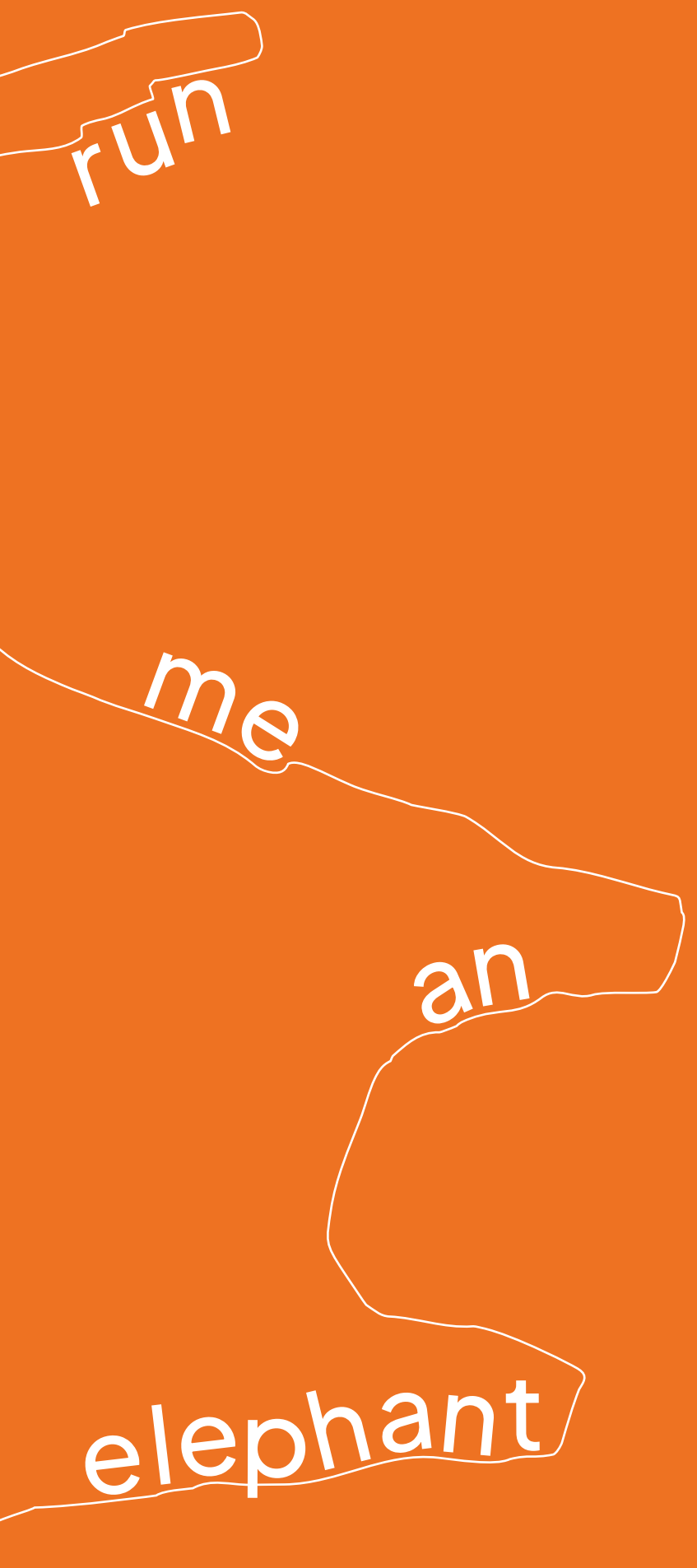
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GPS-drawings and running

The practice of running has evolved greatly throughout history. Once a crucial survival skill necessary for hunting food and escaping danger, it has become an athletic discipline and one of the most popular recreational activities in Europe. Even though running is primarily an individual activity, today it can also be shared collectively, through various run clubs, running events, and running applications like Strava. Since Strava's launch in 2009, its GPS-based self-tracking feature has been partially repurposed by the running community for creative needs, giving rise to a new trend known as "Strava art" or GPS-drawings. This thesis explores the multidimensional nature of GPS-drawings in the context of running, showing that they go beyond simple playful illustrations. Through a series of experiments and 14 interviews, four main aspects of GPS-drawings and their contributions to running practices have emerged: self-expression, collective activity, drawing for a cause, and motivation to run.

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PROLOGUE

Running has never been my passion. I remember at school and university during physical education classes we were forced to run 100 m and 1 km while being timed. Not specifically fit, with my lungs wanting to jump out of my chest and head about to explode, I hated every second of it. And then one day everything changed.

Back in May 2023, I went to support my friend who was running a marathon or 42 km in Geneva. That was the first time I had ever witnessed a running event so close and I had not expected anything. However, I was amazed and even got a bit emotional from the ambiance, when complete strangers shout out your name and even run with you encouraging you to go on, because you are doing something very unnatural for a human body and, hence, something very outstanding. That day I decided that I wanted to be a part of the running community and hear my own name being said out loud while I am proving to myself and to hundreds of people around me that everything is possible as long as you work hard.

Ever since, I have participated in two 10k races. I still do not particularly enjoy running, but the emotions you get are totally worth it. By the time this thesis is submitted, I will have completed (hopefully) my first ever half-marathon or 21 km, the distance I always claimed I would never pursue to do because it is just crazy. But here I am.

New challenges require new solutions. So, as a part of my preparation for the race, I became a member of Strava. And this is where GPS-drawings came into my view.

September 16, 2024

INTRODUCTION

The practice of running has evolved greatly throughout history. Once a crucial survival skill necessary for hunting food and escaping danger, it has become an athletic discipline and one of the most popular recreational activities in Europe (Hulteen et al., 2017). Even though running is primarily an individual activity, today it can also be shared collectively. Each year millions of people participate in various running events, including 5k and 10k races, half-marathons and marathons, taking place all over the world. Additionally, nearly every city has a bunch of running clubs with a supportive community of like-minded people who run together on a regular basis. Beyond these real-life interactions, running can also be shared online, thanks to the development of running apps like Nike Run Club, Map My Run and Strava.

Strava is both a mobile application and website for tracking and registering your sports activities via GPS, with the possibility of sharing your statistics with the rest of the world. Over time, new added features have led to the transformation of the application's original purpose. Now, it is also a social network, while the GPS-tracking has been repurposed to serve the artistic needs of the running community, giving rise to a new trend known as "Strava art" or GPS-drawings. Although it is difficult to estimate how many of Strava's 125 million users (Strava website) engage in GPS-drawing creation, the Strav.art Instagram account, with more than 70,000 followers, demonstrates significant interest in the field.

Some people may compare the GPS-drawings to children's scribbles or even prehistoric cave paintings (TEDx Talks, 2015). However, there is much more to them than simple drawings. Existing research tends to focus on GPS-drawings as a way to reconsider the urban environment and our movements within it (Schauppenlehner et al., 2013) or solely on the artistic self-expression side (Grootens, 2023), often overlooking other potential benefits for both individuals and society in general. Several studies explore automatic route generation (Waschk & Krüger, 2018) and GPS-drawings classification (Xie, 2022). However, no paper fully investigates the field of GPS-drawings, including its current prominent figures, styles, and other dimensions. Furthermore, little distinction is made between the media for completing these drawings, whether it is running, cycling or walking. Yet running, being one of the most accessible sports and simultaneously highly demanding in terms of physical and mental effort, is likely the most challenging and rewarding for GPS-drawing purposes. Taking into account all of this, the research question of this thesis goes as follows:

How do GPS-drawings enhance the practice of running and contribute to the emergence of new exploratory behaviours?

METHODOLOGY

To address the research question of this thesis, I have chosen to adopt a qualitative approach, as it best aligns with my objective of gaining insights into the social phenomena of GPS-drawings in running and their implications. With this in mind, I conducted a content analysis of existing practitioners and their works, focusing primarily on Instagram and the website Stravart, which features a collection of GPS-drawings from around the world curated by Gary Cordery, a cyclist and practitioner himself.

In addition, I organised a series of interviews with two groups of people to learn more about the field, its specifics, and the motivations behind creating GPS-drawings while running. The first group consisted of eight practitioners of different levels, with whom I connected either through acquaintances or by discovering their works on the Strav.art Instagram account and then reaching out to them via the platform. Among them were two people from Geneva with a single experience of completing a GPS-drawing, an amateur from the US who created several drawings mainly during the pandemic and who does not consider himself an artist, and five people from the Netherlands, the UK, Brazil, Germany, and Switzerland, each with distinct styles and more consistent practices.

The second group included six runners who had never attempted GPS-drawings and had known little about them before we got in touch. In addition to asking my running friends and their acquaintances, I also reached out through the Geneva Run Club group chat on WhatsApp, which has over 800 members. While three people initially showed interest in my research, only one of them ultimately stayed involved. This group consisted of two men and four women, aged 25 to 40. I aimed to diversify the participants in terms of their running experience: three were beginners, two had been running for a while and had participated in short races, and one was a professional runner capable of covering long distances and training on a regular basis. They agreed to participate in experiments I proposed to them. The primary task was for them to plan their own routes, complete their GPS-drawings by running those routes, and then share their experience with me. In some cases, I planned the routes for them. On one occasion, I ran with a participant along a route I had planned without revealing the result until the end of our run. With the same participant, we conducted another experiment in a park where we did not plan anything in advance but improvised, attempting to run and draw a shape requested by one of us.

Finally, to complete the overall picture, I took on the challenge of turning each of my runs into a GPS-drawing. Over the course of six weeks, I created eleven drawings and kept a journal documenting my experiences and

thoughts. One of the routes was planned for me by a practitioner from the first group of interviewees.

Through my interviews, I identified four main themes related to GPS-drawings, which will be discussed in Chapters 2 to 5: artistic self-expression, collective activity, drawing for a cause, and the motivation to run.

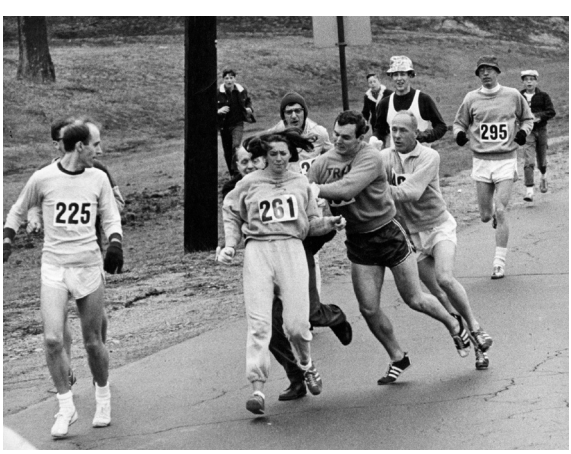
1. CONTEXT

This chapter explores general topics related to GPS-drawings. It begins by taking a broader perspective, examining running as a recreational activity, the emergence and development of GPS devices, and the quantified-self movement. Next, it delves into artistic styles that preceded GPS-drawings, before concluding with a focus on the current state of GPS-drawings.

1.1 Running as a recreational activity

Up until the second half of the twentieth century, running used to be an unusual physical activity, primarily seen as a competitive sport practised by professional athletes or as an extracurricular activity in schools and universities (Scheerder et al., 2015). According to the authors, leisure running was often perceived as a disturbance to public order and was generally frowned upon. However, the cultural revolution of the 1960s and 1970s brought upon a trend of deinstitutionalisation and desportification of sports, bringing a new perspective on sports as healthy and relaxing activities and making running attractive to the masses. These years marked the so-called "first running boom," when running expanded from a strictly competitive activity in an organised setting to a recreational pastime done in public spaces like roads and parks.

During the first boom, running was typically a solitary activity practised mainly by people in their thirties and former athletes (Utrecht University website). Although running groups and races gradually started to form, women and people from minority communities remained underrepresented. In 1967, Kathrine Switzer made history by participating in the Boston Marathon, registering as "K.V. Switzer" to conceal her gender, and became the first woman to officially complete the all-men race, despite an official's attempt to force her out from the course (Mather, 2017). The late 1990s saw the "second running boom," characterised by a significant rise in interest and participation in running, as different demographic groups became more represented. Unlike the first boom, the second wave involved much more participation in organised races (Nilson et al., 2021).



A Boston Marathon official tried to hustle Kathrine Switzer, No. 261, off the course during the race in 1967. Paul Connell/The Boston Globe, via Getty Images. Retrieved from https://www.nytimes.com/2017/04/17/sports/boston-marathon-kathrine-switzer.html

Nowadays, running is one of the most popular recreational activities among adults in Europe (Hulteen et al., 2017), with over 620 million people worldwide practising it in 2017 (Askwonder, 2017). But why do people run? A survey conducted by Blair Evans in 2020 identified four

basic needs that people satisfy, in some cases simultaneously, through running, which are health, control and autonomy (29%), community (34%) and aspiration (36%). Health, encompassing both physical (40%) and mental well-being (61%), was the primary motivation for over 25,000 participants, with more than half of them highlighting the psychological benefits of running. Control and autonomy implied the freedom to choose and plan their activities independently. Additionally, people found a sense of community in running through new social connections and involvement in running clubs and events. Lastly, running served as a means of self-improvement and personal challenge.

1.2 Tracking devices and applications

According to Grootens (2023), at the start of the 2000s, the Global Positioning System (GPS), originally developed and used as a military technology, became accessible to the general public. The system, which consists of a network of satellites and ground stations, provides users with precise information about their location. Making it available for civilian use led to the development of commercial GPS equipment. Initially, GPS receivers were bulky and costly, but over time they became more compact and affordable. Eventually, GPS tracking became a feature on various other devices, including smartphones, smartwatches, and fitness trackers like Garmin, Fitbit and Xiaomi.

To make data tracking and its interpretation simpler, numerous mobile applications emerged. Most of them were developed and purchased by technology or sportswear companies, such as Apple Health by Apple, Runtastic by Adidas or Nike Training Club by Nike. Both types of companies have commercial interests in collecting personal fitness data, which can later be used for marketing and advertising purposes (Grootens, 2023). And then there is Strava, one of the last independent fitness tracking platforms compatible with various GPS devices, which was founded in San Francisco in 2009 (Strava website).

Strava was created as a website and mobile application for self-tracking, allowing people to collect data from their activities, such as distance, pace, time, GPS, and average heart rate, and then share it with other users. Over time, it evolved from an application targeting solely cyclists into a multi-sport platform (Lightfoot, 2022). New features were added, including heatmaps showing popular routes, milestone challenges to motivate users, and messaging for direct communication (Strava website). Today, Strava is a social network for athletes connecting people with shared interests, and has an actively

growing user base — in the first half of this year, the number of its active users grew by 20% (Xie, 2024). It is also home to a growing community of GPS creators, athletes who "draw" with their bodies on maps and then share their GPS data with the community.

1.3 Quantified-self

The quantified-self movement, also commonly referred to as self-tracking, involves monitoring and recording various aspects of one's life, including work, leisure, performance and health (Lupton, 2014). Previously practised in the form of keeping a diary, self-tracking has evolved significantly with the development of digital tracking devices and applications. A study conducted by Btihaj Ajana in 2020 revealed that the most commonly tracked metrics are steps and the distance walked or run. As for the reasons for self-tracking, increasing motivation, monitoring progress and collecting data were among the key ones. In the context of running, Karahanoğlu et al. (2021) found that both professional and amateur runners frequently use self-tracking to document their activities and keep track of their progress towards a certain goal. Ajana's survey further indicated that nearly 60% of the 505 participants engaged in self-tracking share their data on online platforms such as Facebook, Instagram and Strava, driven by a sense of competition, pride, and the desire to belong to a community with similar interests and goals.

Shaleph J. O'Neil, Callander: A 58 km MTB race, 11/04/2014. Screenshot from O'Neill (2018)

While some people focus on collecting and analysing their data, others go further and experiment with its visual representation. Shaleph J. O'Neill (2018) transforms his self-tracked cycling data into art pieces that aim to capture the ephemeral experience of cycling, which is not easy to represent due to its dynamic nature. His images comprise coloured rectangles, each representing a

one-minute data sample, showing metrics like altitude, heart rate and speed. Another example comes from Masaki Fujihata, one of the pioneers of art using GPS, who in 1992 climbed Mount Fuji with a GPS receiver and laptop, recording his velocity as he approached the summit. Later, the artist mapped this data onto a 3D model of the volcano, distorting its representation based on the collected information (O'Rourke, 2013).

Masaki Fujihata. Impressing Velocity (Mount Fuji), 1992–1994. Retrieved from http://locative.articule.net/masaki-fujihata/

These examples demonstrate how tracked data can be interpreted creatively. However, it is also possible to record data in a creative way. Joost Grootens (2023) introduces the term "expressive self-tracking," which involves using self-tracking and GPS to create images or write text as a means of expressing thoughts or feelings intended for others to see; in other words, GPS-drawings.

1.4 Land drawings

Humankind has long been known for leaving giant traces on the surface of Earth for all sorts of reasons, and the GPS-drawings are hardly the first of their nature. The lines and geoglyphs of Nasca and Palpa Cultures located in Peru, dating between 500 BC and AD 500, are arguably

Nasca lines in Peru. Retrieved from https://pixabay.com/photos/nasca-peru-nasca-plateau-1089342/

the earliest examples of these traces (UNESCO website). With no technology involved, but only long and intense labour, they were made by removing the top layer of gravel to reveal a lighter subsoil. Covering about 450 km^2, they depict various living creatures, plants and geometrical shapes, that supposedly had some religious functions. Today the Nasca lines are considered a UNESCO World Heritage Site.

Jumping closer to modern times, the 1960s and 1970s saw the emergence of the land art or earth art movement (Tate website). This movement is characterised by the creation of large-scale works directly within the landscape, blending artistic expression with the natural environment, where nature serves as both the medium and the canvas. One of the most famous examples of land art is "Spiral Jetty," created by Robert Smithson in 1970. Comprised of over six thousand tons of earth and rocks, it is located at the Great Salt Lake in Utah, forming a spiral 1,500 feet (approximately 457 m) long and 15 feet (around 4.5 m) wide. Over time, it has fully submerged underwater and reemerged, embodying the concept of entropy—the idea of gradual transformation, decay, and disappearance (Dia Art Foundation, 2024). Another prominent land artist is Richard Long, who creates his works by simply walking back and forth until he leaves a mark on the surface. For Long, walking is a method of exploring the relationship between time, distance, place, and measurement (O'Rourke, 2013).

Robert Smithson, Spiral Jetty, 1970. Retrieved from https://blog.artsper.com/fr/la-minute-arty/chef-doeuvre-art-contemporain-spiral-jetty-smithson/

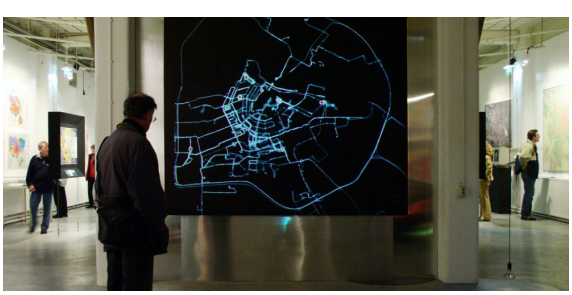
Richard Long, A Line Made By Walking, 1967. Retrieved from http://www.richardlong.org/Sculptures/2011sculptures/linewalking.html

1.5 Locative media art

Unlike land art, which is often characterised by fragility and temporality due to its dependence on the natural environment, locative media art, blends physical and virtual realities, offering a more lasting nature. This art movement appeared in the early 2000s as GPS and mobile technologies became accessible to the general public. Using location-aware technologies, it engages with physical spaces, addressing social, political and environmental issues (Tuters & Varnelis, 2006).

Jeremy Wood, My Ghost 2000–2012. Retrieved from http://www.gpsdrawing.com/maps.html

Some locative media artists use the city as their playground and early GPS technologies as a drawing medium, recording everyday movements and deriving insights from them. Jeremy Wood's project "My Ghost" (2000–2012) represents fifteen years of the artist's movements around the city, creating a form of personal cartography that documents his life as a visual journal. Similarly, in Esther Polak's "Amsterdam RealTime" (2002) seventy-five volunteers had their everyday movements across the city traced and projected on a wall at the Amsterdam City Archive over two months (O'Rourke, 2013).



Esther Polak. Jeroen Kee and Waag Society, Amsterdam Realttime, 2002. Retrieved from https://www.polakvanbekkum.com/works/amsterdamrealtime/

1.6 GPS-drawings nowadays

GPS-drawings began to gain popularity with the appearance of smartphones equipped with GPS functions, smartwatches, and tracking applications, making it

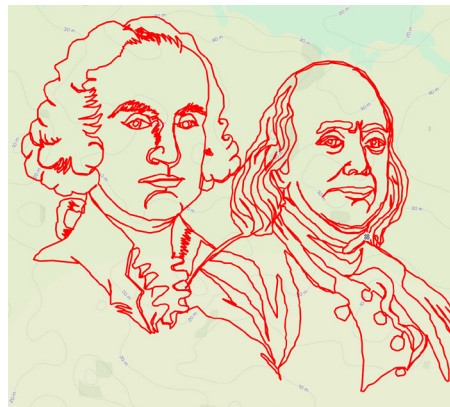
possible for anyone to create them. According to interviews with practitioners, their recent boom coincided with the onset of COVID-19, when running events were cancelled, leaving thousands of runners at home with limited options. GPS-drawings, with their accessibility and creative potential, emerged as a fun pastime that could be shared online with the broader community and occasionally enjoyed in collaboration with others.

Unlike the general tracking of GPS data, GPS-drawings or GPS-art or Strava art involve moving around an area while recording GPS data with the specific aim of creating an image or text on a map. The main and only prerequisite being a working GPS device, like a fitness watch or smartphone, this practice can be performed in any setting, from urban landscapes to deserts and even the sea. Its versatility does not stop here. GPS-drawings can be created through walking, running, swimming, flying, skateboarding, you name it.

Through my discussions with practitioners, it became clear that there are several styles of GPS-drawings to choose from. The most common involves using pre-existing roads and trails. The clarity of the outcome depends on the city grid, with large cities, like New York or San Francisco, being best suited for GPS-drawings and small villages being the trickiest. Another factor is the distance you are willing to cover to complete your drawing. The longer the distance, the more intricate the result can be. This is why the most visually sophisticated GPS-drawings are often done by cycling. However, as noted earlier, the focus of this thesis is running, which limits the maximum distance.

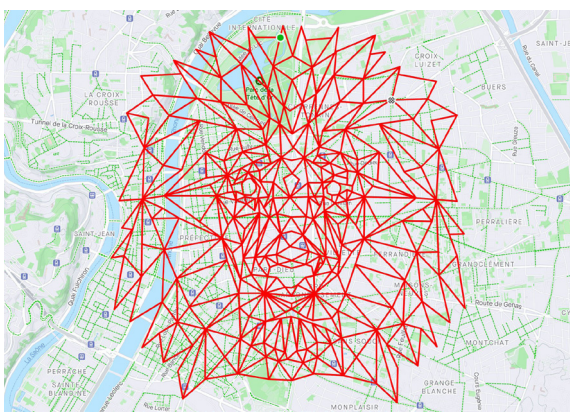
Lenny Maughan, Road style, 2022. Screenshot from Stravart website

Then, there are freehand GPS-drawings, created without relying on the street layout. These are typically done in parks or open areas, meaning the only constraint is the creator's imagination. One could argue, though, that this creative freedom can be seen as a "double-edged sword", as you can no longer blame the street layout



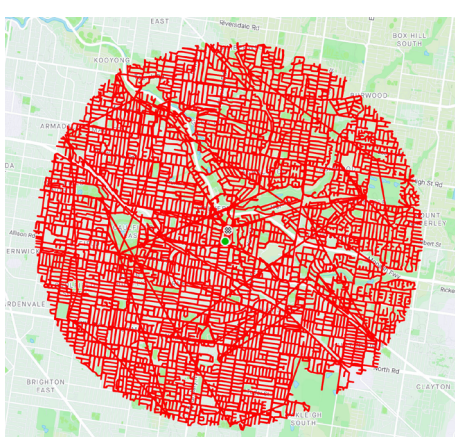
Gustavo Lyra, Freehand style, 2021. Screenshot from Stravart website

for any awkward lines in your drawing. Freehand GPS-drawings require a great deal of precision and dedication, unless you are not aiming for realistic results.



GL Cycling & GPS Drawing, Dot-todot, 2023. Screenshot from Stravart website

Next is the “dot-to-dot”, “connect the dots” or “pause” approach. This involves stopping your GPS device at a certain point and restarting it at another, creating a straight line between the two locations. This technique is sometimes combined with the two styles mentioned above. Some practitioners consider it a form of cheating since you are not physically running the entire drawing, while others base their whole practice on this method.



Ben Loke, Burbing,2020. Screenshot from Stravart website

Another style is called “burbing,” derived from “suburb,” which involves running every single street in a neighbourhood to form an interesting GPS-drawn pattern. This style gained popularity during COVID-19, when people were restricted to staying within a certain distance from their homes.

Additionally, people can collaborate to create larger-scale GPS-drawings. There is also room for some post-processing, where people add colours or combine multiple works to create animations.

2. GPS-DRAWINGS AS A FORM OF ARTISTIC SELF-EXPRESSION

This chapter examines the field of GPS-drawings from an artistic perspective. It begins by exploring the relationship between art and GPS-drawings and then introduces some of the prominent practitioners in the field.

2.1 Doodles, drawings or art

In the context of this thesis, I have chosen to use the term "GPS-drawings," even though a more commonly used term would be "GPS-art" or "Strava art." Similarly, in his TED talk about drawing while cycling, Stephen Lund intentionally refers to his GPS-drawings as "doodles" rather than "art," which he feels can come across as "a bit lofty and exclusive" (TEDx Talks, 2015). But are they actually art?

The definition of art has been a subject of philosophical debate for centuries. Despite the existence of multiple theories and approaches, none can be regarded as definitive. One such approach is the cluster concept proposed by Berys Gaut (Gaut, 2000). Gaut argues that art should be understood as a set of criteria rather than a single defining characteristic. He identifies ten properties commonly associated with art: "(1) possessing positive aesthetic properties; (2) being expressive of emotion; (3) being intellectually challenging; (4) having formal complexity; (5) conveying complex meanings; (6) exhibiting an individual point of view; (7) being an exercise of creative imagination; (8) being an artefact or performance produced with high skill; (9) belonging to an established artistic form; (10) being created with the intention of being a work of art." Not all of these properties must apply to an object for it to be considered art; however, it should possess some of them. Thus, Gaut's approach allows for flexibility in what qualifies as art and is more inclusive of non-traditional works. With this in mind, it may be possible to categorise GPS-drawings as art, since they meet a number of Gaut's criteria. Nevertheless, the goal of this thesis is not to focus on the artistic side of the practice but rather on its creative and expressive aspects. Whether a particular GPS-drawing qualifies as art is left to the reader's judgement.

We can also ask ourselves: what can we define as a GPS-drawing? Must it be executed — run, walked, or cycled — to be considered as one? Or does the mere act of planning a route, which could be run at some point, make it a GPS-drawing? I discussed this question with Tim Lewin, a runner from the UK who discovered GPS-drawings during COVID-19. Today, he enjoys planning them in his free time as a way to relax or focus. For him, it has replaced the usual doodling we all used to do during a boring class at school. Similarly, during a phone call, Tim might pull up a map and start drawing something. Over the years, he has accumulated thousands of drawings, some finished and others waiting to be completed. Sometimes, he spends weeks or even months working on a single piece, coming back to it over and over to improve it until he is sure it is perfect. Yet, despite being proud of his creations, Tim refuses to consider them complete until they are

physically run by someone. Without this additional physical effort, they remain drafts waiting to be realised.

Lion, run by me, planned by TimLewin, 14.10.2024. Export from Strava application

In October, I ventured to run one of the routes Tim had prepared for me — a lion spreading across the centre of Geneva. I felt extra pressure running it, knowing how much work Tim puts into his routes. Based on my judgement, the final result was far from perfect. But Tim's feedback was surprisingly positive:

"You running that lion brought me a lot of joy. I was really happy with the drawing itself, but it's just not real until someone runs it." - Tim

Thus, in the context of this thesis, I have decided to consider a GPS-drawing as one, only if it is planned and then executed, no matter who did each of the stages.

People create GPS-drawings for various reasons. Regardless of their primary motivations, even the most basic GPS-drawings involve a form of artistic or creative self-expression. After all, this practice is just another way of creating, where you draw using the movements of your body traced with GPS as a tool and a map as your canvas.

2.2 Practitioners

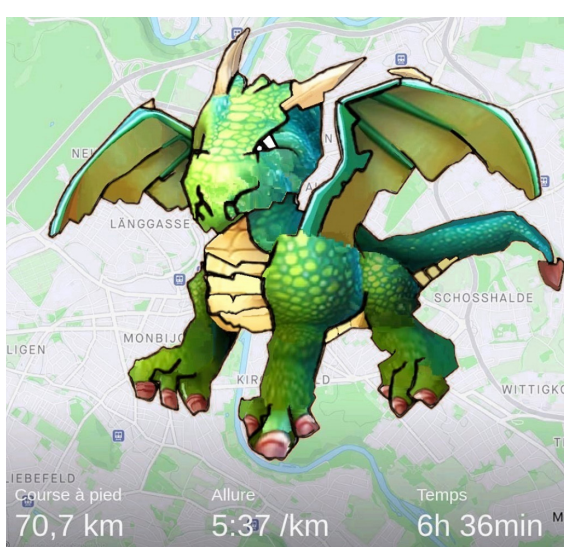
The field of GPS-drawings is vast, even when limited to running practices. In this section, I will present four prominent practitioners whose work, in my view, stands out from the average practice.

It seems logical to start with Lenny Maughan, a runner and creator from San Francisco. Although I did not interview him personally, every single one of my interviewees mentioned him, suggesting that he is one of the main figures

in the field. My research revealed numerous publications featuring him, as well as his Instagram account with more than thirty-three thousand followers, further emphasising his significance. Lenny was among the first runners, about ten years ago, to use the GPS-tracking features of fitness applications to turn his routes into drawings (Cantor, 2019). With San Francisco's perfect grid of parallel and perpendicular streets at his disposal, Lenny is able to create nearly anything. As it seems from his Instagram account, these days he produces one GPS-drawing per month, which is often reposted by Strav.art, an Instagram account run by Gary Cordery, a cyclist and self-proclaimed curator of GPS-drawings (Stravart website).

Lenny Maughan, Clippy, 08.03.2024. Screenshot from creator's Instagram account

One of my interviewees, who was recommended to me during an interview with someone else, was Jean-Sébastien Weiss (JS), a French runner based in Bulle. Like Lenny, he practises the street-based style, though without the advantage of a well-laid-out grid. Bulle, located in the Gruyère region, is known for its small towns, mountains, lakes, and limited road networks, making



Jean-Sébastien Weiss, Dragon, 09.02.2024. Screenshot from creator's Instagram account

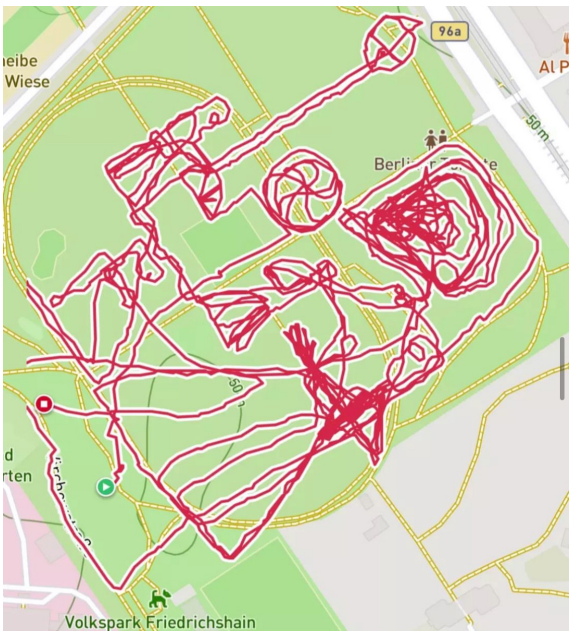
GPS-drawing exceptionally challenging. However, these specifics of the region only motivate JS. He is constantly in search of new challenges, pushing the limits of GPS-drawings and demonstrating to the rest of the community that it is possible to achieve sophisticated, visually appealing results even under such complicated conditions. Additionally, JS adds an extra touch to his creations by enhancing them with colours and shadows before sharing them online. Interestingly, instead of using standard design software like Photoshop, he achieves this with Paint and Word, showcasing a level of skill that few would expect from these basic programmes.

Some runners eagerly take on challenges, while others prefer fewer constraints. Gustavo Lyra, another interviewee, is a runner, or rather walker, from Brazil specialising in freehand GPS-drawings. Having the advantage of a free canvas in the form of sand dunes, he can draw whatever he wants, unrestricted by street layouts. As a result, his GPS-drawings closely resemble the original images and are full of intricate details. However, such precision requires a great deal of dedication. Most of his drawings are over 10 km long, and sometimes Gustavo spends up to four hours in the desert sun, carefully planting each step in the sand.

Gustavo Lyra, HEAD-Genève logo, 04.10.2024. Screenshot from creator's Instagram account. Idea by me

Another practitioner with a similar approach to Gustavo is Michael Kutzner, an artist from Berlin who worked more with traditional media, such as drawing, painting and sculpture, before adding GPS-drawings to his toolset in 2017. Unlike the previously mentioned creators, Michael does not plan his drawings in advance, nor does he know the future outcome when he begins running. Inspired by his artistic practice and life experiences, he generates ideas on the go. A recurring theme in his work is transformation, where analogue drawings are converted into digital ones via satellite technology, only to be transformed back into analogue form when he redraws his GPS-drawings on paper, giving them a new perspective. For some reason, he has never been featured on the Strav.art Instagram account, he has few followers, and none of my other interviewees were familiar with him.

However, in my opinion, his work deserves recognition for its truly unique style that stands out.



Michael Kutzner, 29.03.2024. Screenshot from creator's Instagram account

Some of my interviewees mentioned that they are all very competitive, constantly trying to outperform one another. During a discussion with one of them, I learnt that the Strav.art Instagram account appears to be somewhat subjective in its representation of the community. According to this person, the account's curator tends to favour creators with many followers, regardless of the complexity and diversity of their work, and fails to represent a complete picture of the GPS-drawing world.

3. GPS-DRAWINGS AS COLLECTIVE ACTIVITIES

This chapter explores the various ways running can be practised collectively. In addition to traditional options such as running clubs and events, today, one can also benefit from GPS-drawings.

3.1 Running clubs

If you are looking for community and support, running clubs are there for you. Running clubs have a relatively long history, with the first, the Thames Hare and Hounds, being established in 1868 in London (Singleton, 2024). This club promoted running as a social activity and laid the foundation for future running organisations. Today, running clubs are places where you can meet new people, which is especially helpful when you have just moved to a new city and do not know anyone yet. They also allow you to practise running collectively, which could give you a boost of motivation in moments of weakness.

"I ran quite a lot on my own and then found that it's actually nice for me to run with other people. It's good for my mental health. If you know that you're going to meet people, it helps to keep going even when things are hard." - Jez

Jez is the co-founder of the Geneva Run Club which was created as an informal run group during the second year of COVID-19. Currently, the club holds two weekly group runs covering distances of 6, 9 and 10 km every Monday and Wednesday at 7 pm, followed by drinks at one of Geneva's bars.

"We wanted a group that would be free from racism, free from sexism, free from discrimination. We wanted it to be open to everyone. We wanted to ensure that no one, or very few people, got lost. We wanted to be social." – Jez

3.2 Running races

Running collectively can also mean running competitively, where your competition is represented by others or simply by yourself. Each year, millions of people participate in various running events, including 5k and 10k races, half-marathons, marathons, and ultra-marathons, taking place all over the world. Based on findings from the State of Running 2019 report, race participation in 2018 alone totalled 7.9 million. For some runners, the primary goal is to achieve a specific time or improve a personal record, while others join to experience the strong emotions associated with participation and feel a sense of unity with others in a friendly, encouraging atmosphere, where complete strangers unite in celebrating the manifestation of human perseverance (Malchrowicz-Mośko & Poczta, 2018).

In Switzerland, running is promoted by an independent association called Swiss Runners, founded in 1994. Each year, more than 300,000 runners take part in 58 running events organised by the association. According to Datasport, Switzerland's leading IT service provider for

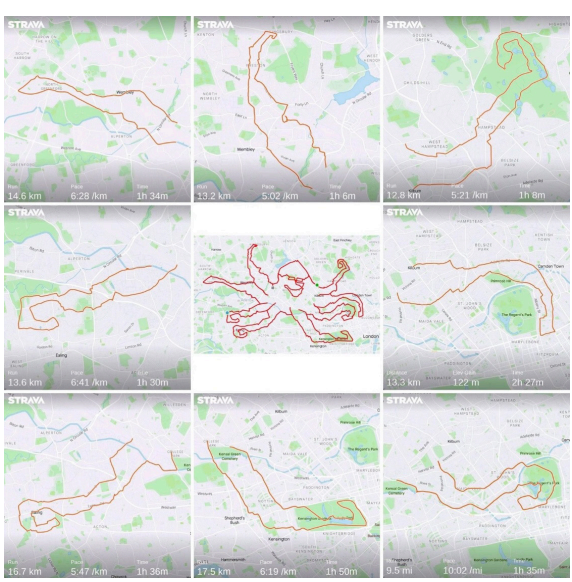
popular and mass sports, the largest races by number of finishers in 2022 were the 10k and half-marathon races in Lausanne (with 4541 and 3753 participants respectively) and the Jungfrau marathon (3716 participants).

3.3 GPS-drawings together

Running clubs and races seem like a perfect way of experiencing running collectively. But what would you do in the case of a global pandemic, when governments around the world start forbidding people from going out and gathering in groups, while all running events are cancelled for months? This was our reality some 3 to 4 years ago. Faced with this unprecedented challenge, the running community managed to find solutions, not only to continue running but also to do so collectively in a fun way.

"We're all runners, and all of a sudden, we're not able to compete. Nobody is able to race, because all the races have been cancelled. But we were all very well-trained and ready to go. It was right at the beginning of marathon season, and so we were all just really bored and we wanted to run. So, I made these… fake competitions." - Tim

By "fake competitions" Tim refers to his GPS-drawing group runs that he organised during the COVID lock-downs in the UK. At that time, running with one other person was allowed, making it possible to complete relay races with multiple participants. Two people would run a part of the drawing, covering 10–15 km, and then the next two would continue with the following part, and so on. Tim created various silly rules to make the whole activity more entertaining.



Tim Lewin, Octopus parts, January 2021. Screenshot from creator's Instagram account

Tim Lewin, Octopus full, January 2021. Screenshot from creator's Instagram account

"... your time was part of the equation. I had all these different metrics and I made up all these weighting criteria where you could run fast, but it didn't really matter, unless you took a good selfie." - Tim

Tim was not the only one who turned to GPS-drawings during the pandemic and found collective benefits in doing so. Siobhan is a member of Lazyboys, another running club in Geneva. In 2020, along with other club members, he took part in a GPS-drawing running competition, organised by the running wear brand Saysky. Each of them separately ran to create a letter of the phrase they had chosen, and Siobhan then compiled all the GPS track screenshots to finalise the group drawing. This collective effort was not just about winning the prize of a pair of socks, which the club actually did. For the participants, it was a way to maintain a sense of team spirit and community during the lockdowns. Moreover, it allowed people to join in from anywhere in the world.

Lazyboys, Saysky competition, 2020. Screenshot from club's Instagram account

"Running together apart since March 2020." - Lazyboys

Nowadays, COVID hardly poses the same problem as it once did, though we occasionally still hear of people getting sick. Long gone are all restrictions. Running clubs and races are back in the game. Yet, GPS-drawings, which became popular during the pandemic as a way to get around numerous restrictions, remain a part of the running community.

Sander Gabel, also known by the pseudonym Runbrandt, is a runner from Amsterdam who gained fame within 24 hours after his rooster-shaped run in Haarlem was featured by local media in June 2020. Today, he enjoys

organising group runs, for which he plans the route himself and does not reveal it until the very end. This way, participants are left wondering throughout the run what the route will turn out to be. For Sander, GPS-drawings also offer a unique opportunity to meet people he would not ordinarily connect with.

"Usually, I reach out to people who run ultras (ultra-marathons) and would normally not be in my range of contacts to just say: 'Hey, let's go for a run together.' But now, with GPS-art, it's such a fun thing, that most say: 'Oh, that sounds cool, let's go for it.'" - Sander

Sander Gabel, Rooster, 01.06.2020. Screenshot from Strava application

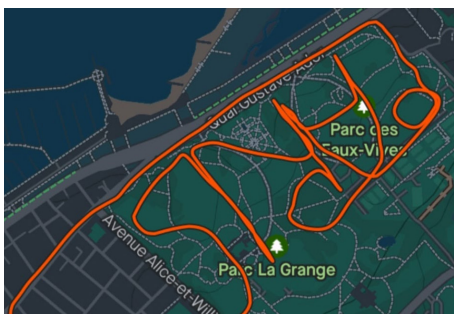
Thus, GPS-drawings complement traditional forms of practising running collectively, adding a fun creative aspect that brings runners together to achieve a shared goal. Regardless of location or running background, GPS-drawings can serve as a common ground for connecting people.

4. GPS-DRAWINGS FOR A CAUSE

This chapter explores how GPS-drawings are used to convey messages, raise awareness, and support various causes. By creatively transforming runs into meaningful shapes, practitioners inspire solidarity, promote charitable efforts, and draw attention to important issues.

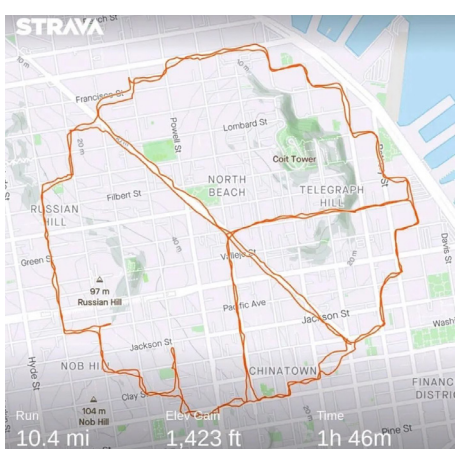
4.1 Sending a message with your drawing

With all the technology at our fingertips today, sending a message to someone and expressing one's support is easier than ever. However, doing this creatively and with physical effort arguably adds extra value to the gesture, which is where GPS-drawings can come in.



Jez Smith, Paris, 2020. Screenshot provided by creator

In 2020, Jez had just started a new job in Geneva and was looking forward to a conference in Paris that ultimately moved online due to COVID-19. To send a message to colleagues he could not meet in person, he went to La Grange Park in Geneva and spelt out the word "Paris" with his run, later sharing it in social groups. His effort conveyed that he was thinking of his colleagues, leaving a strong impression as GPS-drawings were a rare thing back then.



Octavian Voicu, Peace sign, 07.03.2022. Screenshot from creator's Instagram account

With GPS-drawings, the scale of your intended audience can vary widely, from small groups, as in Jez's case, to a more global impact. Octavian Voicu (Octav) from San Francisco began creating GPS-drawings during COVID-19. Unlike most practitioners who tend to study maps for ideas, he is driven by inspiration and creates GPS-drawings almost exclusively to honour specific occasions or causes. In March 2022, a month after the war in Ukraine started, Octav decided to express his support for Ukraine by creating a GPS-drawing in the shape of a peace sign. During his run, he made several mistakes,

taking a few wrong turns, and the overall circle turned out to be rough up close due to the specifics of the street layout. However, in the end, this imperfect outline communicated his message even more effectively.

"These trivial details may well reflect how peace is like in the real world: messy, but the result is worth it." - Octav

4.2 GPS-drawings to raise funds and awareness

The idea of running for fundraising is hardly new. Fundraising running events are a popular way to combine physical activity with charitable causes while promoting health and fitness. These events foster community building, as strangers come together with a shared purpose to show solidarity and raise awareness for a specific cause (Higgins & Lauzon, 2003). In the case of GPS-drawings for a cause, the running events are often organised by the GPS-artists themselves and supported by organisations promoting and researching the cause.

Octavian Voicu, Lina, 23.06.2024. Screenshot from Strava application

In June of this year, Octav completed another GPS-drawing for a cause, this time with a more personal meaning. He ran a 31.6 mile (over 50 km) route across San Francisco that spelled out "Lina" in cursive, dedicated to a little girl Lina, his friend's daughter, who has CDKL5 deficiency disorder (Cyclin-Dependent Kinase-Like 5). CDKL5 deficiency disorder is a genetic condition characterised by seizures and developmental impairments from an early age (Benke et al., 2024). By June, Octav had already participated twice in "Move CDKL5 Forward," a fundraising and awareness event organised by the International Foundation for CDKL5 Research, which encourages participants to engage in any form of movement, with one dollar donated for every mile recorded. This year, however, Octav decided to add extra meaning to his participation by turning his run into a GPS-drawing as a gesture of support for his friend. His initiative sparked a snowball effect, inspiring another friend to

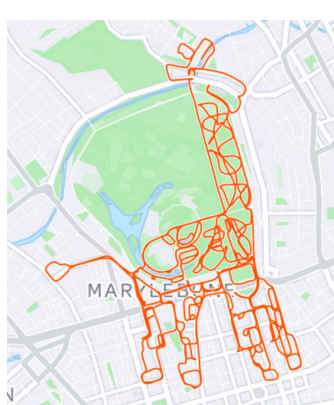
create similar “Lina” drawings in other cities, resulting in three additional replications of his original drawing.

Another practitioner with similar motivations is Jerec Yuen, a London-based runner known on Instagram as Coderunnerguy. After recovering from a toe injury in 2018 that kept him inactive for about four months, Jerec decided to give back to the community by fundraising for Spinal Research, a UK non-profit charity organisation that promotes research on paralysis caused by spinal cord injuries (Azar and Akinwolere, 2019). Through his GPS-drawings, he aims to raise awareness for the cause and encourages people to contribute by organising group runs and asking for donations at the end (BBC News, 2022).

“I’m not doing all the Strava Arts for fun. For those who don’t know, I’m trying my best to help paralysed people to live an active life again.” - Jerec

Not all causes supported by GPS-drawings are health-related. For example, Sander, mentioned in the previous chapter, raised around a thousand euros with his GPS-drawing of a killer whale for the Plastic Soup Foundation in Amsterdam, an organisation that promotes reducing plastic use. Similarly, Tim has created and run several giraffe-shaped routes to support the Giraffe Conservation Foundation, drawing public attention to the organisation.

Sander Gabel, Killer whale for Plastic Soup Foundatio, 11.07.2022. Screenshot from Strava application



Tim Lewin, Giraffe for Giraffe Conservation Foundation , 27.10.2024. Screenshot from Strava application

5. GPS-DRAWINGS AS MOTIVATION FOR RUNNING

This chapter examines the factors that influence running motivation. It begins by highlighting the barriers runners face, then explores how GPS-drawings can offer additional incentives to engage in the activity. Finally, it addresses solutions to the common issue of "I don't know what to draw."

5.1 Barriers and incentives for running

Running has a relatively low entrance barrier. In practical terms, all you need to get started is a pair of running shoes, and you can run anytime and anywhere (Janssen, 2017). However, running also has a high dropout rate, as it requires both physical and mental commitment to maintain it as a long-term practice (Menheere et al., 2020). The authors mention several potential obstacles to sustaining a running habit, including low self-confidence, lack of social support, unfavourable weather, and simply having a bad day.

Existing research on enhancing motivation for running proposes a range of solutions. Menheere et al. suggest several design recommendations to support runners in their journey, from an interactive "sports buddy" that simulates positive self-talk before a run to an art piece with a delayed reward mechanism to extend post-run satisfaction and encourage future runs. Furthermore, Gomes Fernandes et al. (2024) propose several approaches for developing a motivational mobile application for running, with personalisation and gamification identified as key elements. Nevertheless, these ideas, though promising, remain just ideas.

A study by Franken et al. (2023) suggests that social networks may also offer some motivational benefits for running. The authors found that "kudos," Strava's version of Instagram "likes," which users can give to each other's activities, encourage people to run longer and more frequently. But what about GPS-drawings, another concept associated with Strava?

5.2 Running to complete your GPS-drawings

Before beginning my research, I had a hypothesis that GPS-drawings could serve as a motivation to start and finish a run. This hypothesis was confirmed through my interviews and experiments. All six participants in my experiments found the process of completing GPS-drawings enjoyable, with four of them acknowledging the motivational benefits for running. This was also supported by seasoned practitioners I interviewed.

This can be explained by the fact that once you begin your run, and thereby start your GPS-drawing, you cannot easily abandon it; otherwise, you will lose all your progress, and your drawing will never come to life. Of the 12 runs that I initiated with the intention of completing a GPS-drawing, I did not finish only one due to health issues. For the rest, no matter how hard or long they were, including a run in pouring rain, I pushed myself till the very end, eager to see the final results. Additionally,

as suggested by Sander, GPS-drawings can change one's perspective on running, making it less about performance, which can be discouraging if you do not see much progress or compare yourself to others, and more about creation.

"If I'm running a GPS-art, the only thing that matters is the next corner. So I'm not busy with time, with distance, not with pace or speed... And because you're creating something, there's no doubt in my mind that I'm going to finish the route. Because otherwise, it's a failed attempt and I have to do the whole thing again." - Sander

This approach to GPS-drawings can also help motivate people to start a run. In fact, some creators, like JS, often encourage friends to join them, even in poor weather or with limited running experience. It turns out that even contributing to a small section of a larger GPS-drawing can be motivational enough for people to participate.

Understandably, everyone approaches running differently. Some do not mind introducing some distraction to their running routines, particularly for long runs, which can be as long as 30 km, depending on one's training plan. Tim shared how he once prepared GPS-drawing routes for a woman in his run club who wanted something to take her mind off her long runs. Meanwhile, Tim himself prefers "to go by the book" when it comes to training for a race.

Although GPS-drawings allow you to shift focus away from statistics, they still require you to keep track of your location, unless you memorise the map by heart, which is not very feasible for long distances. For some participants, this did not present a problem, while others found it inconvenient. Lena, an intermediate runner from Saint-Petersburg, considered her GPS-drawing experience curious but did not see herself doing it again. She enjoys running without a specific purpose and treats it as a form of meditation. For her, completing the GPS-drawing added some stress, as she had to keep checking her phone. Similarly, Conor, the most experienced participant, noted an interesting shift in his attention while completing his GPS-drawing but did not see much value in it for himself, preferring to focus on his running statistics. He also commented on having to consult his phone:

"I hate checking my watch and then checking my phone... So that's my least favourite part of the run. So if I had to keep doing that, especially for a long run, I would go crazy." - Conor

5.3 Exploring new areas

Another interesting finding from my research was the connection between GPS-drawings and exploring new

places. While GPS-drawings serve as a source of motivation, they also bring the added incentive of discovering new areas. This was the feedback I received from Andrés, one of my participants, after our "bird run" together in Ferney-Voltaire, France. Since I had planned the route myself, Andrés did not know what shape we were creating or where we would run. Aside from being intrigued about the final outcome throughout the experience, he was also surprised to discover some new parts of town.

"I think I've already lived here for more than a year. And I have never been to these small neighbourhoods." - Andrés

Andrés and me, Bird, 29.09.2024. Screenshot from Strava application

I have felt the same during my own runs. When planning a route, you do not focus so much on the location itself, but rather on how the roads form the shape you want to draw. Living on the outskirts of Geneva, I often found myself running through fields with cows and sunflowers — places I would never normally visit since they are hardly destinations in my everyday life.

And it is not only about seeing new areas. Polina, another participant, suggested that it works the other way round too. Running unfamiliar routes brings fun and novelty, making it easier to keep running as your attention is distracted by your surroundings. However, there is a trade-off between novelty and proximity to home, meaning the benefit of exploration with GPS-drawings is more noticeable when you begin your run farther from where you live.

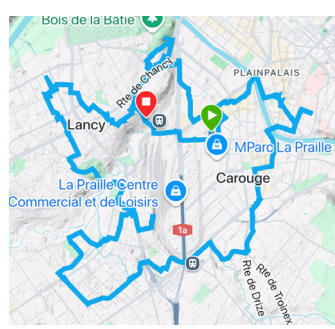
5.4 What do I draw?

One of the most common feedback that I received from the participants in my running experiments was that they struggled to come up with ideas for what to draw. This issue constitutes an obstacle to creating GPS-drawings and, in turn, can undermine their usefulness in motivating people to run.

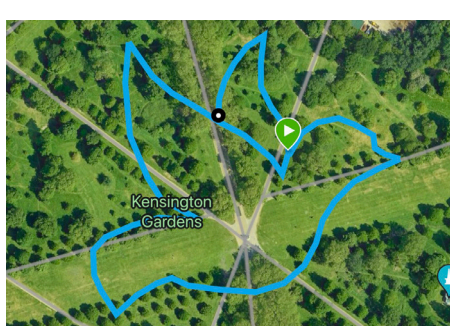
Most of the time, the challenge is not even a lack of ideas about what to draw. Anyone can think of basic shapes like a circle or a heart. The real difficulty lies in finding these shapes on the map. To address this issue, several studies have explored algorithms for automatic route planning (Waschk & Krüger, 2018). However, these algorithms still lack precision and are not widely used.

Researchers at the University of Washington took this a step further by creating a mobile application called Trace, which generates walking routes based on digital sketches made by users (Rosner et al., 2015). Although their research paper does not explicitly state this, the provided screenshots suggest that the app, which appears to no longer exist, struggled to create recognisable shapes on the map, especially for shorter distances. A similar functionality is currently available through Strava's premium subscription, which allows users to draw their own routes on the map. However, it faces the same challenges as Trace in producing clear shapes.

But what if you do not have any creative ideas? These days, there is another solution: GPSArtify, a GPS-drawing generator powered by artificial intelligence (AI). You can select from predefined shapes, and choose your area, and the website generates a route for you. You can then download its GPX data and upload it to your GPS device. There are two modes to choose from: urban and freestyle. The former is based on the streets in your area. As expected, the results lack detail and are not always easy to recognise. The latter option is intended for areas without roads, like parks, and produces the most recognisable outcomes.



GPSArtify, Bird, urban mode. Screenshot from GPSArtify website, accessed on 16.10.2024



GPSArtify, Bird, freestyle mode. Screenshot from GPSArtify website, accessed on 16.10.2024

Although the idea of a GPS-drawing generator seems practical, in its current state, GPSArtify is better suited to a guessing game of figuring out what shape it has produced. The free predefined forms are very basic, and even then, the outcome on city streets is often barely understandable. To access a larger range of forms, you must pay a subscription fee of $7.99 per month, which also allows you to create your own forms. However, with more "interesting" shapes, it becomes even harder to generate a clear route, unless you are working with distances over 50 km, which are more suitable for cycling. Additionally, it is doubtful that many people would pay nearly $8 for a collection of mediocre GPS-drawings when they could contact creators like Tim or Sander, who would willingly plan a route for them in the city of their choice.

Alternatively, it would be helpful if there were a database of GPS-drawing routes. In fact, there are already examples of databases with GPS-drawings. I have found one created by Yassan Takahashi (https://gpsart.info). It contains over 1000 routes in Japan and allows you to choose your preferred area, length, and theme. Additionally, it is possible to request a route to be planned for you.

Finally, it may be helpful to change the approach and study the map looking for familiar shapes, a so-called "pareidolia" concept, and then slowly building up from there.

"I never wake up and say I'm gonna draw a lion today. That's just not how it works. What happens is I see a shape, I see something that looks interesting, like the way a street goes. And I start to play around it and I just see where that goes." - Tim

CONCLUSION

Running has been a popular recreational activity for decades. Today, we also run to complete GPS-drawings. While seemingly simple creations, they possess a truly multidimensional nature, encompassing a wide range of styles, contexts, challenges, and media. As demonstrated in this thesis, GPS-drawings contribute to meaningful running practices by incorporating artistic self-expression, promoting collectivity, supporting causes, and serving as a source of motivation. Enhancing the running experience in numerous ways, they inspire new exploratory behaviours, transforming both how individuals perceive the city and how they experience running itself.

Nonetheless, there are possibilities to broaden this research. My personal experiments, while insightful, were inherently subjective, influenced by factors such as my half-marathon preparation and current research focus. Additionally, due to time constraints, I could not explore the long-term benefits of GPS-drawings or their role in sustaining a running practice over time. Future studies could distinguish between runners training for races and those running recreationally, as well as investigate how GPS-drawings influence motivation in the long run. This thesis, therefore, serves as a foundation for further exploration into the potential of GPS-drawings.

The findings of this research present several opportunities for the development of further media design projects. One promising direction involves simplifying and enhancing the creation of GPS-drawings. Many participants, as discussed in Chapter 6, struggled to generate ideas for their drawings, while existing solutions remain limited. A mobile application powered by AI could address this issue and by suggesting routes for GPS-drawings based on the user's location and preferred distance. Additionally, it could include a database of routes saved by other users, classified by themes. To mitigate the disruption caused by frequently checking a phone for directions, the app would send audio notifications for upcoming turns. For a more personalised and engaging experience, the app could also offer a "surprise mode," hiding the route and revealing the final GPS-drawing only at the end of the run.

Another design opportunity lies in the observation concerning the exploration of new areas. GPS-drawings often push runners to places they would not typically go to, bringing some novelty into everyday life and transforming the surroundings into a creative playground. This aspect, highlighted by participants and practitioners in my research, suggests that it may be interesting to develop an augmented reality (AR) mobile game that encourages users to interact with the city and explore it in a playful way. By moving around and following virtual

traces or landmarks invisible to the naked eye, users could “unlock” new areas and rethink the urban spaces they are familiar with.

Finally, the motivational potential of GPS-drawings, that comes from shifting focus from running performance to the visual reward of completing a drawing, gives ideas for broader applications. This concept could inspire the creation of a motivational application that applies the same approach to tasks people are reluctant to tackle. By turning mundane tasks into creative challenges with visual rewards, the app could redefine how people approach motivation in their daily lives.

Some other design opportunities lie in the field of education, where GPS-drawings could be incorporated to encourage creative expression in children, integrating physical activity with artistic exploration. Additionally, the intersection of embodied interactions and creativity extends beyond GPS-drawings, offering ground for further exploration and innovation, merging movement, art, and technology in new and engaging ways.

You might still be wondering about the title of this thesis. In our interview, Tim mentioned that elephants are, in his opinion, the easiest GPS-drawings to create. In fact, he has built an entire collection of elephant routes. So, I challenge you to find an elephant on the map and run it.

“There’re a lot of elephants out there, they’re everywhere.” - Tim

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APPENDICES

Practitioners' interviews transcripts

Experiment participants' interviews transcripts

Board journal

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