

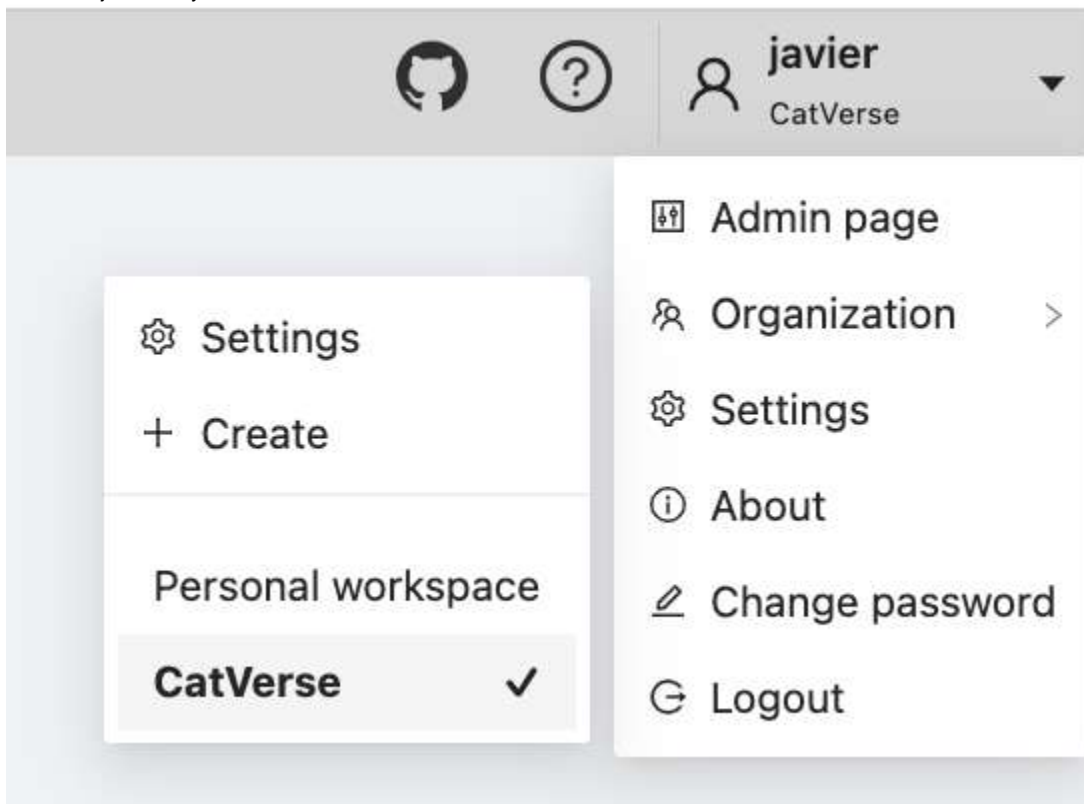
CVAT Annotation Instructions

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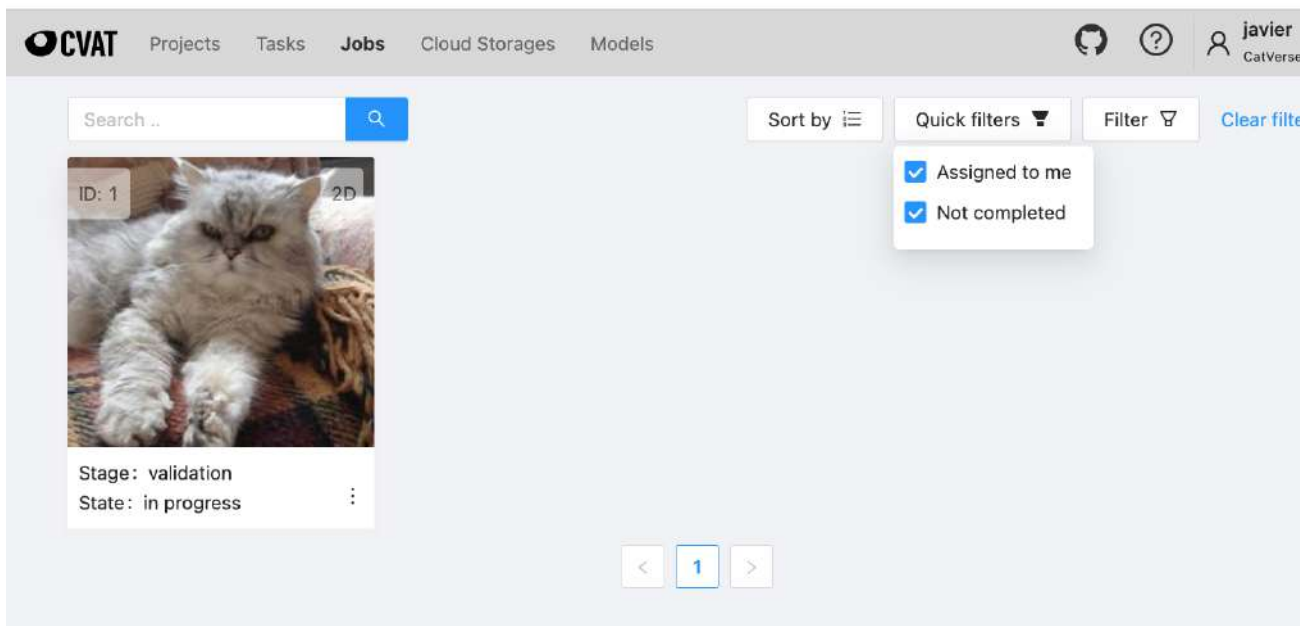
CVAT is a leading tool for annotating images and videos. To learn more about what you can do with CVAT or how to use it, go to their website here: <https://cvat.org/>

Logging into CVAT and loading a task list

1. Open <https://annotate.catverse.app/>
2. Login with your CVAT username and password
3. Set the CVAT “organization” to CatVerse through the dropdown menu at the top right. You will not see or be able to access the project tasks and jobs until you do this.



4. Select jobs from the top menu bar then set the “Quick Filters” to “Assigned to me” and “Not Completed”. This shows jobs that are assigned to you and not finished.



- Note:** CVAT organizes work into Projects Tasks Jobs.
5. Select a job you want to work on.

Annotating (Labeling) Images for Cat Poses

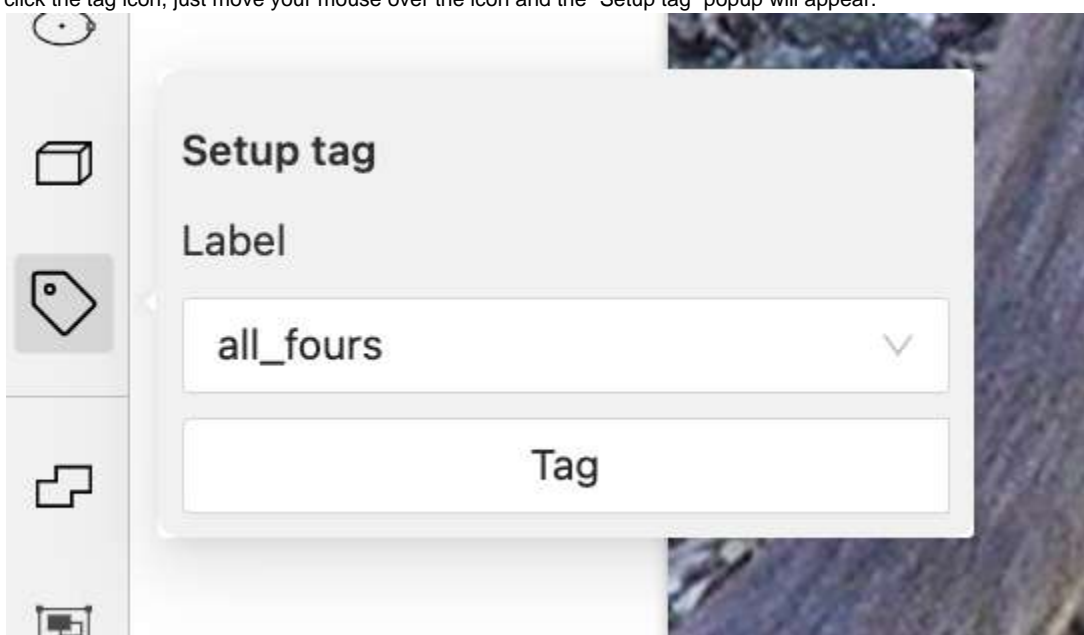
Once you've opened a job it's time to annotate the images. In this section we are assuming that the job requires annotating cat poses. A pose is the position that the cat is in. For example standing on all fours, walking, jumping, in the loaf position, etc.

The position labels available along with an example image and description are listed in the Reference section of this document.

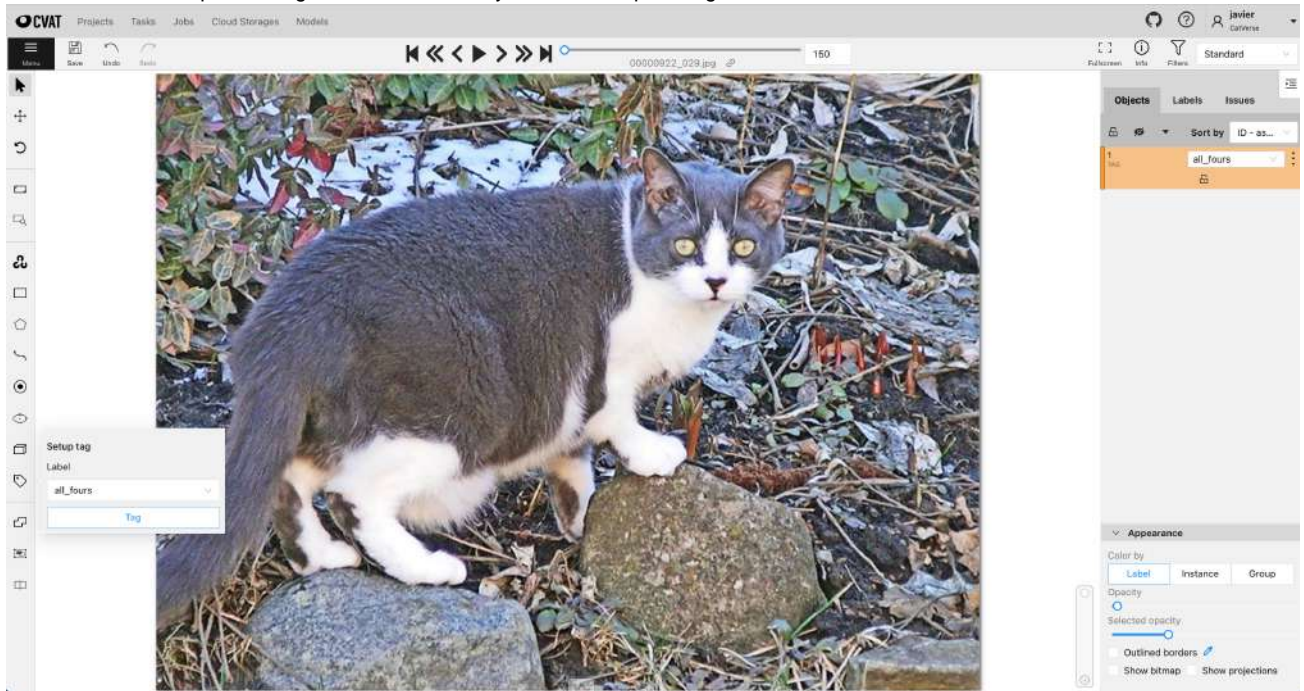
To learn more about the UI and basic usage see the CVAT help site here: <https://openvinotoolkit.github.io/cvat/docs/manual/basics/interface/>

Process Steps

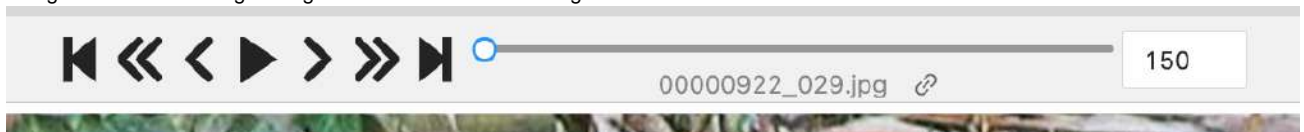
1. Using the "Setup tag" popup that's accessible from the right button bar, label the image with the pose the cat is in . You don't need to click the tag icon, just move your mouse over the icon and the "Setup tag" popup will appear.



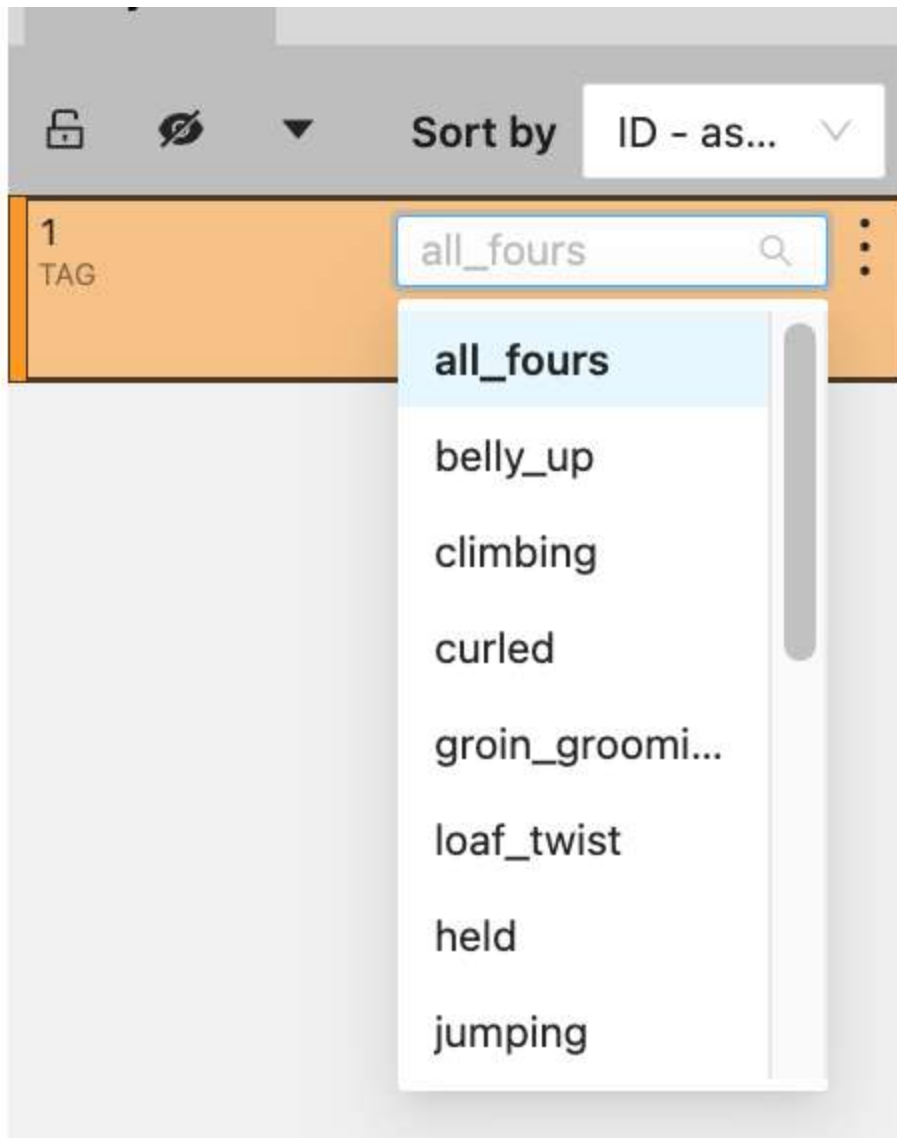
2. Select the correct cat pose from the dropdown menu and the select the "Tag" button at the bottom of the popup.
3. The label will show up on the right. There should only be one label per image.



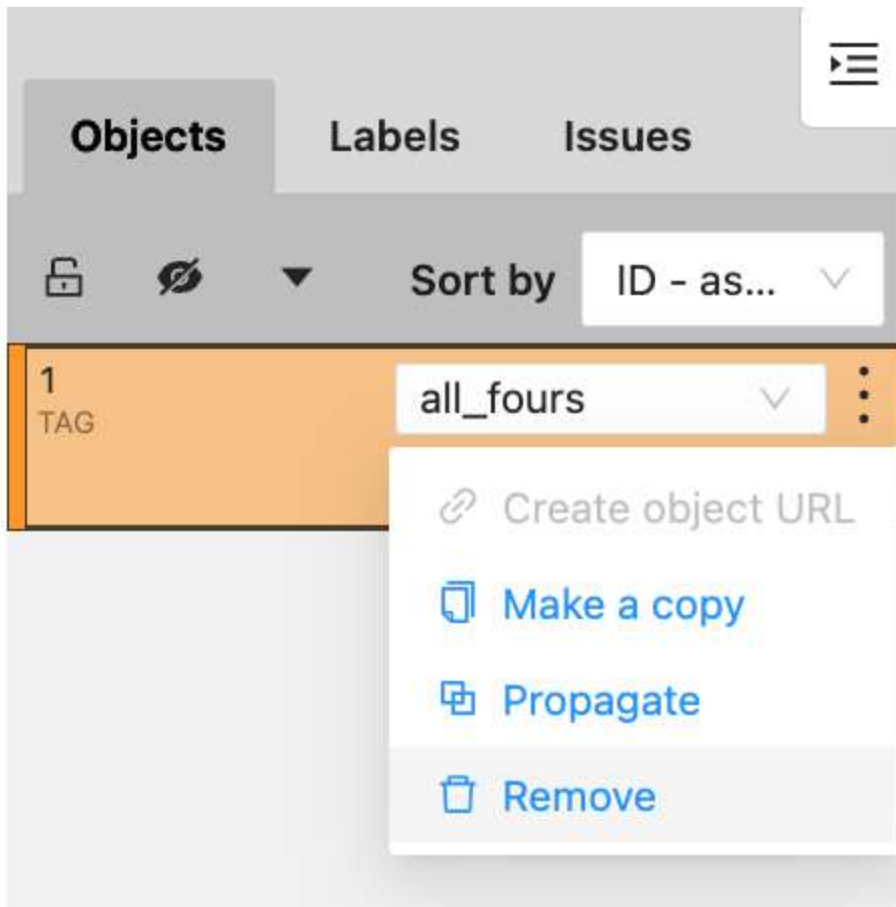
4. Navigate to the next image using the controls above the image



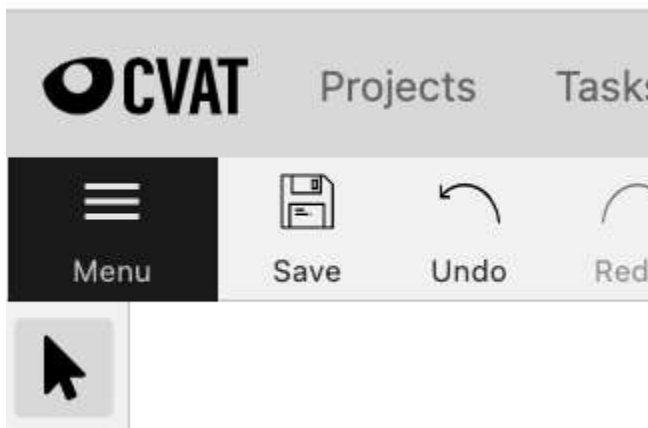
5. If you accidentally add the wrong label you can change it through the label's dropdown menu



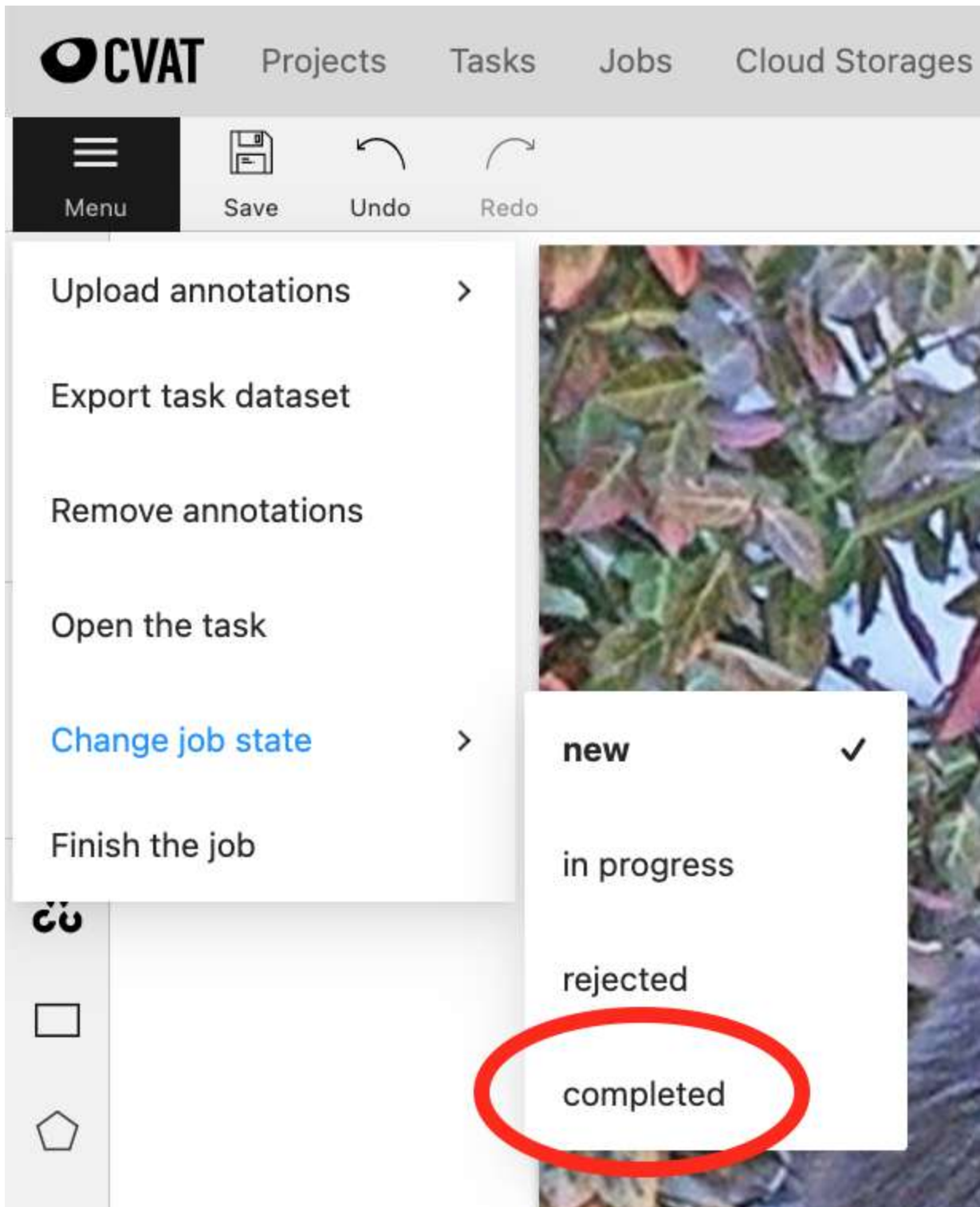
6. If you accidentally add multiple labels you can delete a label through it's "... " icon, just move your mouse over the icon to show the delete menu option.



7. Save your work often as it's not automatically saved to the server. Use the save button at the top right



8. Once you completed all the labels for the job mark the job **complete** through the "Menu" "Change job state" menu item.






9. Go back to step 1 if there are more jobs assigned to you.




Tag Annotation Mode

Tip: you can switch the UI into "Tag Annotation" mode that lets you tag the image using number keys. This easily doubles or triples the annotation speed as you do not use mouse to label the images and navigate to the next image. you can set this mode in the top right corner dropdown.

Learn more about this here: <https://openvinotoolkit.github.io/cvat/docs/manual/advanced/annotation-with-tags/>



**javier**
CatVerse



Tag annotation ▾

FullscreenInfoFilters

Tag label

all_fours

Add tag

☐ Automatically go to the next frame

Frame tags: all_fours ✕

Shortcuts for labels:

Key 1:

all_fours ▾

Key 2:

belly_up ▾

Key 3:

climbing ▾

Key 4:

curled ▾

Key 5:

groin_grooming ▾

Key 6:

loaf_twist ▾

Key 7:

hold ▾

Key 7: field ▼

Key 8: jumping ▼

Key 9: loaf ▼

Key 0: ready_to_pounce ▼

Use or digits to add selected tag
or to skip frame

PoC Experience - Cat Scanning with Keypoint Detection

What are keypoints?

Key points are points in an image that have significant meaning. For example, the location of a person's eye in a face image could be a "keypoint". A model can detect multiple keypoints and (if these points represent joint locations) the keypoints can then be connected to detect body posture and position.

Detectron2 is a great project built on PyTorch that has models that detect keypoints like joints for people.



For CatVerse we will detect keypoints that are specific for cats.

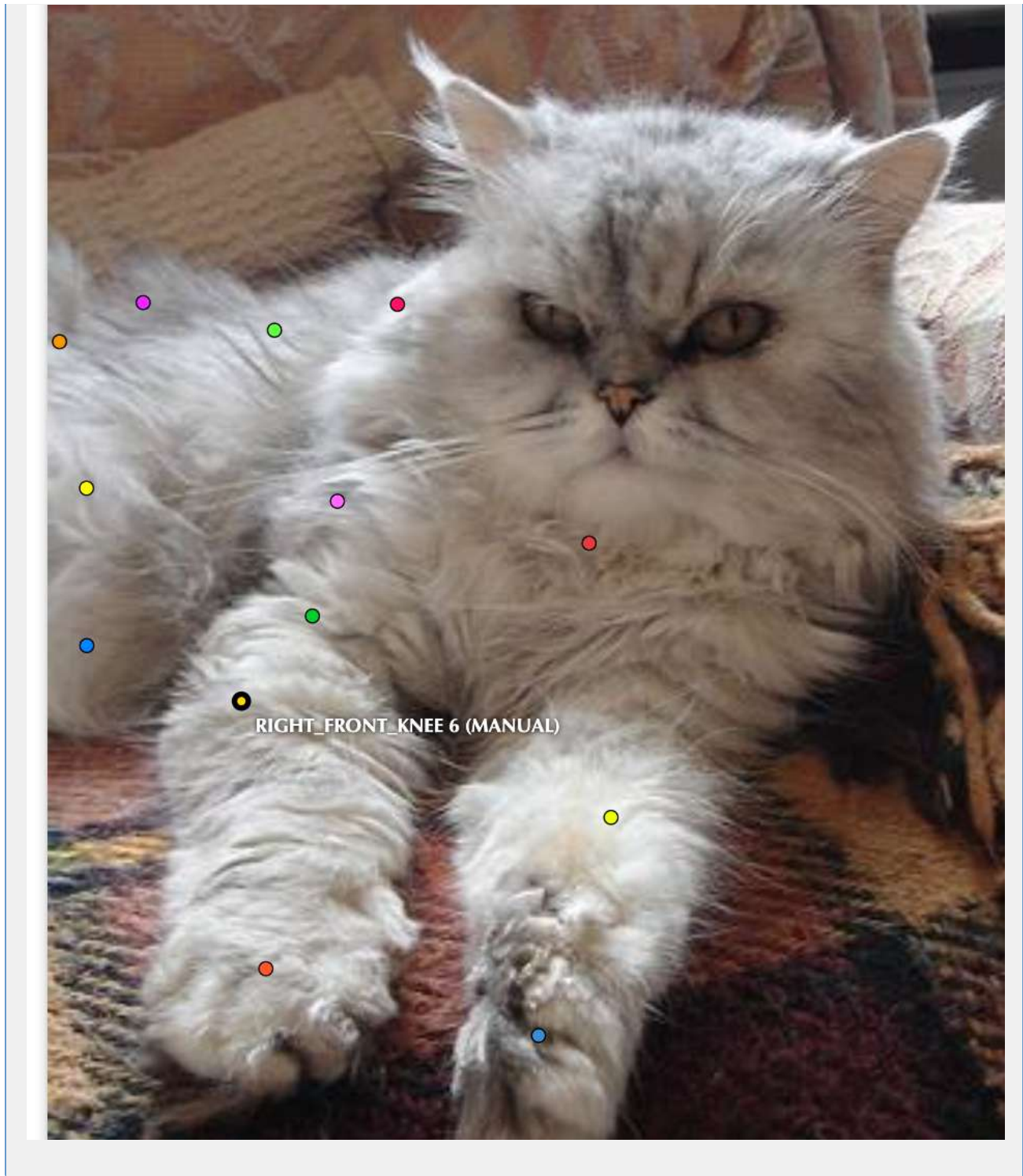
Keypoint Labels (this list can change):

- | | |
|---|---|
| <ul style="list-style-type: none">• left_eye• right_eye• left_ear• right_ear• nose• throat• withers• tail_base• left_elbow• left_wrist | <ul style="list-style-type: none">• left_front_paw• right_elbow• right_wrist• right_front_paw• left_knee• left_ankle• left_back_paw• right_knee• right_ankle• right_back_paw |
|---|---|

Example of bounding boxes:



Visual Examples of Keypoint annotation:

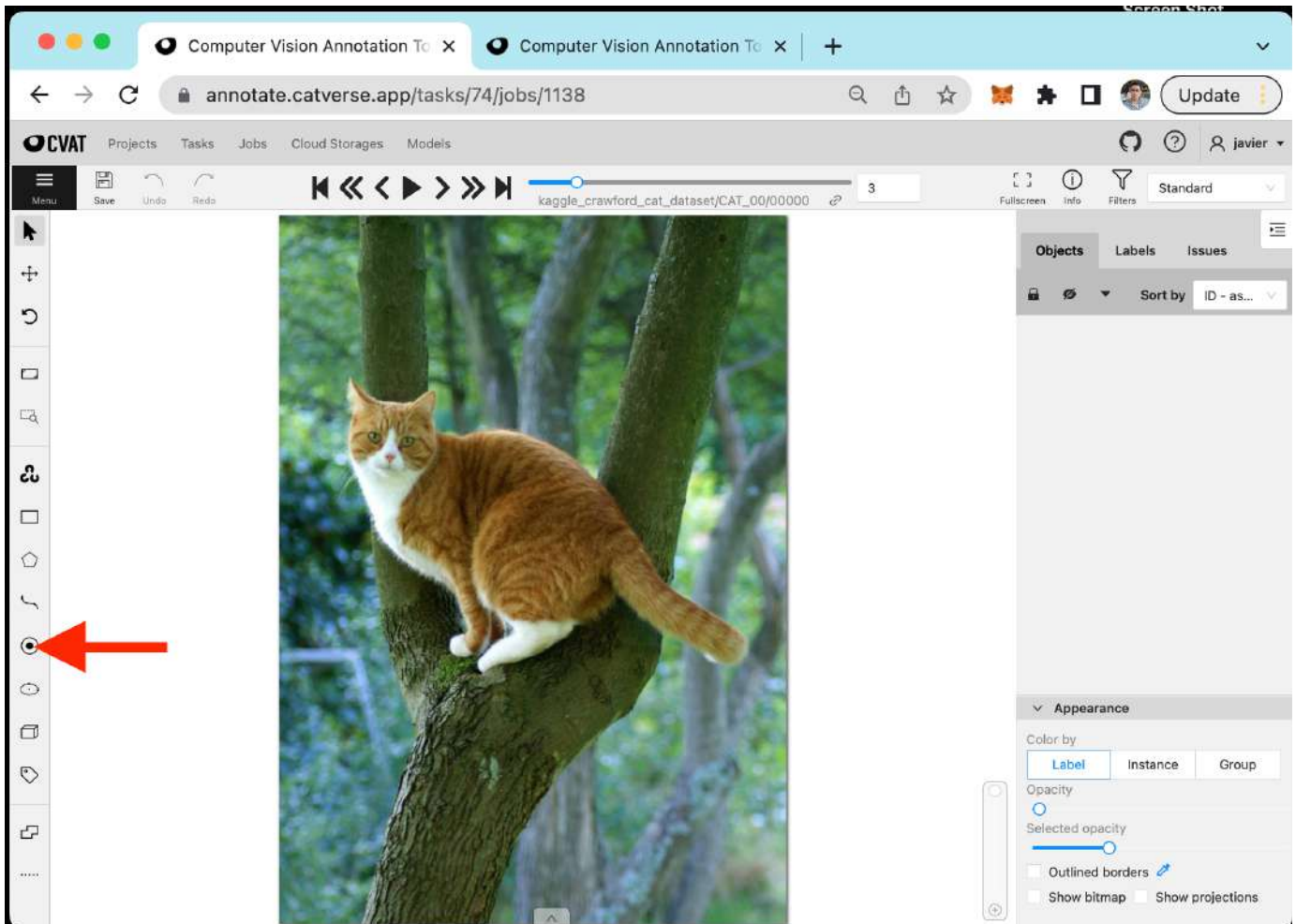


Annotating Body Key Points

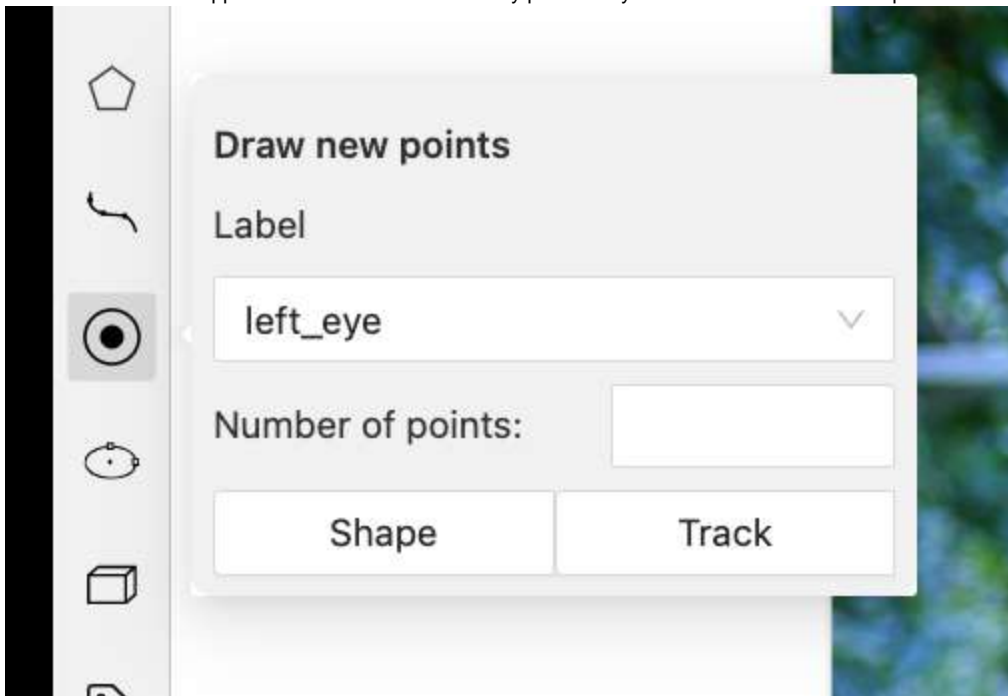
Key points are specific points in an image that could represent anything. For example the location of their eyes, nose and mouth could all be identified with a keypoint, which will appear in CVAT as a labeled point.

Process Steps

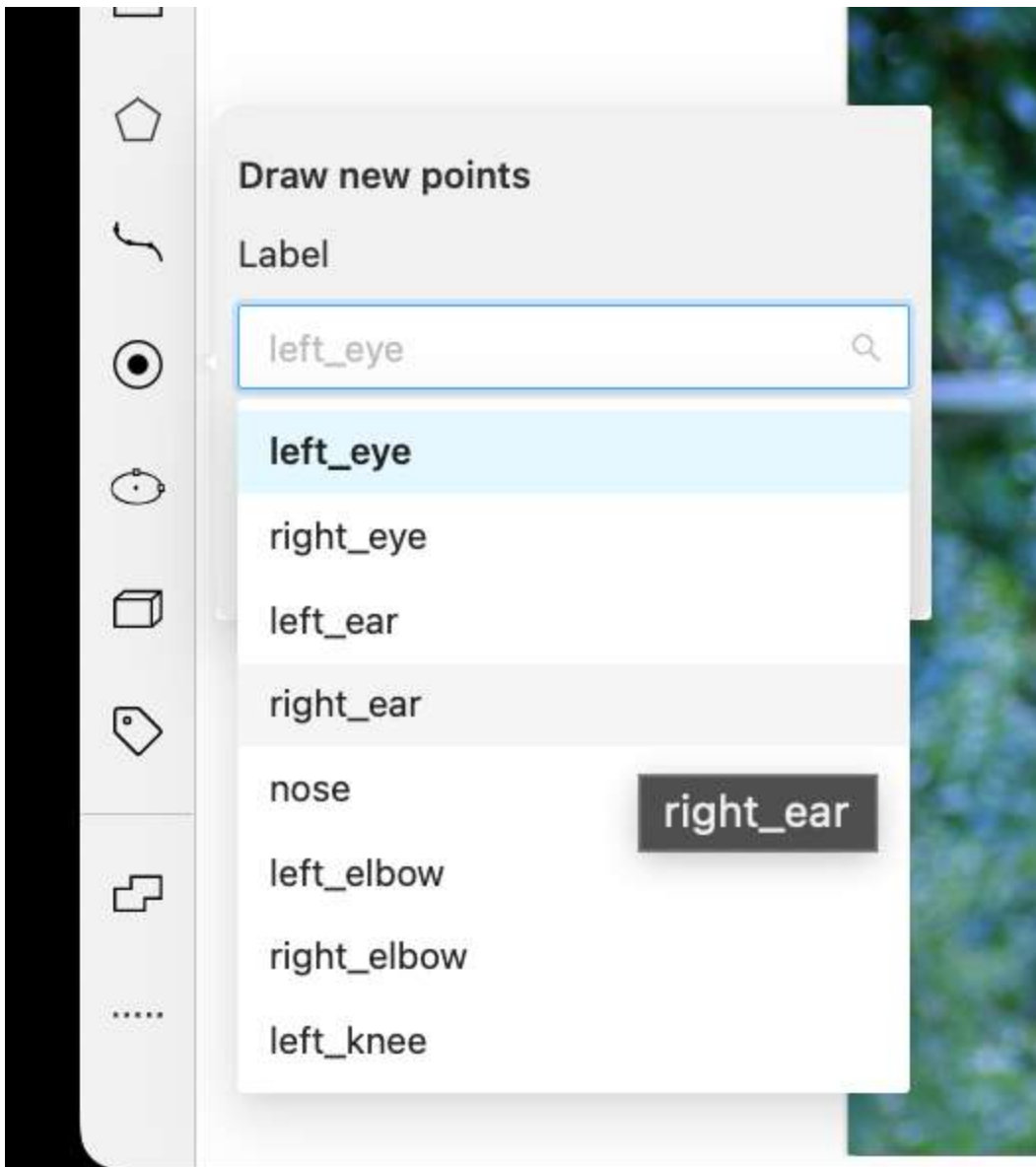
After logging in and opening a job assigned to you for key point annotation, you will see a screen similar to the following. In this case it's just an image and there haven't been any points added yet. To add them hover the mouse over the "Point" icon on the left-hand menu bar (see red arrow below)



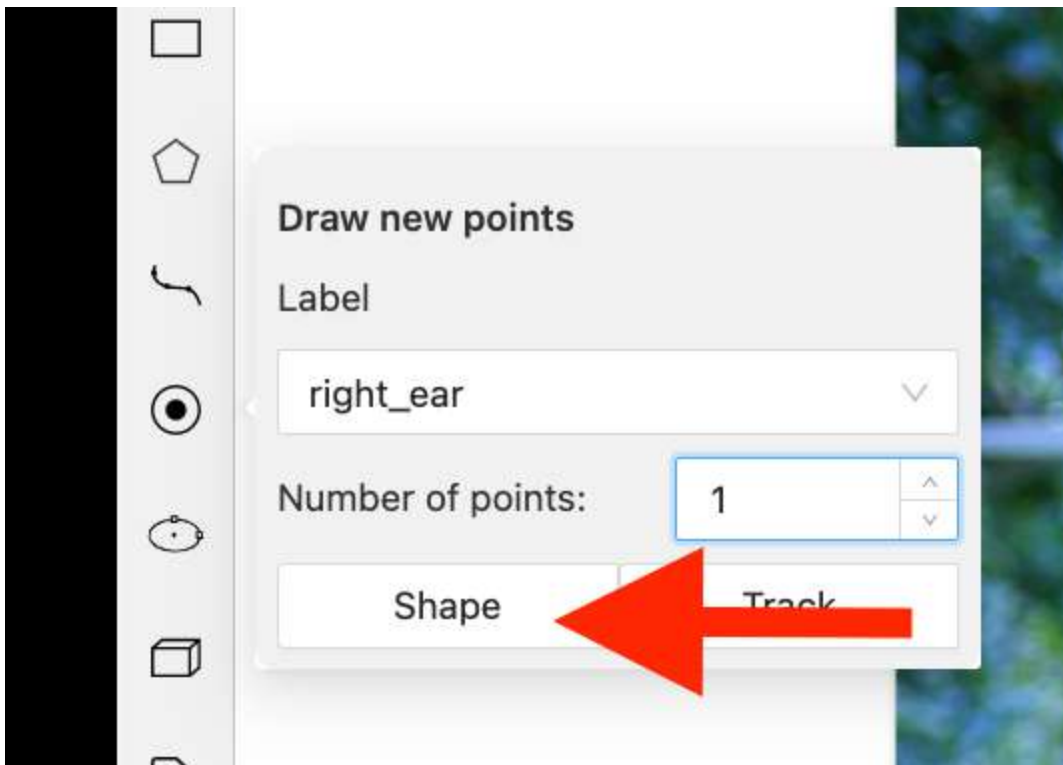
A modal window will appear. Select the label of the key point that you want to add from the drop down menu.



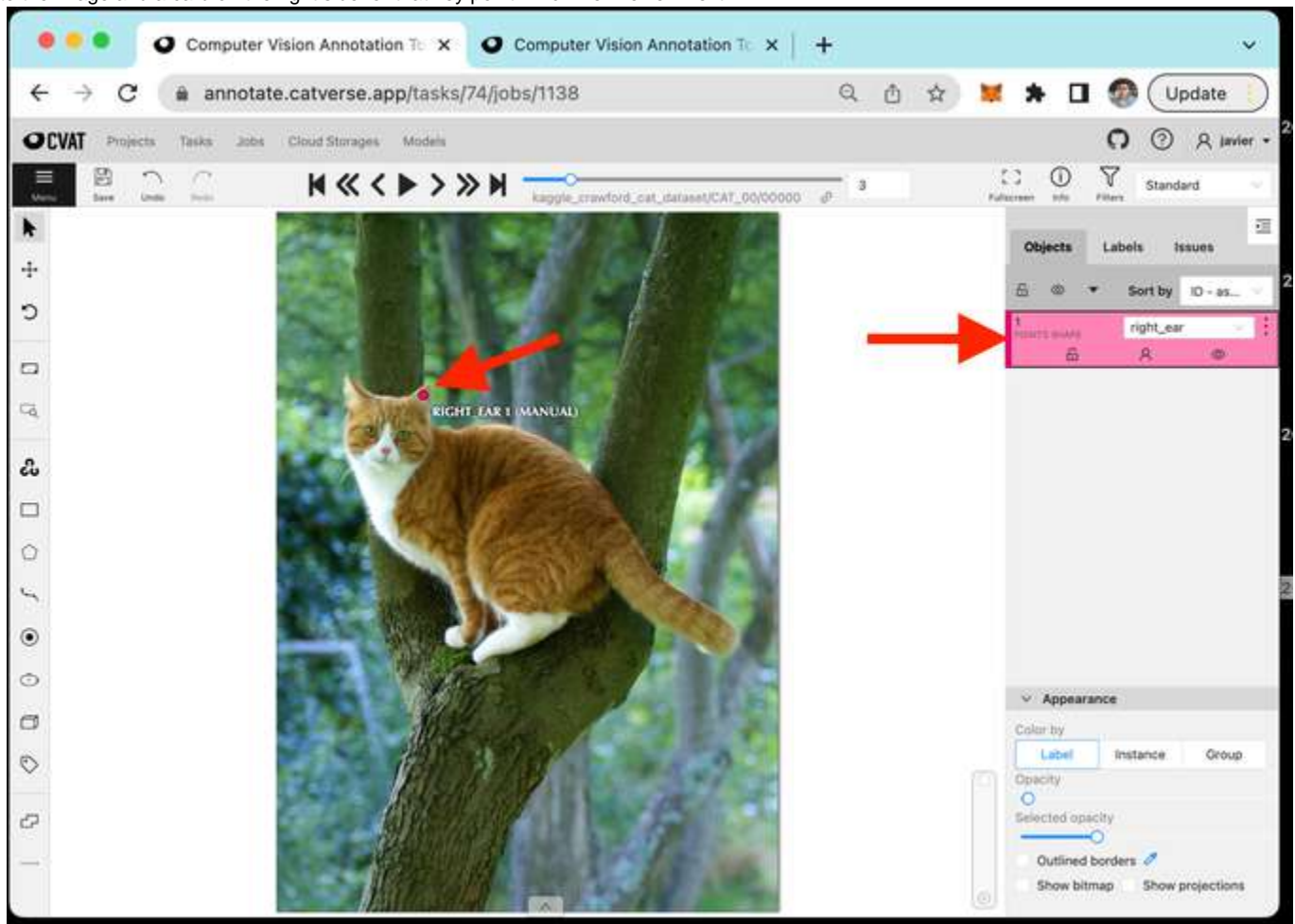
Here we select "right_ear"



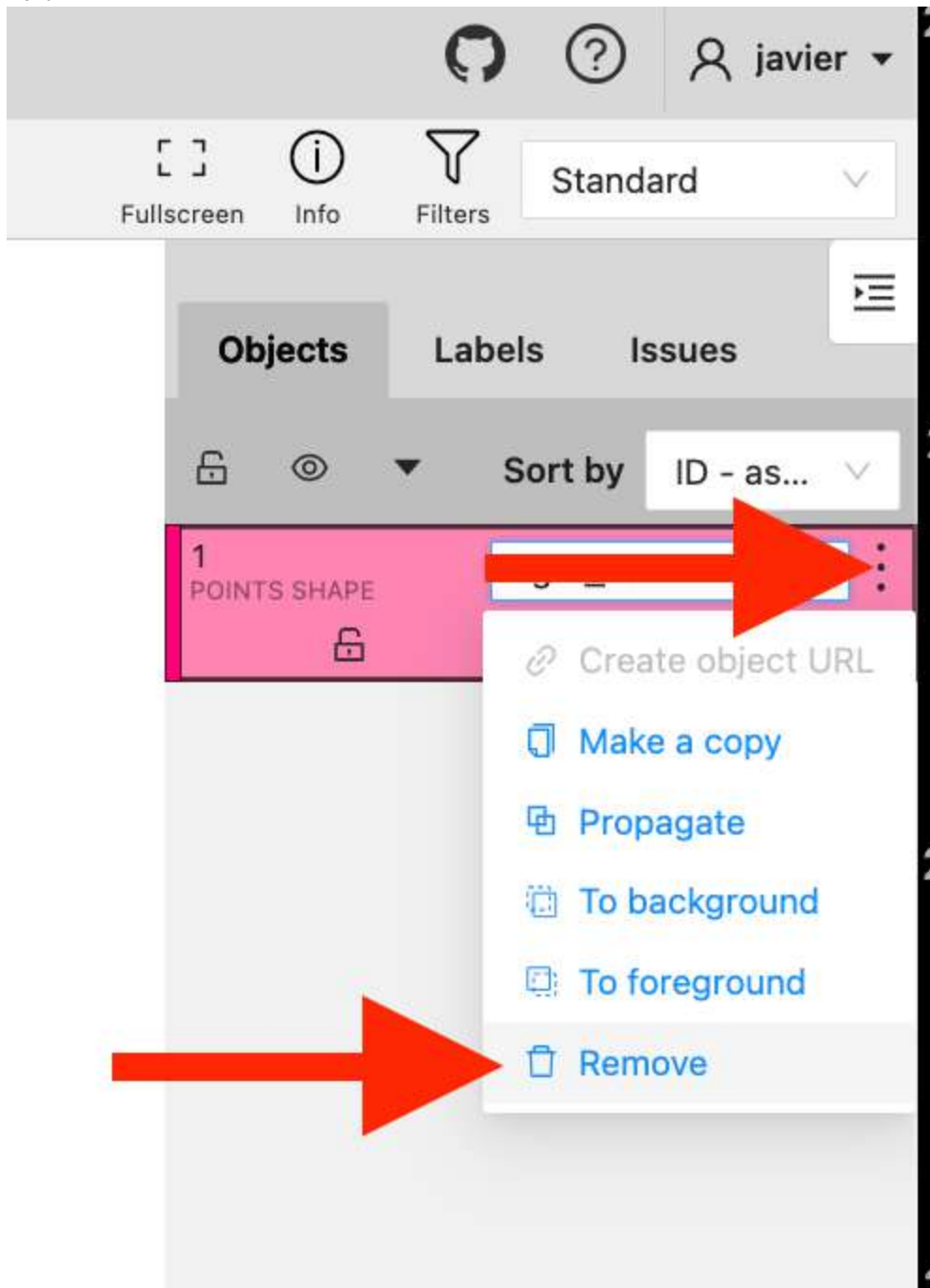
The select "Shape"



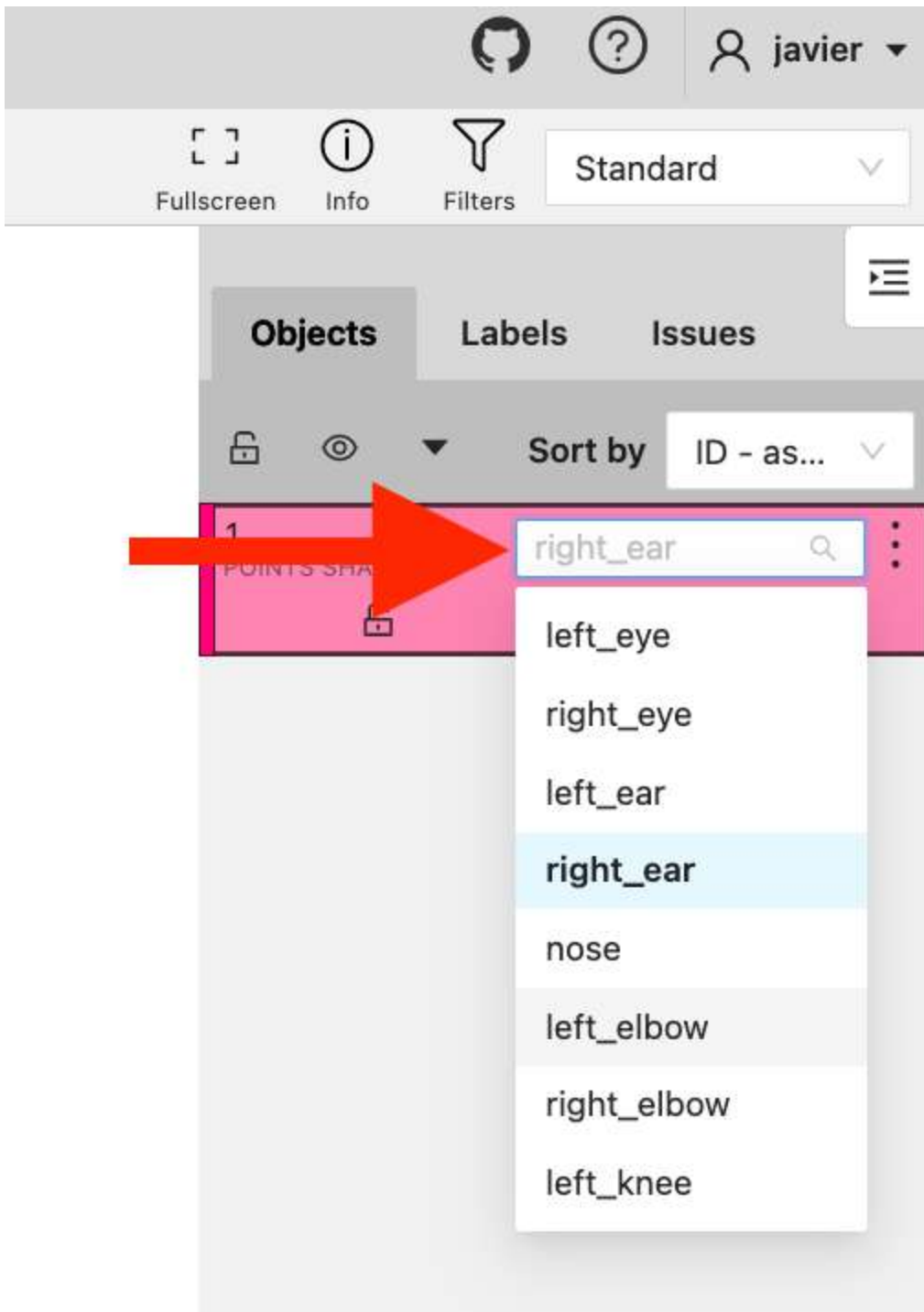
The mouse will turn into a crosshair icon. Now select the position where you want to add the point. In this case the cat's right ear. The example below shows that we labeled the cat's left ear with the right_ear key point. We'll fix that later. In the image below you can see the key point added to the image and a card on the right side for that key point which we'll review next.



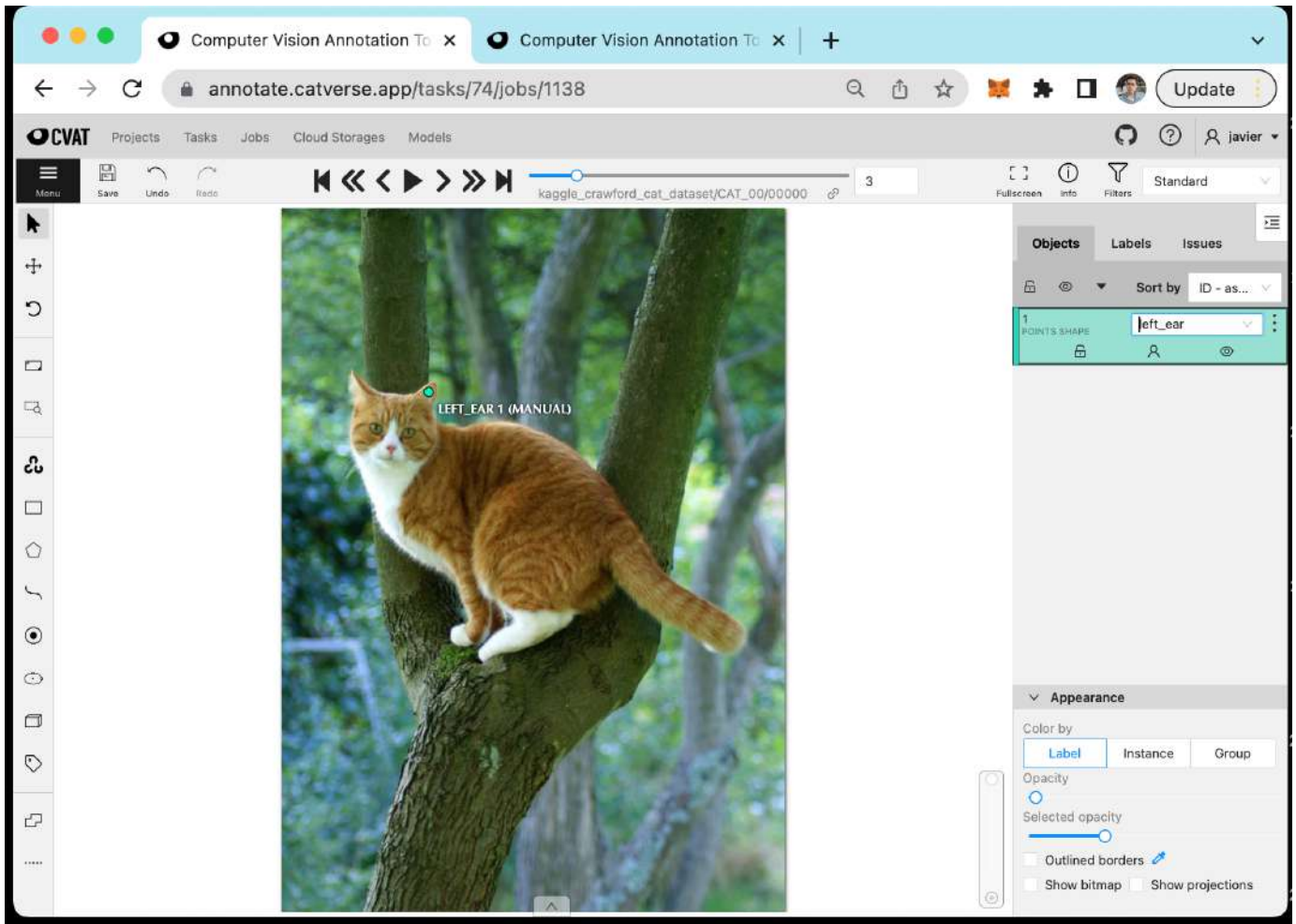
You can remove a point by accessing the three-dot menu icon from the card on the righthand side, then selecting "Remove" from the drop down menu.



Using the same card you can also change the key point's label.



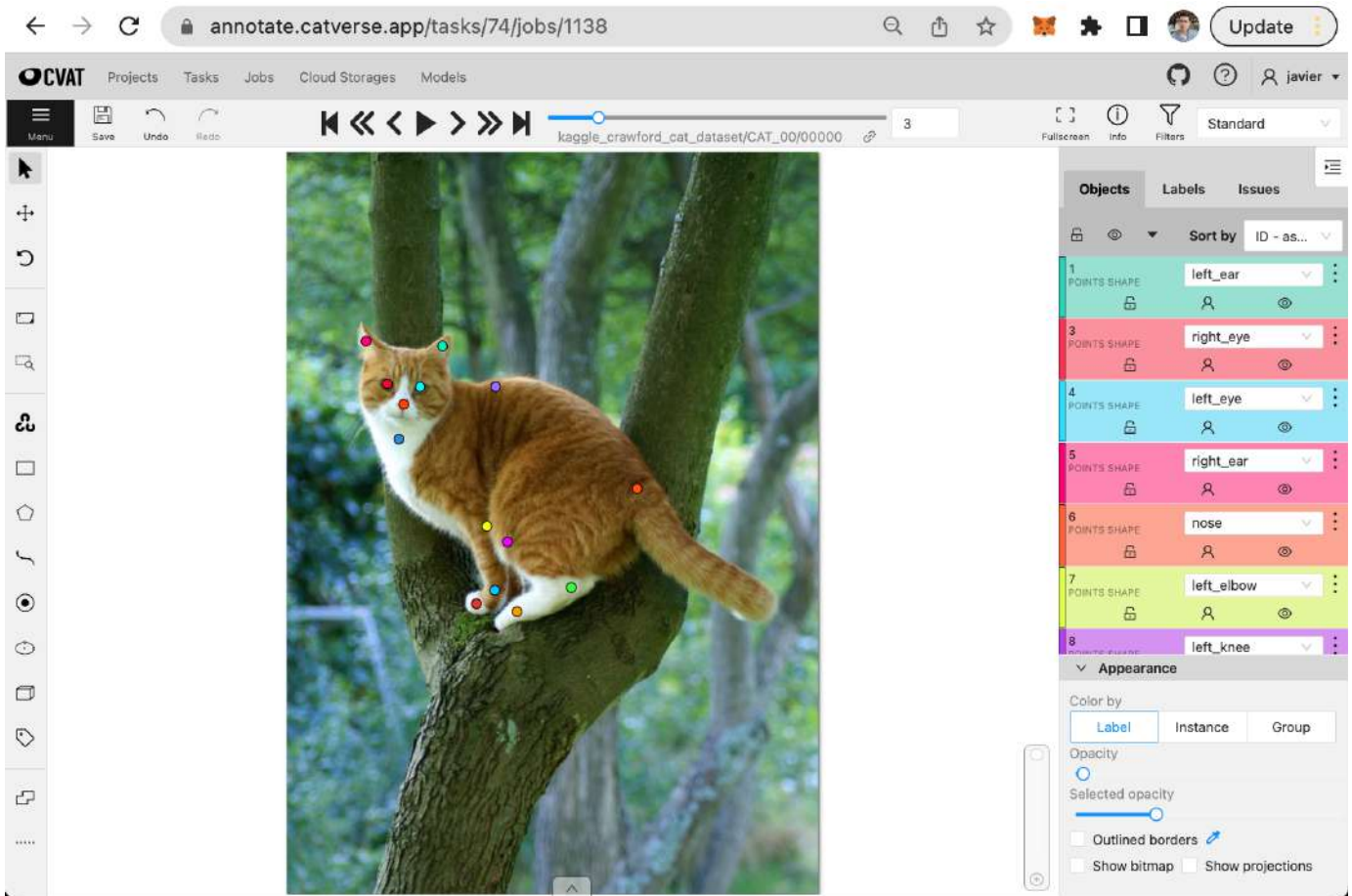
As we stated earlier, we already made a mistake. Let's change the label of the point from "right_ear" to "left_ear" since we actually labeled the cat's left ear and not its right ear. We should see this now:



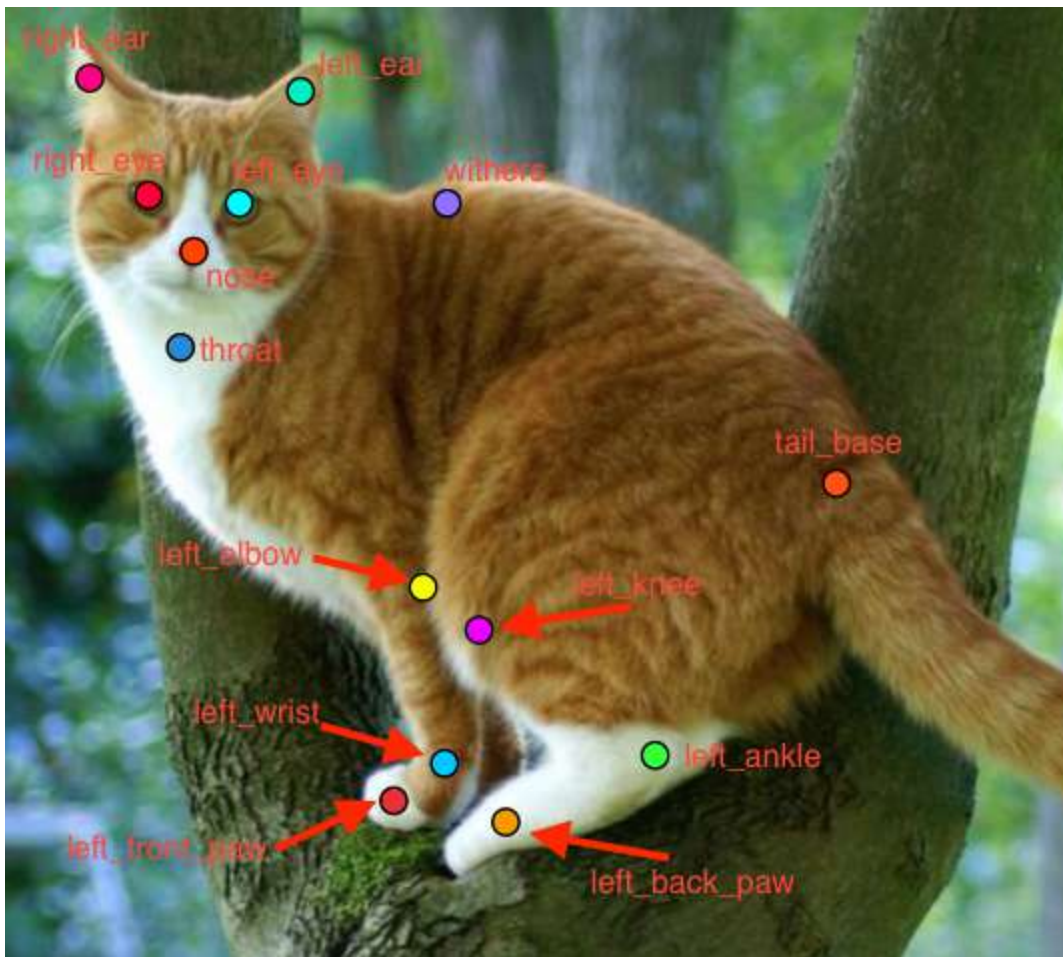
In this image we cannot see all the cat's keypoints but we can see most of them. The key points that we can see and label are the following so let's label them:

- | | |
|---|---|
| <ul style="list-style-type: none"> • left_eye • right_eye • left_ear • right_ear • nose • throat • withers | <ul style="list-style-type: none"> • tail_base • left_elbow • left_wrist • left_front_paw • left_knee • left_ankle • left_back_paw |
|---|---|

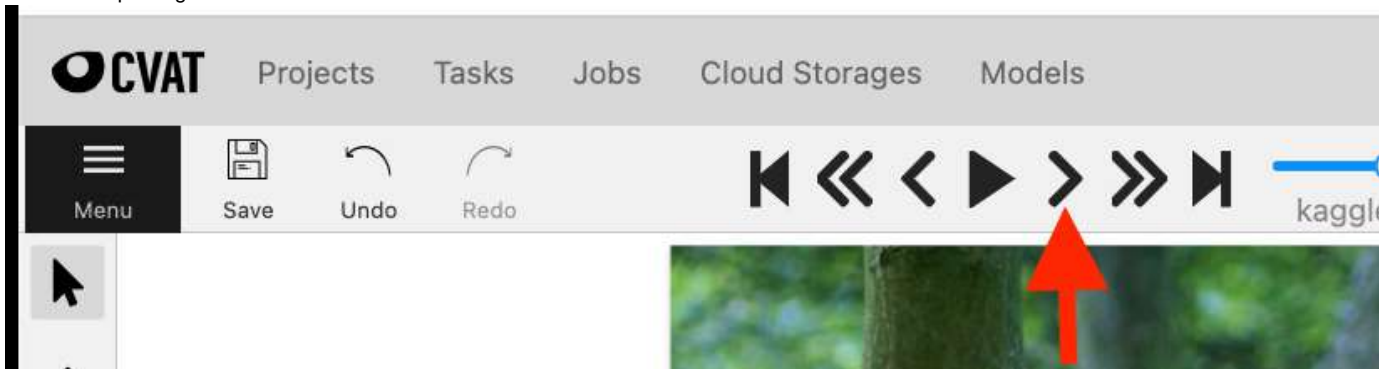
This is what it looks like after we add and assign all the points



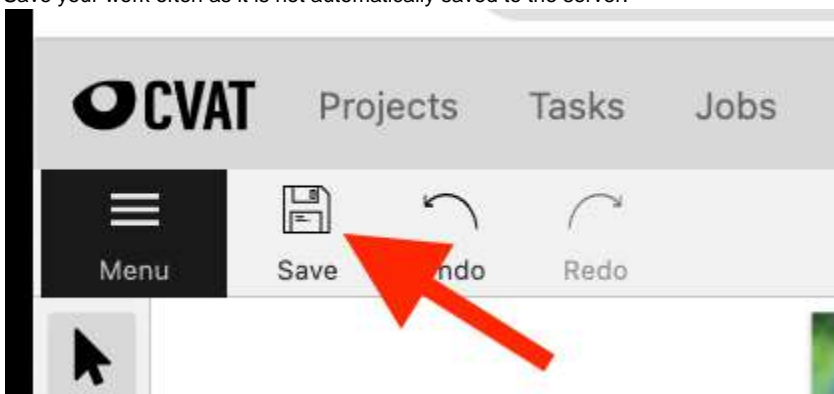
Notice the positions of the cat's knee and ankle on the rear leg compared to the wrist and elbow of the front leg. On the rear leg the paw and ankle are farther apart compared to the wrist and paw on the front leg.



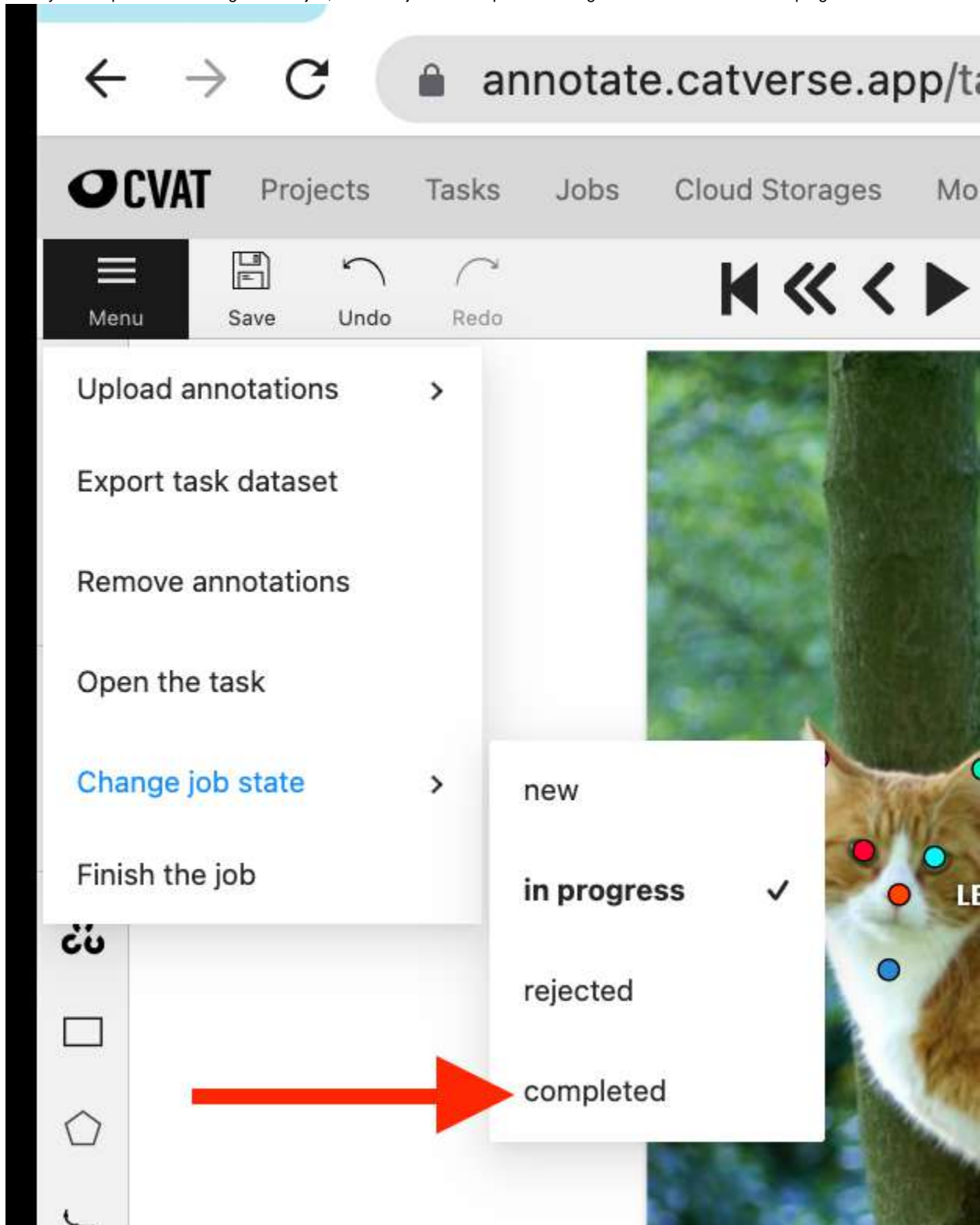
After you finish labeling an image, continue to the next one until all images in the job are labeled. Use the next arrow button as seen below that is located in top navigation bar.



Save your work often as it is not automatically saved to the server.



Once you complete all the images in the job, mark the job as “completed” through the menu button at the top right.



What about key points on the cat that are not visible in the image?


Do not label key points that are not visible in the image. In the example above we could not see the cat's right front and back legs. Thus, we did not label the key points for those legs.

How to automatically add key points to each image

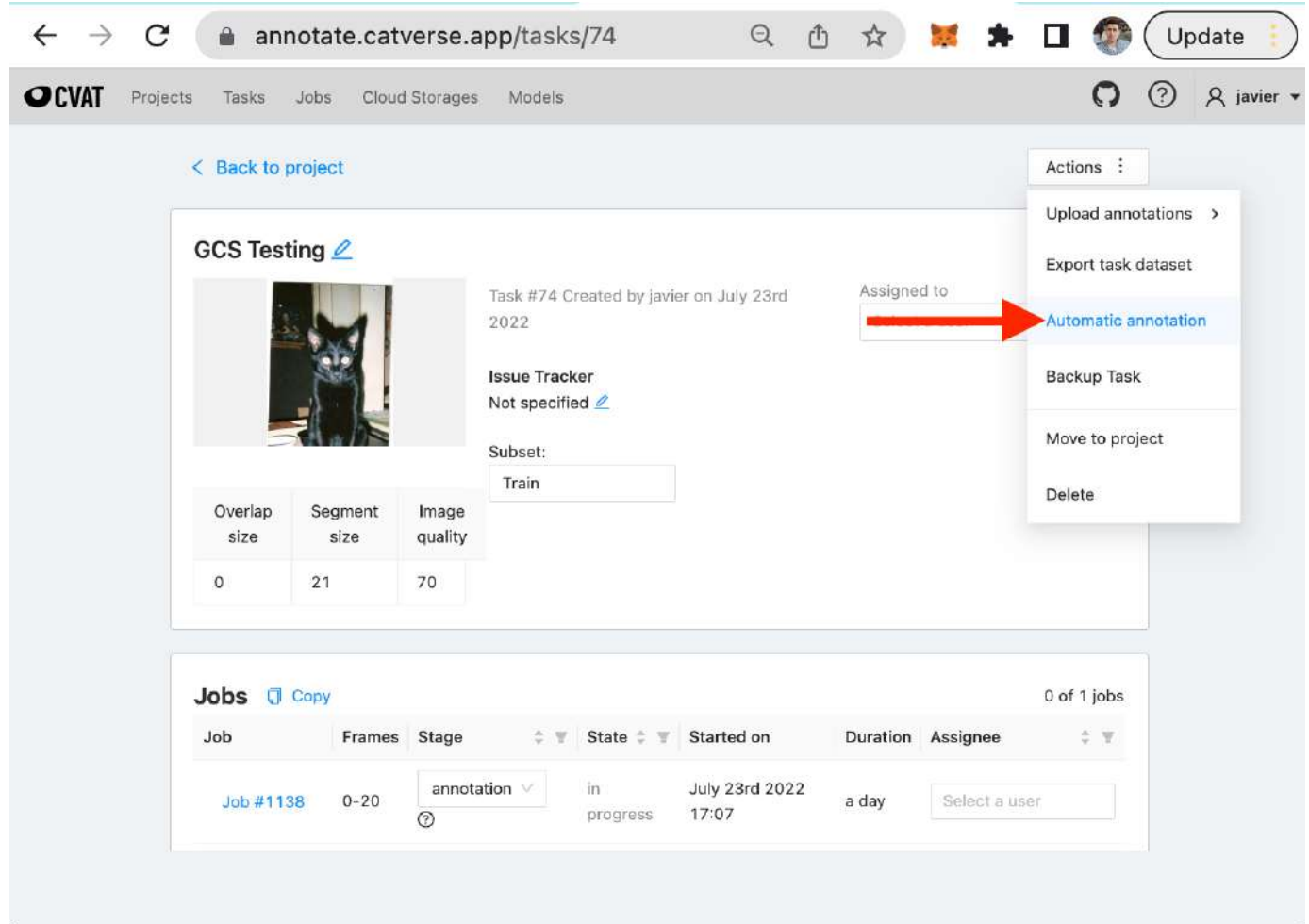
Adding each key point (one-by-one) to each photo can take a lot of time and is tedious. There are two ways to add all 20 key points to each photo automatically so you don't have to add them one-by-one. With all the points preloaded onto the image, you can then just move them to the correct position or delete them if they are not present, saving a lot of time.

Adding key points to all jobs in a task

The first and preferred way is to add all the key points to each photo in the job. This can be done from the task screen when you open the task.

 You may not have the required permissions to do this. If you don't then see the next section that describes how to add all labels to an individual image.

To automatically add all 20 points to all images in the task: From the action menu select "Automatic annotation". A modal will popup letting you select the model to use.

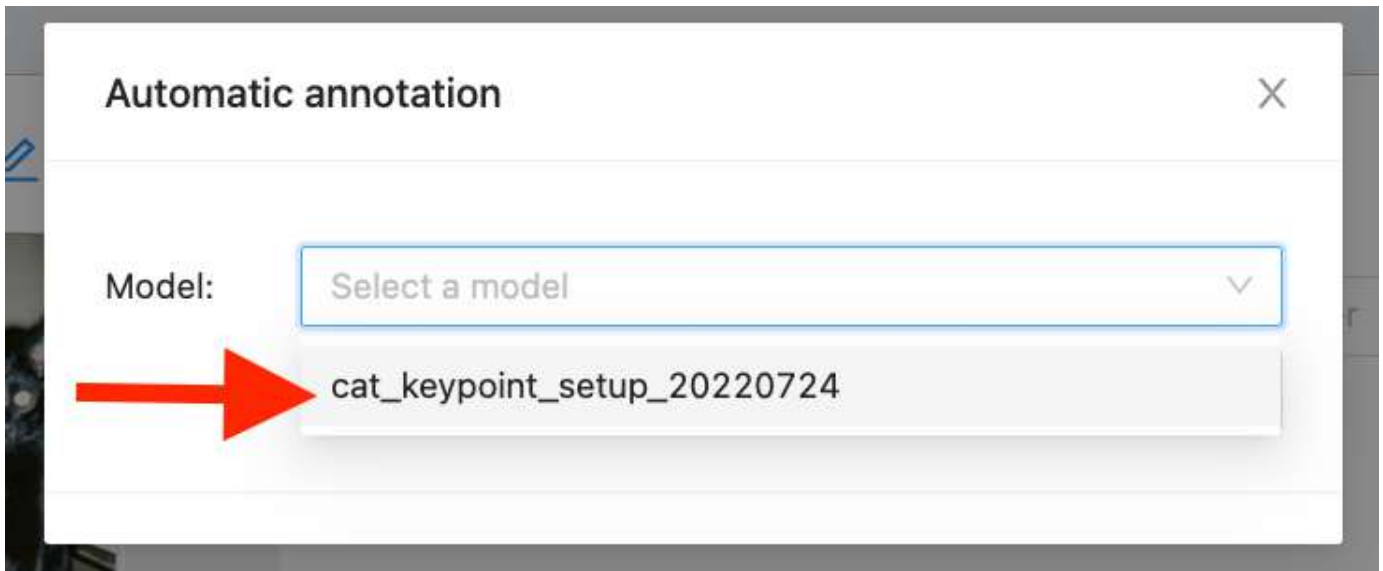


The screenshot shows the CVAT web interface. The browser address bar displays `annotate.catverse.app/tasks/74`. The page header includes the CVAT logo and navigation links for Projects, Tasks, Jobs, Cloud Storages, and Models. The user profile 'javier' is visible in the top right corner. The main content area shows the task 'GCS Testing' with a thumbnail image of a cat. To the right of the image, it says 'Task #74 Created by javier on July 23rd 2022'. Below this, the 'Issue Tracker' is 'Not specified'. A 'Subset' dropdown is set to 'Train'. A table shows 'Overlap size' as 0, 'Segment size' as 21, and 'Image quality' as 70. An 'Actions' menu is open, showing options: 'Upload annotations', 'Export task dataset', 'Automatic annotation' (highlighted with a red arrow), 'Backup Task', 'Move to project', and 'Delete'. Below the task details, the 'Jobs' section shows a table with one job: 'Job #1138' with frames '0-20', stage 'annotation', state 'in progress', started on 'July 23rd 2022 17:07', duration 'a day', and an assignee dropdown set to 'Select a user'.

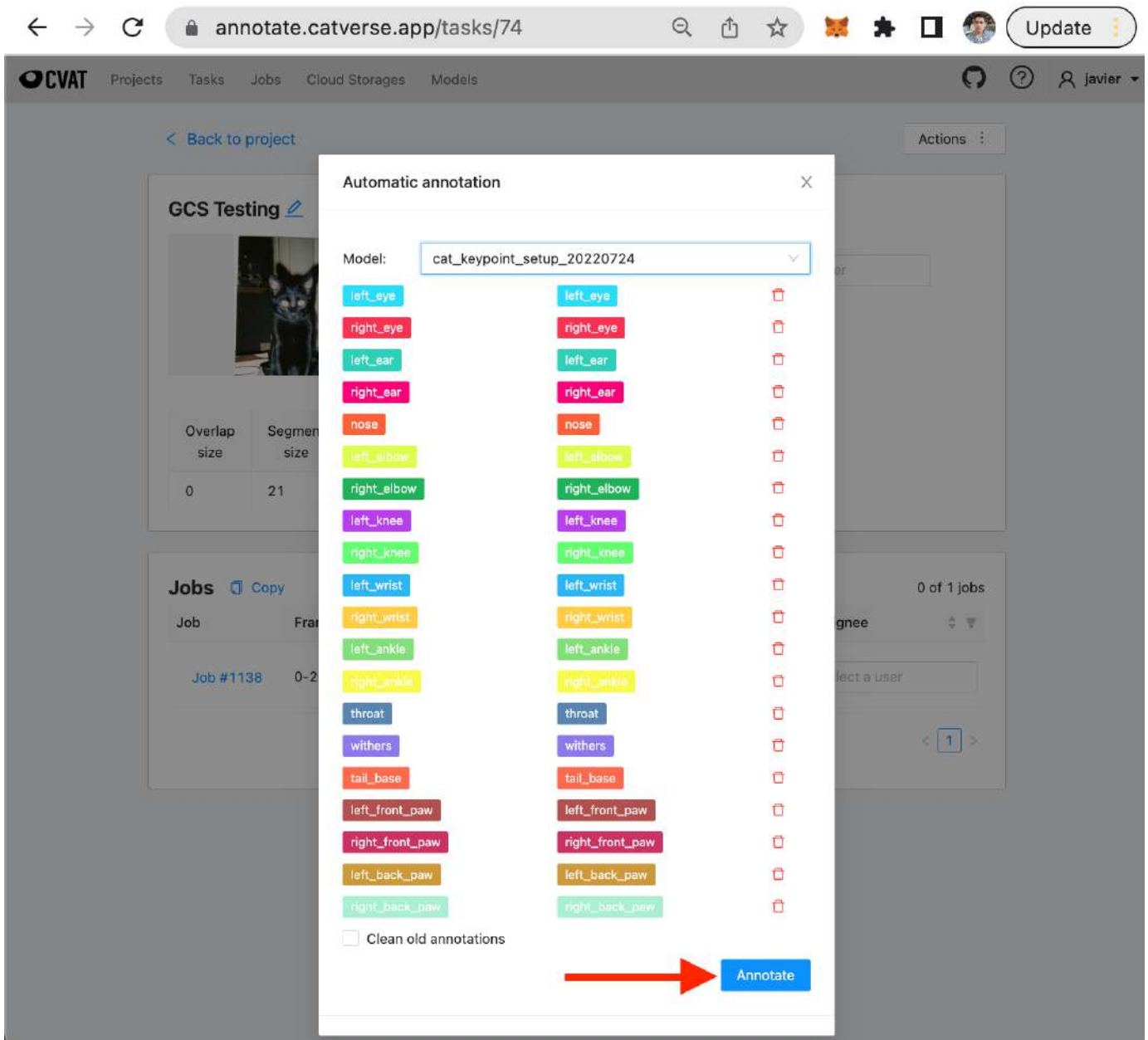
Overlap size	Segment size	Image quality
0	21	70

Job	Frames	Stage	State	Started on	Duration	Assignee
Job #1138	0-20	annotation	in progress	July 23rd 2022 17:07	a day	Select a user

Select the "cat_keypoint_setup" model.



A list of label mappings will appear. Don't worry about this, assume they are correct. There should be one mapping for each label you want to use in the job. Select Annotate.



The modal will disappear and you will see a progress indicator for adding the labels to each photo in the task. If there are multiple jobs in the task, then each photo in each job will have the labels added.

[Projects](#)
[Tasks](#)
[Jobs](#)
[Cloud Storages](#)
[Models](#)

javier

[< Back to project](#)

Actions

GCS Testing [✎](#)

Task #74 Created by javier on July 23rd 2022

Assigned to

Issue Tracker
 Not specified [✎](#)

Automatic annotation

✕

Subset:

Overlap size	Segment size	Image quality
0	21	70

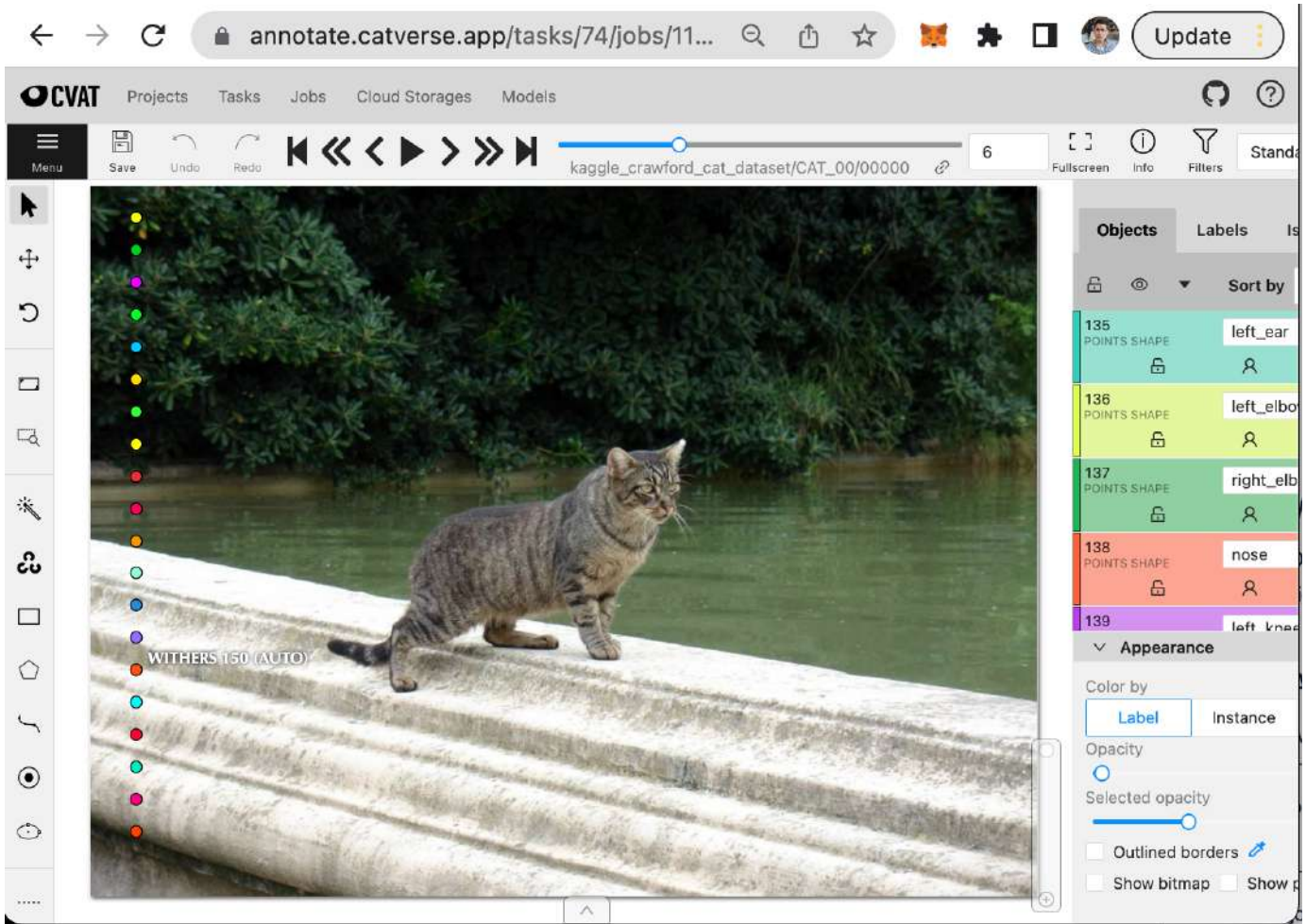
Jobs [📄 Copy](#)

0 of 1 jobs

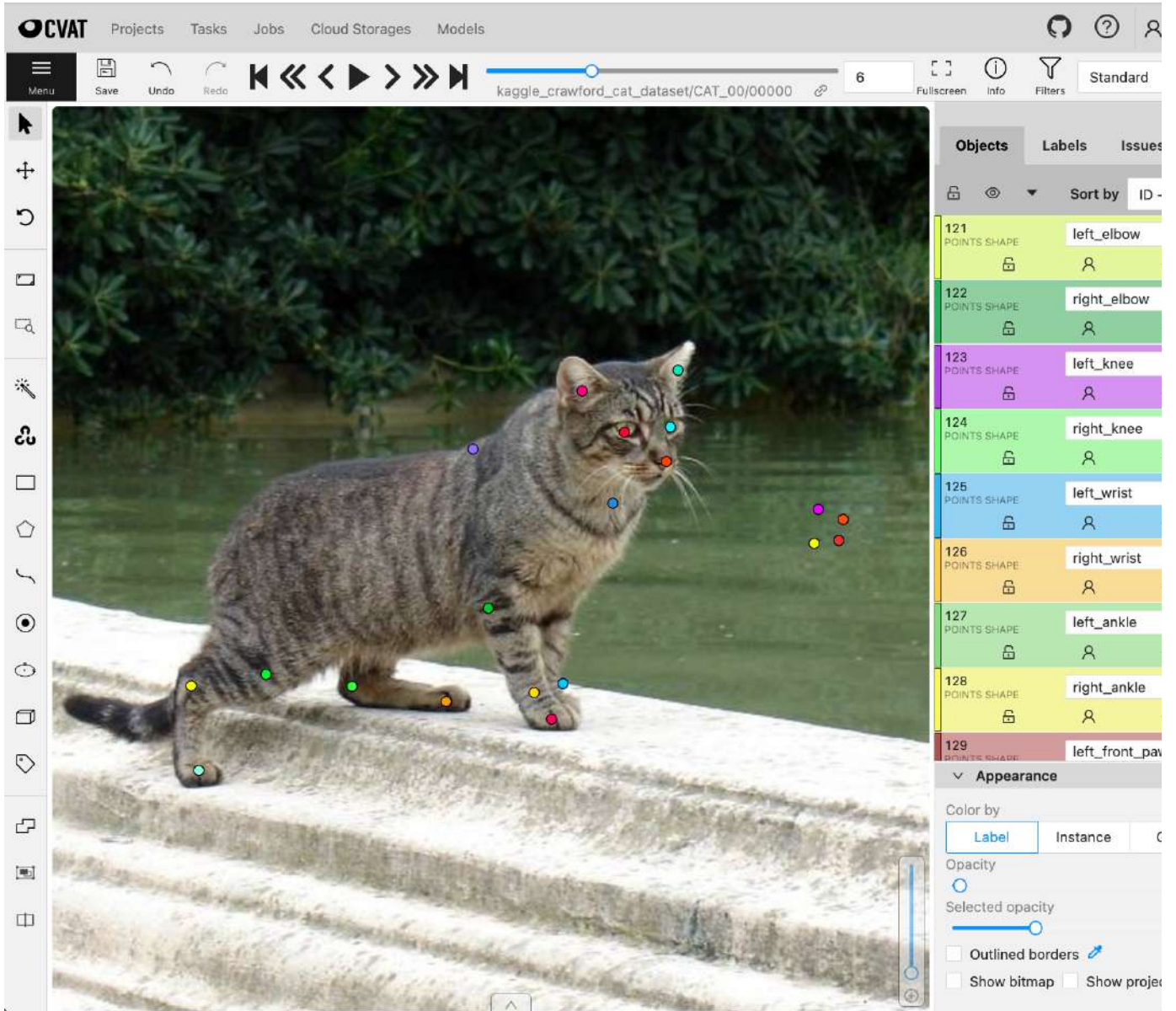
Job	Frames	Stage	State	Started on	Duration	Assignee
Job #1138	0-20	<input type="text" value="annotation"/> <div>?</div>	in progress	July 23rd 2022 17:07	a day	<input type="text" value="Select a user"/>

<
1
>

When you open a photo you should see the key points lined up on the left side of the photo. Move them to the correct position or delete them if they are not needed for the photo.



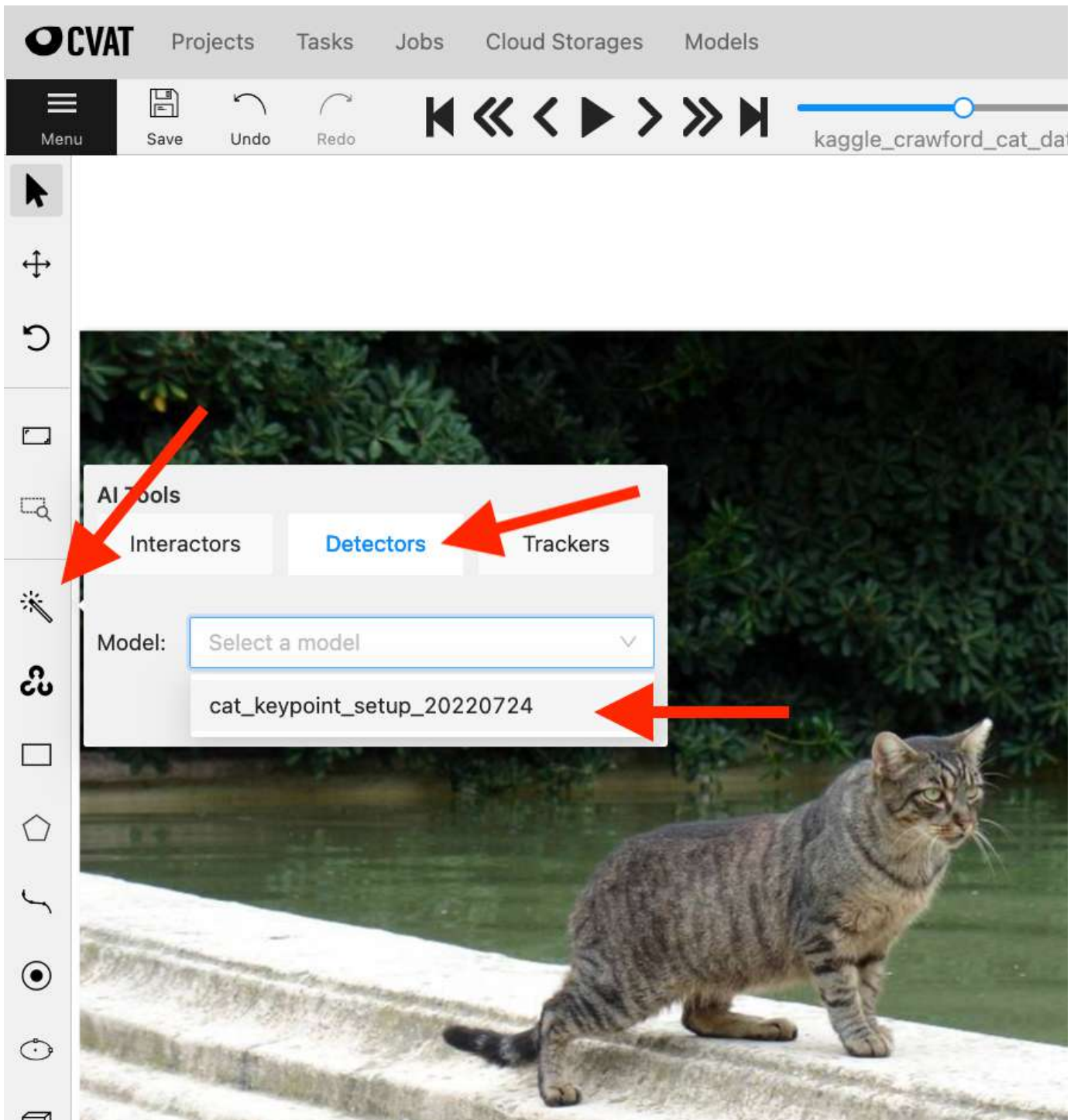
Here's what the results look like after moving the points to the correct position. As you can see we have 4 points we could not use because they were not visible (tail_base, left_knee, left_front_paw, and left_elbow). They must be deleted if they are not used. They are visible in this photo just to show you that there were points we could not use.



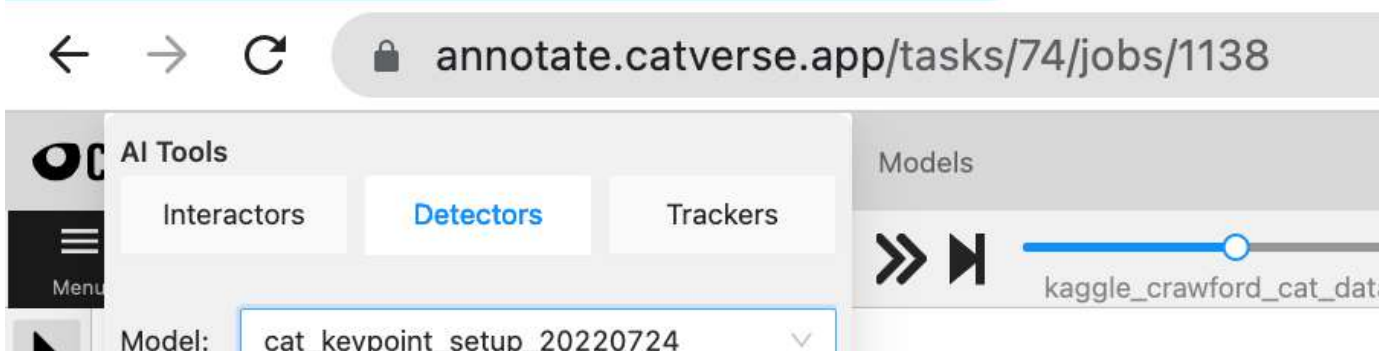
Adding key points for a single image

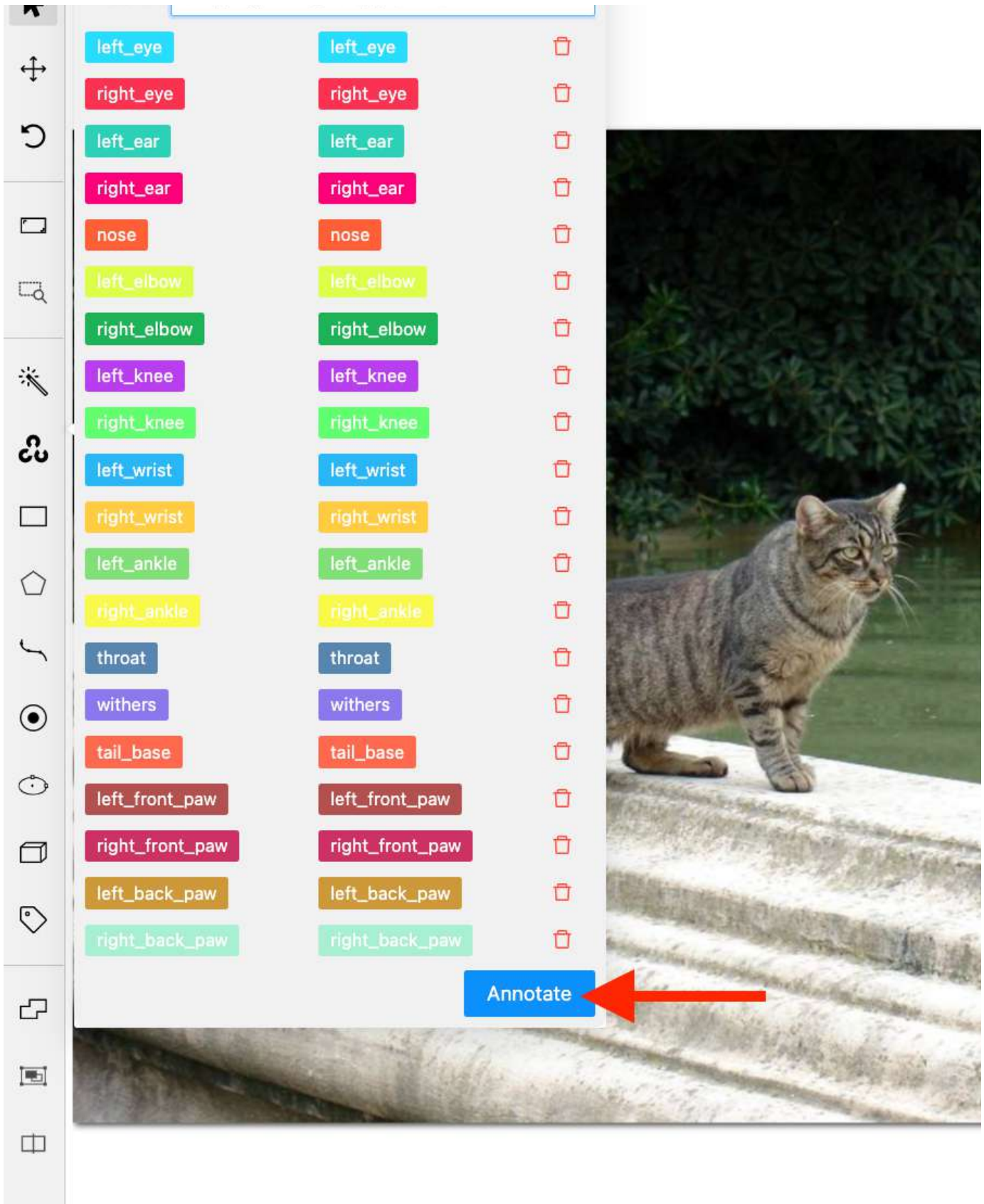
If you don't have the access permissions to add all key points to the entire task then you will need to add them to each image individually. As you load a new image to annotate as part of a job you will need to following the process below to automatically add the 20 key points to the image.

Hover your mouse over the wand icon on the left had menu bar, a modal window will open up, select Detectors then select "cat_keypoint_setup" from the drop down.

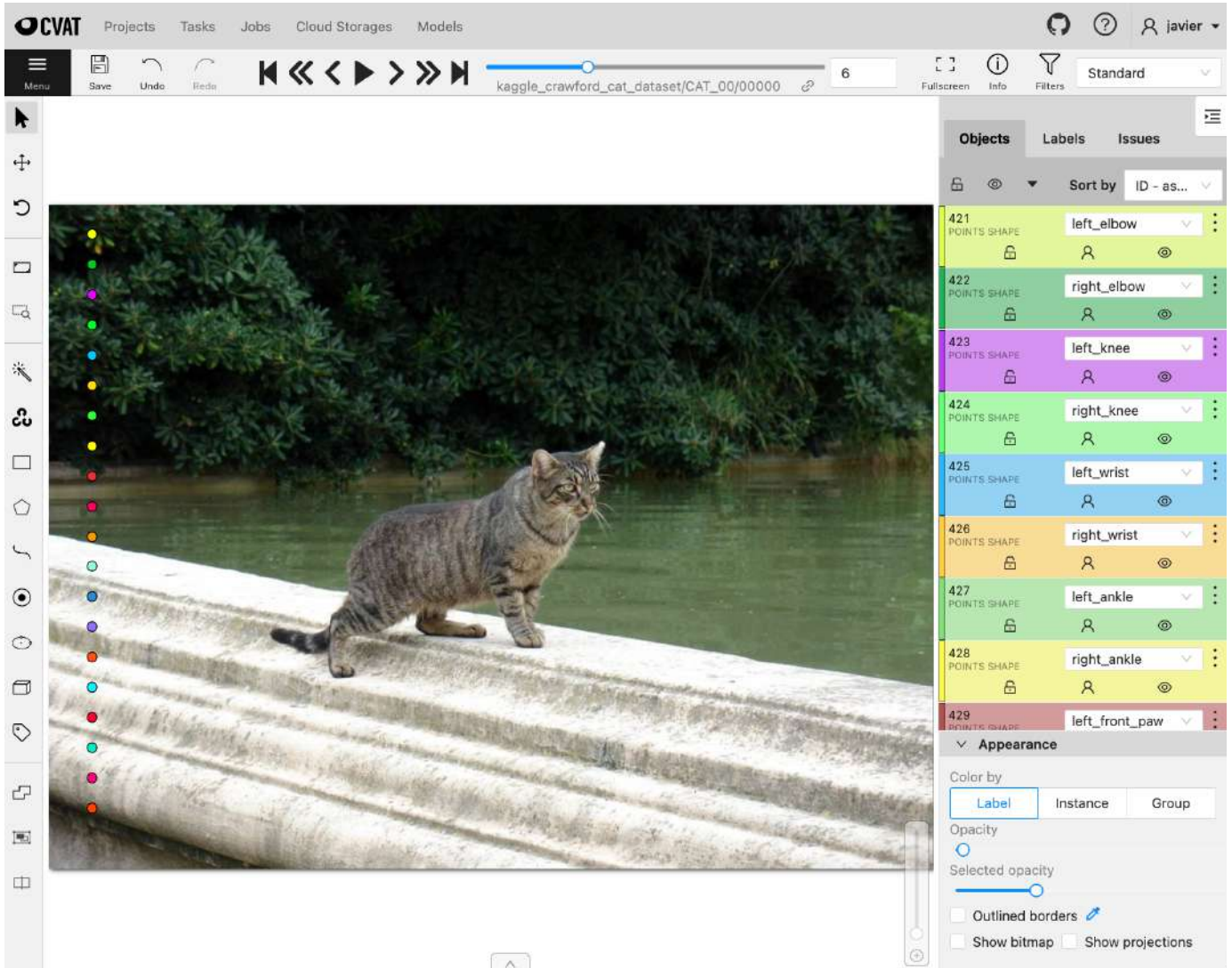


A list of label mappings will appear; assume these are correct and select "Annotate"





All 20 key points will be added on the lefthand side of the image. You will now need to drag them into the correct position or delete them if they are not visible in the image. Refer to the previous section to see examples of what the results should look like with all the key points correctly positioned.




Annotating Fur Patterns



⚠ Section in work



References



Cat Pose Labels and Sample Images

Label	Description	Primary Pose	Example Image


all_ fours	Stan ding on all four legs	P R I M A R Y	
curl ed	curl ed up like a seas hell	P R I M A R Y	

sitting	sitting	PRIMARY	
loaf	in the cat-loaf position	PRIMARY	

loaf_twist	first half of the body is in the loaf position and the second half is in the side ways position	PRIMARY	
sideways	cat is laying on its side	PRIMARY	

walking		PRIMARY	
straight	cat is laying on its body straight as a board		

bell y_up			
cli mbi ng			
groi n_g roo ming			
held	some one is holdi ng the cat		
jum ping			
rea dy_ to_ pou nce			
run ning			

standing up	cat is standing up on its back two legs	
stretching	cat is stretching out its front two legs	