Cats'heart, Cats'lake

—— Xinyue Yu
121025

Sound is a great medium of communication between humans and animals. I have often seen artworks that achieve communication with insects through sonic transformation before. Compared to insects, various mammals, because of their larger brain capacity and greater domestication, can even understand human language directly, such as cats. So I was curious: how do cats react and feel when they hear their names called by humans? For this reason I carried out the following experiment:
link: https://youtube.com/playlist?list=PLsN6eU2xTDDzqQrCYrXqyJ0y0MQ4ruDsx

Experiment 1: Which one do cats prefer to, other interesting sounds or his owner's call?
Experimental Results:
- Cats loved being called by its owner's name, it would approach its owner and was happy.

Experiment 2: When the owner call the cat's name over the phone or a recording, could the cat tell the difference from call in person?
Experimental results:
- The cat could clearly recognize the difference between the sound made by a real person and a recording. Its reaction to the human and to the recording was completely different.
- Cats are very sensitive. It can also detect when its owner is talking extremely quietly on the phone behind the door and the telephone speaker in the room plays its owner's voice loudly and goes to the other side of the door to find its owner.
link: https://www.youtube.com/watch?v=XR-km3RJ8m0

Experiment 3: A person sits motionless while he plays a recording calling out the cat's name, while another person sits opposite and calls out directly to the cat. What will the cat choose at this point?
Experimental results:
- The cat chose the owner who called its name, rather than the owner who played the recording. This shows that cats can indeed hear the difference between a recording and a real person.
link:https://www.youtube.com/watch?v=6eHpt_fXIh4

The above experiment shows that cats are very dependent on humans and want them to call their names and keep them company. When cats hear their names called, they are very happy and will actively get close to humans. At the same time, cats are very intelligent and can clearly distinguish the difference between a human voice and a recording.And only the call of the owner himself and his company will satisfy them; recordings will either only make them more anxious to see their owner or they will simply be ignored.In addition to this, the cat had the following interesting behaviour: when the owner was sitting over there but called his name on the recording, he would sometimes crouch in front of the recording and wait for him instead of rubbing against him, while when only the recording was in front of him, he would mostly ignore it

and roam around. In all the experiments, he was only very active when his owner called his name directly and he rubbed against him.The dependence of cats on people is expressed entirely in their movement.

In this semester I have made an interactive installation that uses water waves to reflect the mood of a cat that is dependent on its owner. The mood cannot be seen or grasped, and the cat cannot speak or express itself. This installation can use water waves ripples to show the cat's heart, allowing the audience to watch the water waves fluctuate and indirectly experience the cat's heart of dependence on its owner.The audience can also interact with the installation, for example when they shout at it, touch it, or play a sound, the ripples will change in response.
link: https://youtube.com/playlist?list=PLsN6eU2xTDDyOJmOfZkCPHmQXFnh7E-9b

In China, we often use water as a metaphor for moods: to describe a joyful and excited mood, we say "heart surging"——心潮澎湃; to describe a calm mood, we say "heart as calm as water"——心如止水; to describe an unmoved mood, we say "unperturbed by the waves"——波澜不惊; When describing melancholy, we say "falling into a whirlpool of melancholy"——掉入忧郁漩涡, etc. The fluctuation of mood is indeed very similar to water waves, and people can feel emotions through the fluctuation of water.

Procedure

First, I took video record of the reactions of my 3 cats in 3 separate scenarios.
1. The owner calls out and strokes
2. The owner sits still, only the shout recording is played
3. The owner leaves and only the shout recording is played

I input the filmed video into the installation. When the cat walks around, a large wave is created on the lake; when the cat stands motionless and watches somewhere, a whirlpool appears there; when the cat leaves, the lake is motionless again. I recorded the final effect of the installation corresponding to each cat in each scene.

I used touchdesigner to create the lake background and the ripple effect, and added the live tracking feature. I created the lake background by combining the ramp, geo and phong functions and adding the right amount of noise. The optical flow and wave ripples were then combined to create a real time tracking ripple effect. Wave ripples are generated based on the real-time tracking coordinates of the cat and the intensity of the movement. As the cat moves around the observation area, the water surface generates waves in response to its movements. As the trajectory and activity of the cat in different scenes is completely different, the waves generated by the installation are also completely different. （Ill 1. Screenshot of software playground)
）

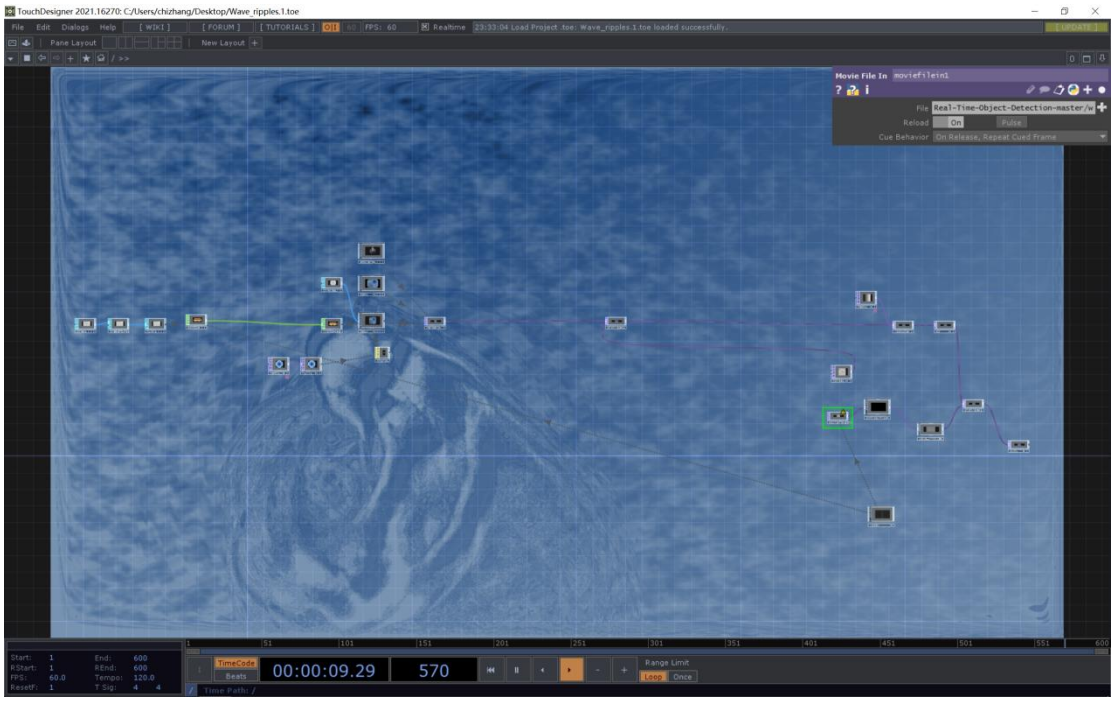
In addition to the real-time kinetic effects, I calculated the areas where the cat was most active during the experiment and drew a kernel density estimate of the

coordinate points of the active areas, using shades of blue to indicate the frequency of activity: where it stayed the most, it was the deepest blue; where it strolled past, it was a lighter blue. (Ill 2. Kernel density estimation maps for all scenarios and all cats) Kernel density estimation maps are also used for reference in the device's interaction with humans, allowing people to visualise the cat's feelings of concern for them.

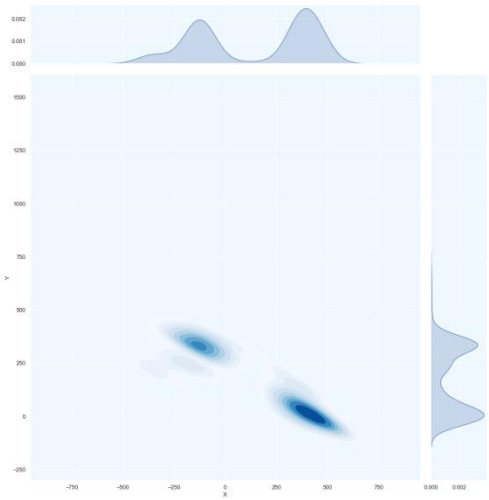
The principle of kernel density estimation map analysis: I used a python real-time tracking program I wrote to record their activity trajectory and the time spent at each point. link: https://www.youtube.com/watch?v=6ZADfrrQLGE&t=1s

After obtaining these coordinates, I aggregated the time and coordinate information of each segment and used the seaborn library as well as the matplotlib library to create a kernel density estimation map, where the origin of the coordinate system is the location where the owner is located. In this graph, the darker the colour, the more frequent the activity; the closer to the origin, the closer to the owner. (Ill 3. Screenshot of programm for object tracking)

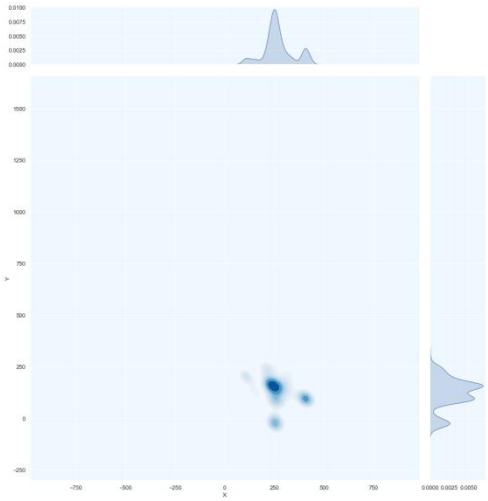
Attachments



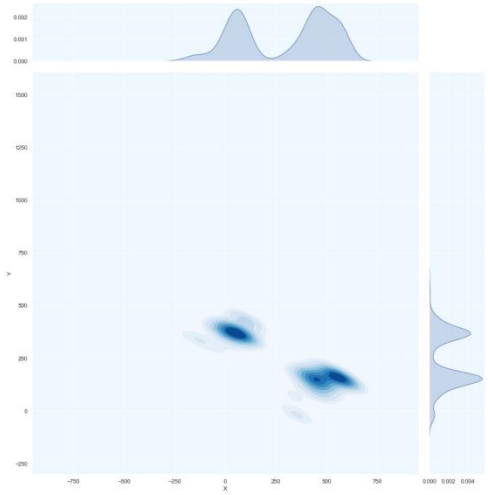
Ill 1. Screenshot of software playground



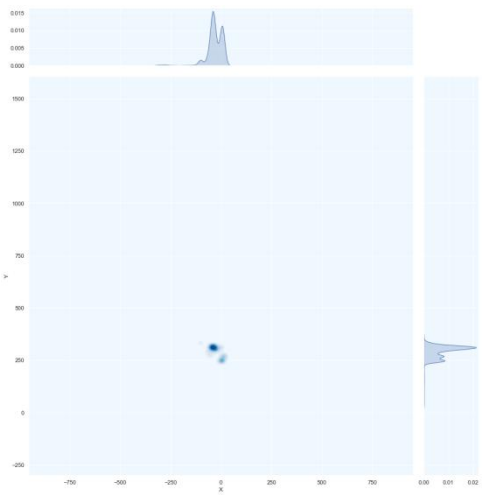
1. Scenario 1, cat Baobao



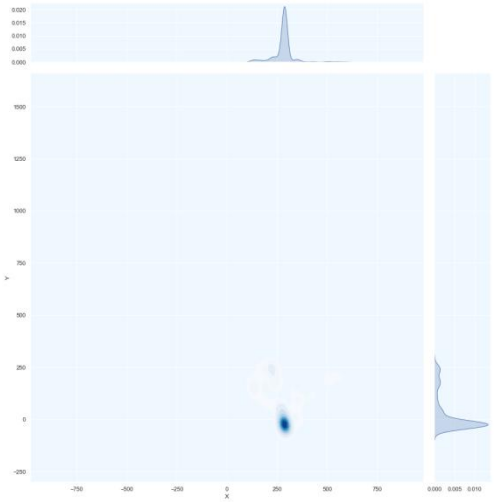
2. Scenario 1, cat Bingbing



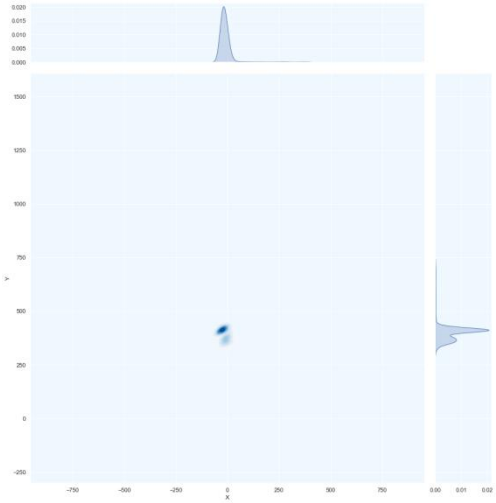
3.Senario 1, cat Wulongcha



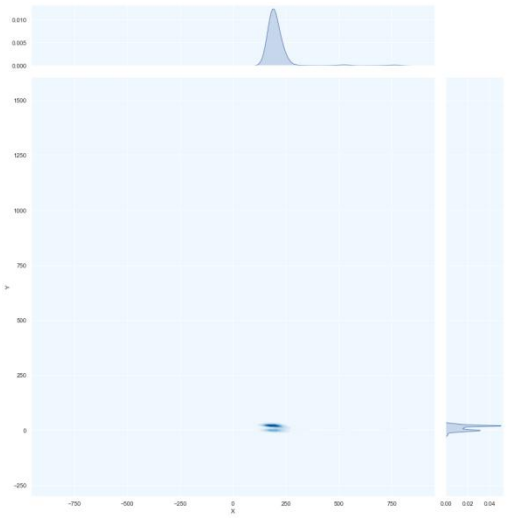
4. Senario 2, cat Baobao



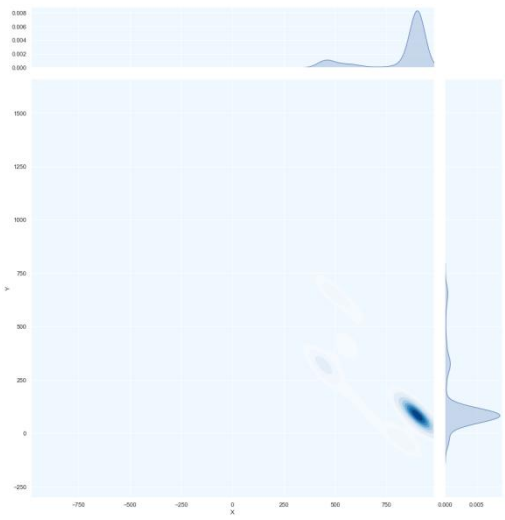
5. Senario 2, cat bingbing



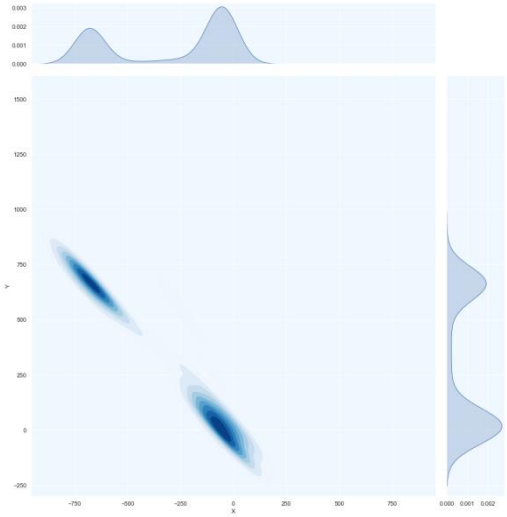
6. Senario 2, cat Wulongcha



7.Senario 3, cat Baobao

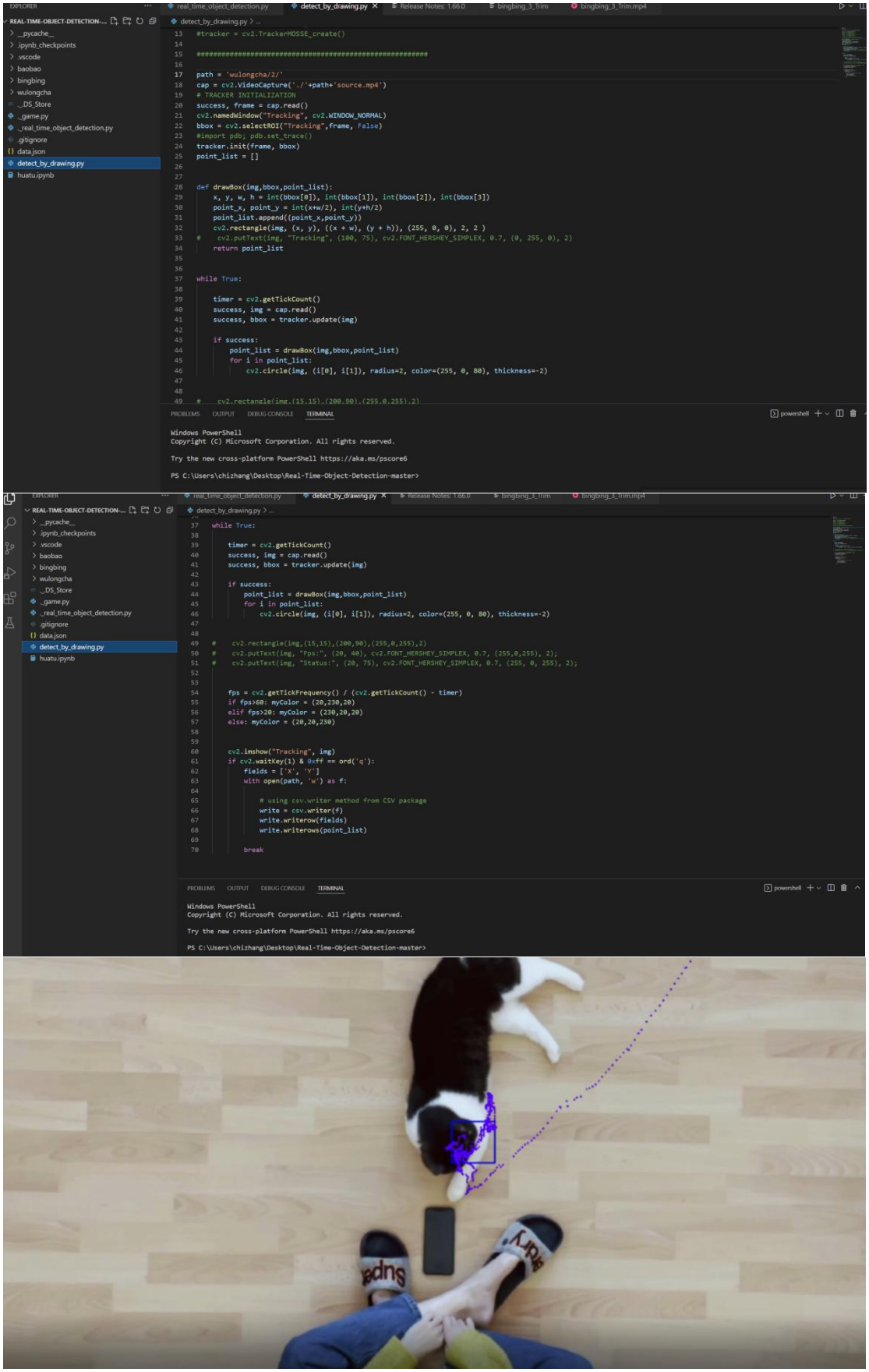


8. Senario 3, cat Bingbing



9. Senario 3, cat Wulongcha

Ill 2. Kernel density estimation maps for all scenarios and all cats



Ill 3. Screenshot of programm for object tracking