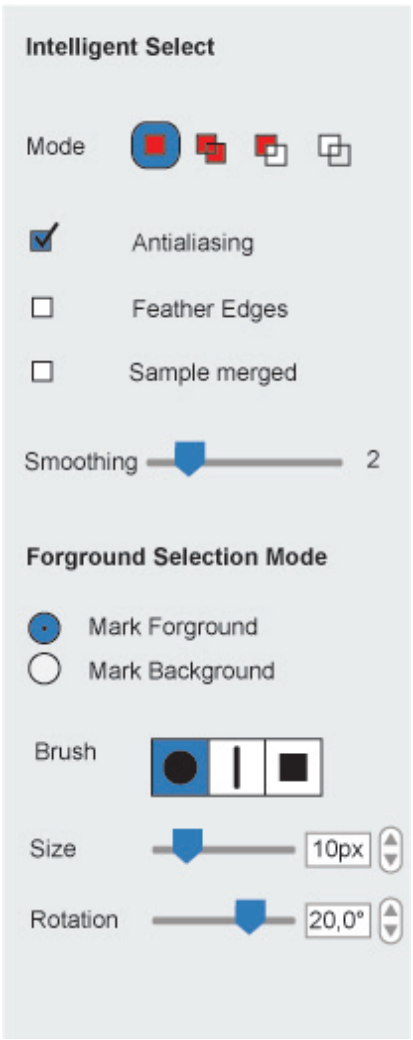
The last step the user can choose to use to refine the selection is the “path”-mode. The selection (depicted as a black and white dashed line, as usual) will have hidden points and handles, that can be adjust like path-points on a path can be adjusted. If the user moves his mouse over the dashed line, the closest points will be visible. These path-points will have handles so the user can adjust the curve. It is also possible to add more path-points (by pressing the SHIFT key), or to delete path-points (by pressing the CTRL key). With that mode it is possible to refine the selection perfectly, since it is completely regulated by the user.

Since the path-points are not visible until the user moves its mouse over the path, this mode will not bother the users, which do not wish to use it. However, it is always present.

## 7.5 The Toolbox



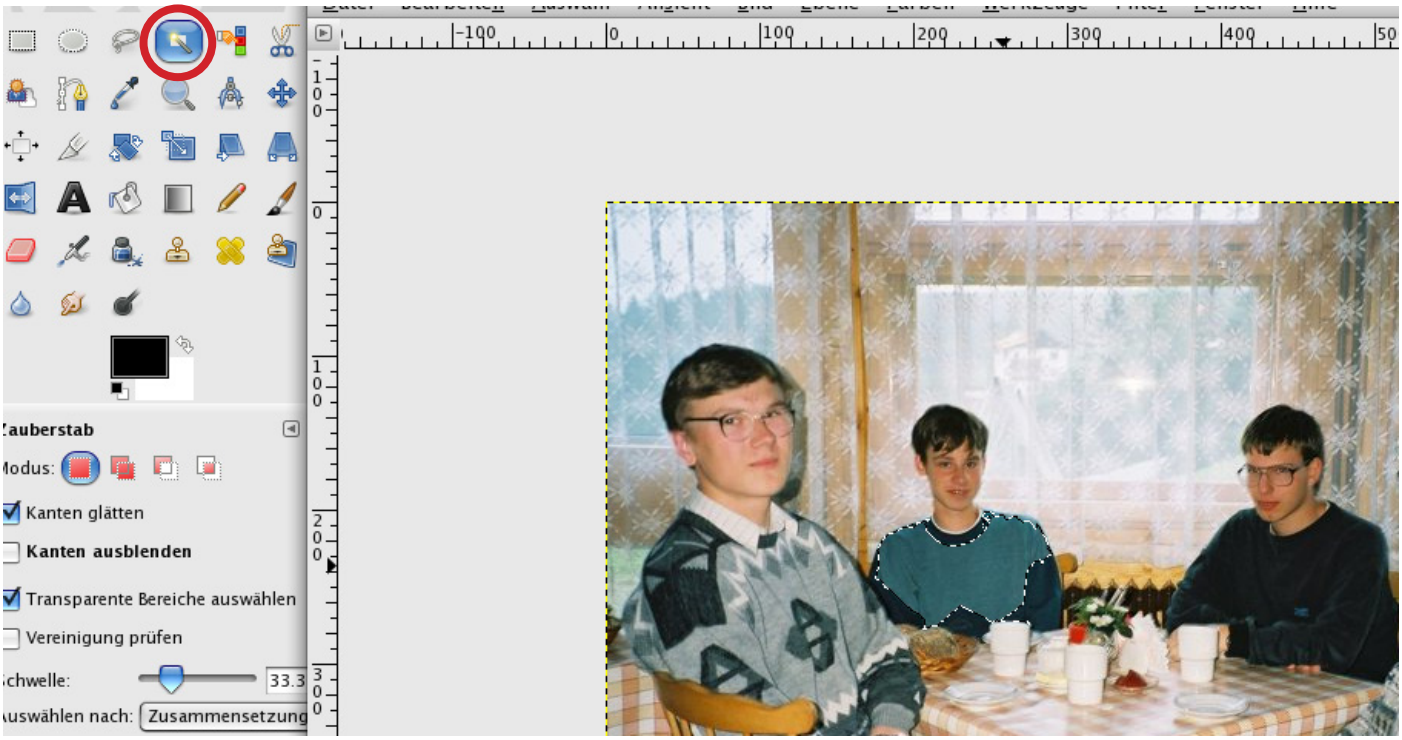



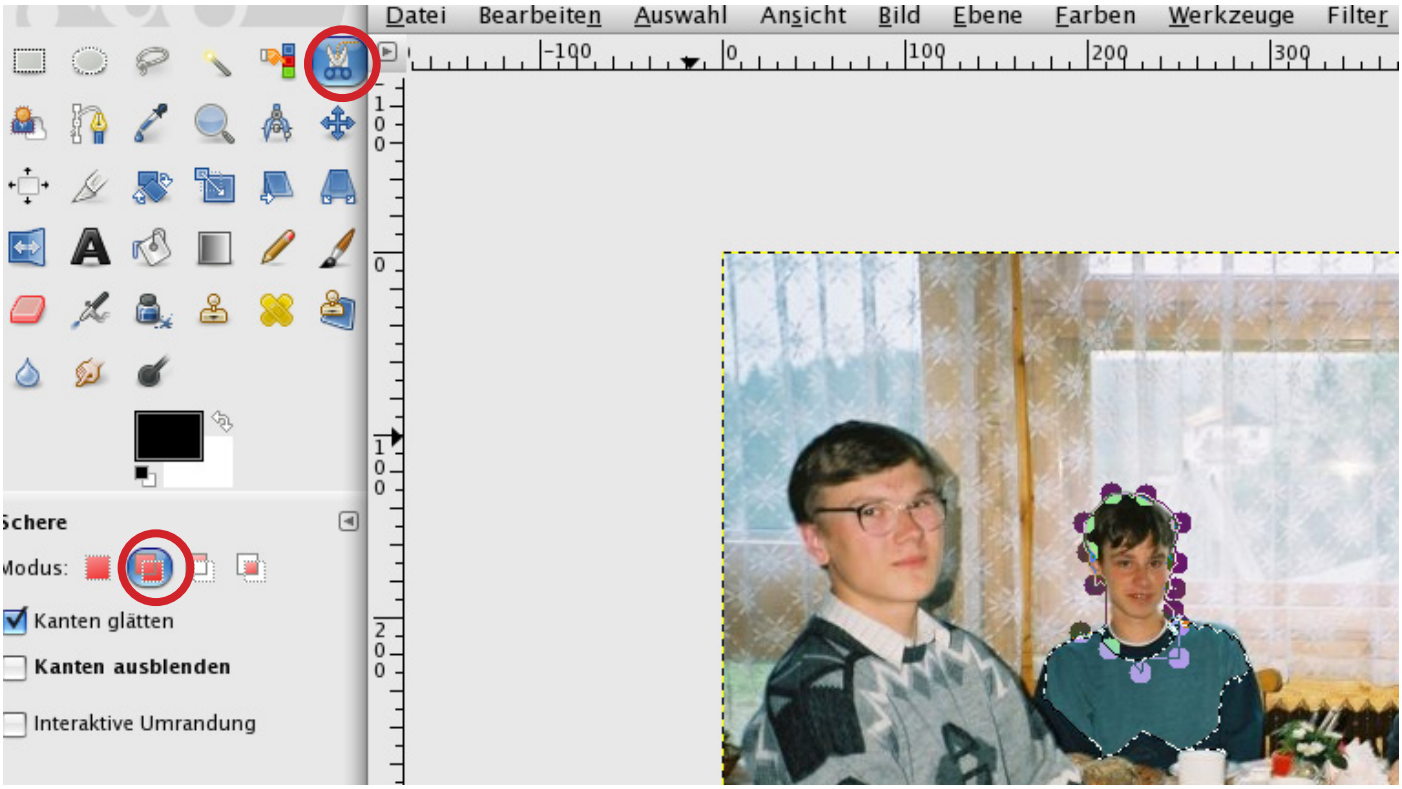

There is one toolbox for the the new tool. It changes itself, when another selection strategy is selected. The first picture shows the basic toolbox, when the new tool is selected, but no selection strategie is choosen so far.
The second picture shows the toolbox of the click select strategie and the third picture shows the toolbox while the foreground selection strategie is used. There is no seperate toolbox for the edge select strategie, straight lines can be selected by pressing the SHIFT key.

# 8. Examples

## 8.1 Before

If you want to start off with selecting the green sweatshirt, you go ahead with the Magic Wand.Now you want to continue with selecting the head with the Magnetic Scissor tool. But before you have to select the additional selection modus.

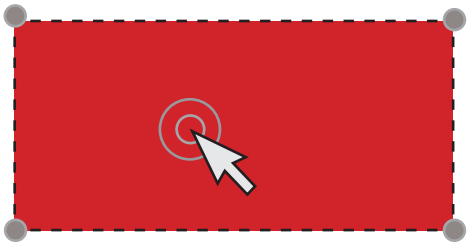


## 8.2 With the intelligent select tool

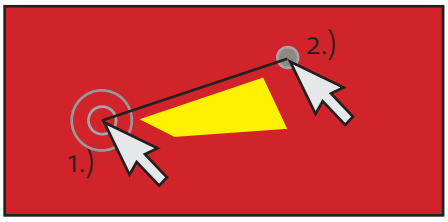
Solution:
1 Tool: Intelligent Select Tool

Example 1
Color Select Mode



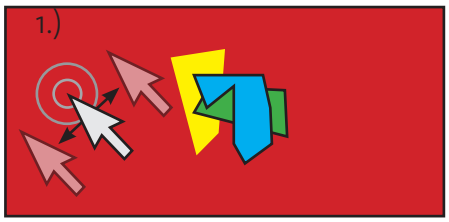
One click to select the similar color around the spot you selected.

Example 2
Edge Select Mode

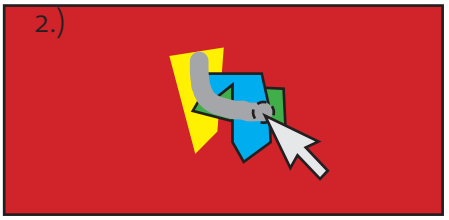



1.) Click and 2.) drag to the point where you want set the second "pathpoint". When releasing the mouseclick, the "path" is set.

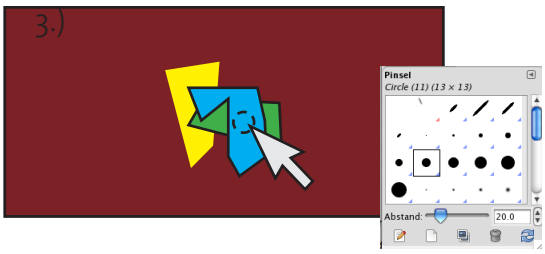
Example 3
Fore-Background Select Mode




1.) Click and shake

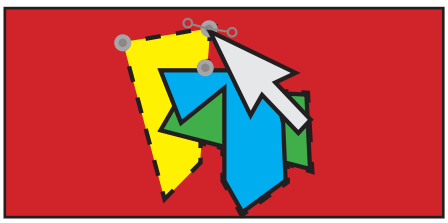



2.) Selecting the foreground




3.) For refining some parts that are not selected properly, you can use now different brushes. For better selection you can also switch to paint in the background mode.

Example 4
“Path“-Mode



If needed, further refinement is also possible by adjusting the “paths“ of your selection. You have this possibilty everytime you have selected something. If you come near a dashed selection line, the nearest “pathpoints“ appears.

## 9. Conclusion

With our new tool which has several strategies to select different content, doing selections with GIMP is much faster and easier. The user doesn‘t get confused anymore, like with the difference of the former tools „magic wand“ and the „color selector“. A big speed increase is the possibility to change the different selection strategies through mouse gestures. So the user saves a lot of mouse movement (=time) to click at the different tools or to use the different shortcuts. He only needs the mouse to get started. The strategies can be easily combined, which gives the user all possibilities to come to a fast and good selection. With the path mode we give the user the possibility to bring his selection to perfection, without a lot of hassle. The smooth function assists here.