Writing With the Machine

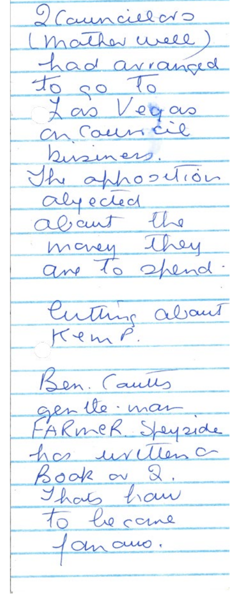
Eirunn Marie Margaret Kvalnes
Oslo School of Architecture and Design
Autumn 2021

But that's another country that has been plagued for hundreds of years by murderous bastards. What is your job to be there?

I think that's my lot for tonight. Do you notice how many mistakes there are in the typing? I need a typewriter that will automatically correct the errors.

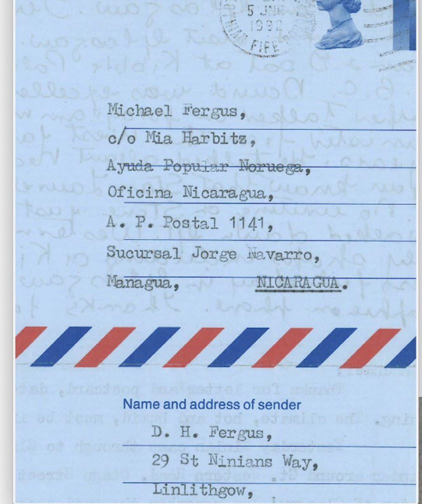
Love to all the family and yourself,

Dad

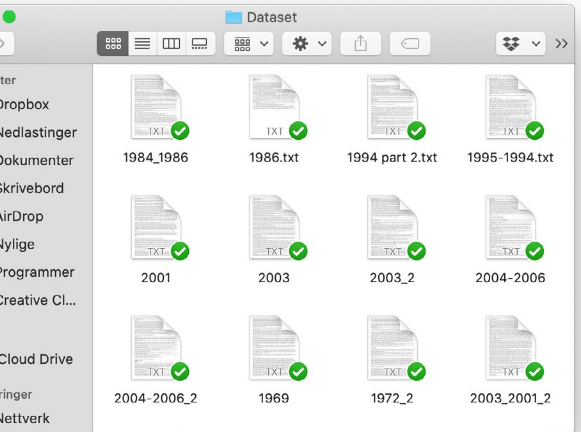

2 Councillors (Mother well) had arranged to go to Las Vegas on council business. The opposition objected about the money they are to spend.

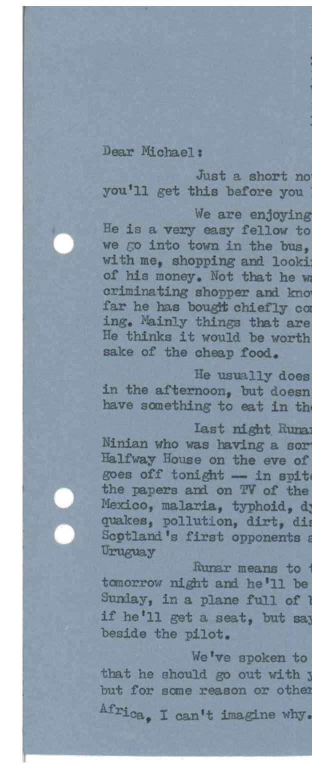
Cutting about Kemp.

Ben. Coutts gentle-man FARMER Speyside has written a Book or 2. Thats how to become famous.


Michael Fergus,
c/o Mia Harbitz,
~~Ayuda Popular Noruega,~~
Oficina Nicaragua,
A. P. Postal 1141,
Sucursal Jorge Navarro,
Managua, NICARAGUA.

Name and address of sender
D. H. Fergus,
29 St Ninians Way,
Linlithgow,




29,
Lin
Wes
Sco
Fri

Dear Michael:

Just a short note,
you'll get this before you lea

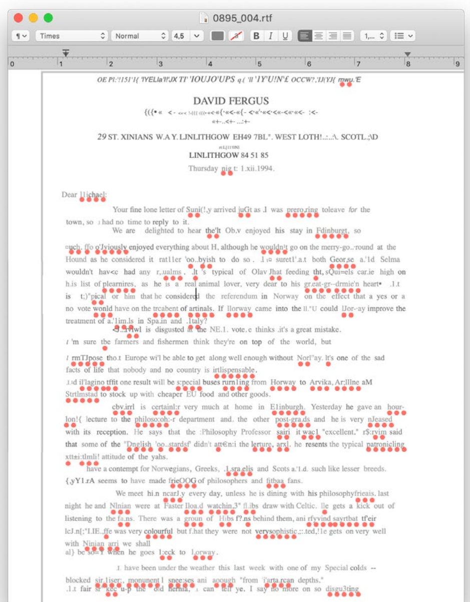
We are enjoying Ru
He is a very easy fellow to en
we go into town in the bus, an
with me, shopping and looking
of his money. Not that he wast
criminating shopper and knows
far he has bought chiefly compa
ing. Mainly things that are ch
He thinks it would be worth li
sake of the cheap food.

He usually does a
in the afternoon, but doesn't
have something to eat in the C

Last night Runar w
Ninian who was having a sort o
Halfway House on the eve of hi
goes off tonight — in spite o
the papers and on TV of the da
Mexico, malaria, typhoid, dyse
quakes, pollution, dirt, disea
Scotland's first opponents are
Uruguay

Runar means to tak
tomorrow night and he'll be fl
Sunday, in a plane full of boo
if he'll get a seat, but says
beside the pilot.

We've spoken to hi
that he should go out with you
but for some reason or other h
Africa, I can't imagine why.



DAVID FERGUS

29 ST. XINIANS W.A Y. LJNLITHGOW EH49 7BL". WEST LOTH!..:..\. SCOTL.;\D

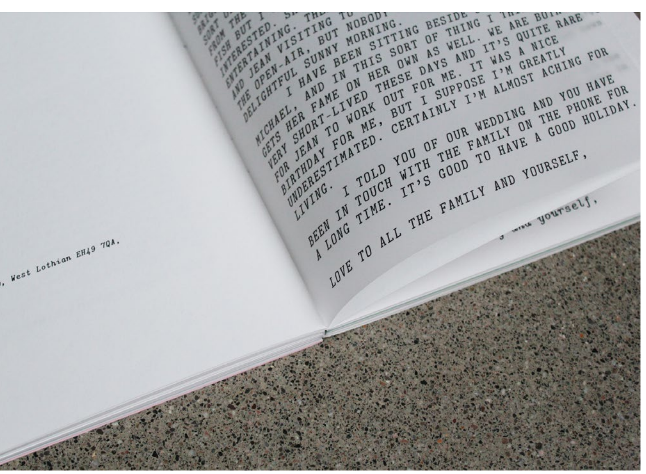
LINLITHGOW 84 51 85

Thursday nig t: 1.xii.1994.

Dear l1ichael:

Your fine lone letter of Suni(!,y arrived juGt as .I was prero.ring toleave for the town, so had no time to reply to it.

We are delighted to hear the'lt Ob.v enjoyed his stay in Fdinburgt, so



Letter No. 81

First of all, very many thanks to both of you for that marvellous Christmas parcel which arrived on Saturday. The Glasgow Street Library, a theatre in Glasgow (not for sale, as the street was jammed with squirrels) was closed in time and nobody could look out the window. You must have had a letter from Franson in London, but I think that was pretty long before I got the letter. I had the decency to put it into action as the relevant article "The Rejected £6 Loan Was Too High For Our Sixty Readers' Home" was published by a new publisher. I got a lot of your letters this year, as the tatium of iced-up dinars in the Edinburgh Riots were dreadful. There were no books for sale. On the Saturday there were masses of Scots really good in the Book Store and they were probably quite good enough to be in Edinburgh for a weekend in October. I also had a very interesting article for the Scotsman in which I explained the politics of the Book Store. It is quite interesting to me that, at age 86, we are not in the dark ages of independence (or our own age) and I do not know if Scottish Democracy co-operates with the Tories' efforts to destroy the Borders. (I think my old favourites are That Runar is just as stupid as my old pals in Carribas or Leith).
I'm still being hammered out of the prednisolone (painting) regimen by the wee W. H. Young at Motherwell. I won't be taking a course of prednisolone at any given time in time. I am certain it's not a good exercise. What can I do? But why am I so tired of worrying about the ghastly new film about Denmark in the film? Ninian is such a big-hea, like most people I know. And that's why he will do all his extra haggling to get into business with the UK in the European elections next month.
Do you know that Gruden is looking for a short film about his own reign in Downing Street?

12 Lennox Gardens, Linlithgow, West Lothian EH49 7QA,
Tuesday, 23.ix.2002.
Dear Michael & Jorunn:
Last night I took the long bus up to the Zoo in Aberdeenshire where they went down to No. 83 where the kite was removed from its place. The creature, the kite, waing and scraping its way through the view from the balcony into its place looks like the prize of a foreign treasured item. It is interesting to look at the beast that has been to the Zoo all its life, and thinks that there is something special about it. To make any change to it, it must be the bare worst of its kind. We could have had no more photographs, as we know nothing about Loch Ness and the Loch Ness Monster. Or as it is today, I'd imagine that if I could write to the Council asking for ileugenics, I'd have had something about that. He likes to show his one hand to them, if only he'd stop it.
I was impressed to hear that the Norwegian Parliament is now insisting on "taking drastic steps" on universal suffrage as they believe that the Government can't demand to take immediate action. They have been busying this mess, with this order from Mahler to Musselburgh to St Petersburg (they don't think so). They say they are going to take all they can to the Council and take action again and again. I'm sure that most Scots feel that if they can impose drastic changes, they can push it back. Aye aye aye aye aye aye aye aye aye aye aye aye aye aye aye aye aye aye aye aye aye aye aye aye aye aye
Aye Aye Aye Aye Aye Aye Aye Aye Aye Aye Aye Aye Aye Aye Aye Aye Aye Aye Aye Aye Aye Aye Aye Aye Aye Aye Aye
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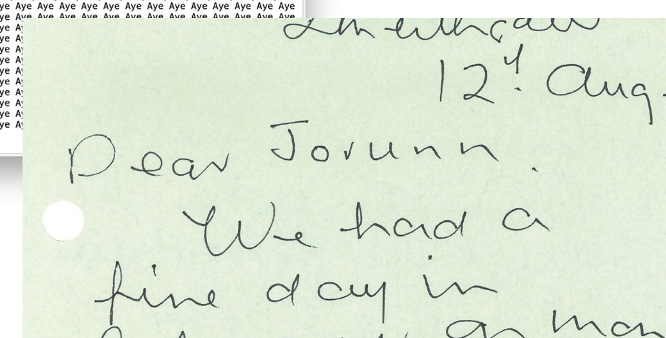

12th Aug.

Dear Jorunn.

We had a fine day in

Field: Interaction Design

Supervisor : Lars Marcus Vedeler
External Supervisor : Audun Mathias Øygard

Institute of Design
Oslo School of Architecture and Design
Autumn, 2021

Introduction

Tuesday, 8.v.

Dear Michael:

Every day we check the previous
usually in the 70s. It was much like that

Dear Tharan
and
Dear Runar
and
Dear Sophie

When are you lazy layabout
going to start school?
I'm sure you must be tired
of swimming
and lying about in the sun

Dear Michael + Jorunn

To·day -

Dear Jo

We
fine d
& easy
+ faun
in Byr
when
3 cauz

LE PLAISIR DELICIEUX ET TOUJOURS NOUVEAU D'UNE OCCUPATION INUTILE

DAVID FERGUS

29 ST. NINIANS WAY, LINLITHGOW EH49 7BU. WEST LOTHIAN. SCOTLAND
TELEPHONE:
LINLITHGOW 84 51 85

Thursday night: 1.xii.1994.

Dear Michael:

Your f
leave for the tow
We are
much. He obviously
merry-go-round at
that both George
that feeding th
animal lover, ver

Dear Michael & Jorunn:

Thank you very much for the jumper for my birthday
one, and it was very nearly the only non-alcoholic

Well, you missed my soirée, which was quite a lot
the SNP club in North St.Andrew Street on Satu
fairly kenspeckle group of friends from the pre
course Hiram, Phil, Derek and the Lithgae team wer
Johnny Costello, now living in Aberdeen whom I had
years, and Alan Queree, who came all the way fr
him in Lahore in 1975 en route for India. We
Bombay, and back as far as Montreux where he heade
Oslo to see you. We've kept in touch since, but I
1983, when Philippa and I stayed with him in Londo
a pretty drunken affair, but the SNP must have ben
takings!

29, St Ninians Way: Linlithgow:
Sunday, 26.iv.

Dear Michael:

Thank you for yo
Portal which arrived yester
Mountains of the Moon Hotel
and so does the telegraphic
It must be a wonderful exper
exotic places, but at what
existence you're leading at

Increasingly our world is being created by software we hardly understand, often so that it becomes hard to sort out where the human influence is. Today, machine learning systems are everywhere beneath the surface of contemporary life. As these systems are gradually becoming infrastructural, they are also becoming unnoticeable to us. Before this happens, we should develop ways to approach, think and talk about them.

Writing With the Machine is an experimental design diploma exploring machine learning as a design material. As a design experiment, I trained a machine learning model on an archive of personal letters written by my great grandfather. Using this experiment as a starting point, working hands on with both the data material and the software, I reflect upon different aspects of machine learning.

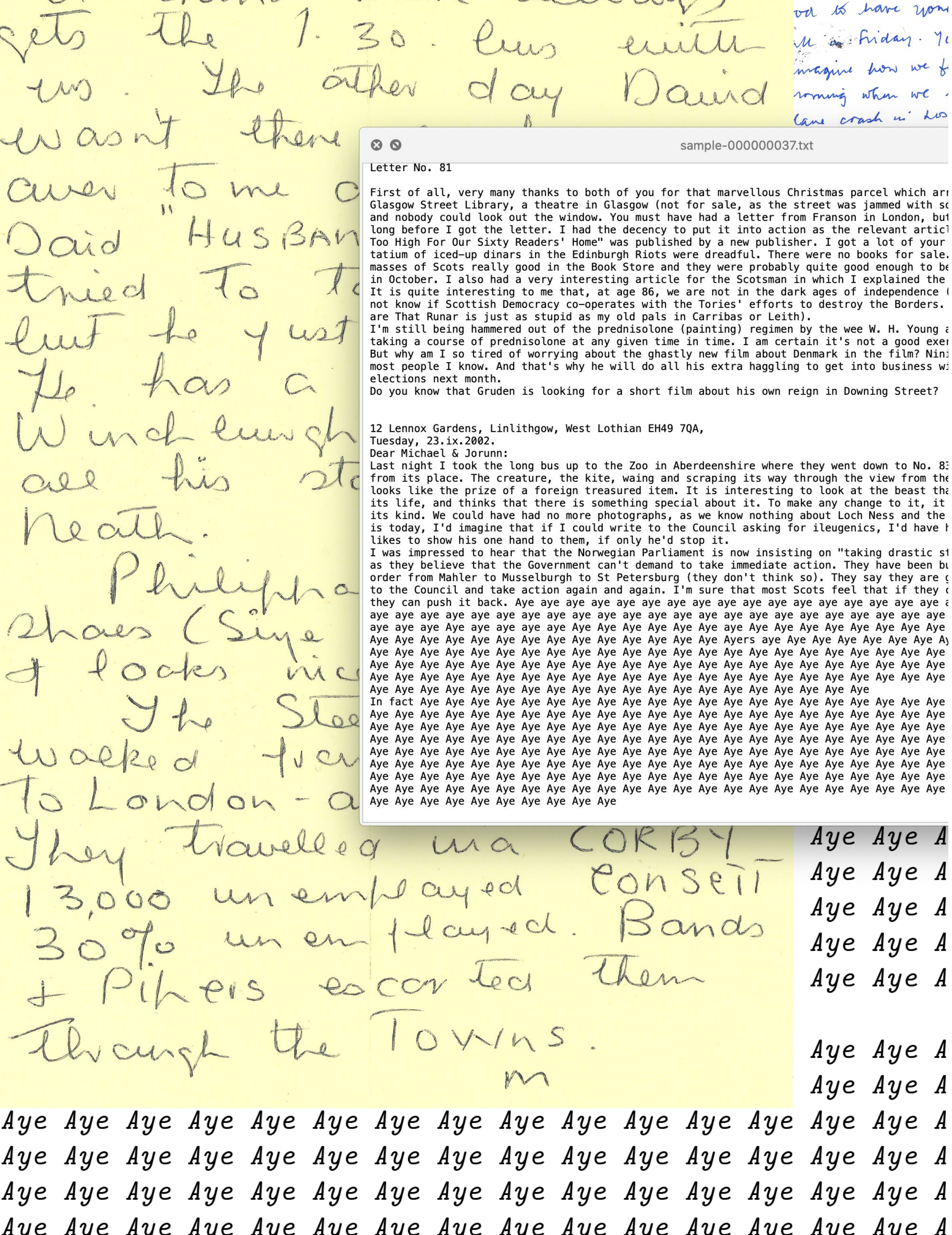
The outcome of the project is a set of three books, alongside a website. Together these artifacts make out a framework to discuss and talk about machine learning.

The main ambition of the project is to investigate:

How might we use design to explore and communicate aspects of machine learning?

How can we approach highly technical and complex technologies like machine learning, through alternative perspectives and approaches?

Approach


gets the 1.30 bus with
us. The other day David
wasn't there
over to me
Daid "HUSBAN
tried To ta
but he just
He has a
Winchburgh
all his sto
Neath.
Philippa
shoes (Size
& looks nic
The Stee
walked from
To London - a
They travelled via CORBY -
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30% unemployed. Bands
& Pipers escorted them
through the Towns.
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ll on Friday. Yo
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It is difficult to position this project within a particular design discipline. This project is explorative, moving in between interaction design and graphic design, experimenting with the frameworks and tools that these disciplines offer. As an interaction designer I am interested in how new emerging technologies shape human behavior and culture. As a visual designer I consider aesthetics and visual culture as entry points to understand how we organize ways of seeing and thinking. I enjoy working with narratives and storytelling to design new ways of seeing and thinking. I consider this diploma an opportunity to bridge my different interests as a designer.

The project is primarily intended and directed towards other designers, and other practitioners that work with machine learning. This has influenced the way I communicate and articulate the project. However, I hope that my designs can be of interest to other people as well.

As the field of machine learning is complex, I wanted to use an approach that prioritizes research and experimentation. As Timo Arnall writes, experimental design can be seen as the «means of exploring a subject area through a practice of making, without direct formal or commercial constraints.»[1]. Schön, characterizes designing as “a reflective conversation with the materials of a situation.» According to Schön design is a process of ‘reflection-in-action’, where the designer makes ‘design moves’ and the material ‘talks back’.[2] A central part of my approach has been to actively experiment with materials and software, using this process as a way of observing and reflecting upon machine learning. I see this as an iterative thinking process between the design materials and myself.

One could argue that my approach differs from more conventional design projects as it is not focused on solving a problem or creating a solution. As a designer I have always been more interested in design as a means of articulating questions, rather than with solving them. I am passionate about my own discipline, and so I aspire to use my design skills to produce reflections and conversations.

“Some people (they are wrong) say design is about solving problems. (...) Obviously designers do solve problems, but then so do dentists. Design is about cultural invention.”[3]

1 Arnall, Timo. *Making Visible - Mediating the material of emerging technology.* PhD Thesis. Oslo School of Architecture and Design. 2013.

2 Schön, Donald. *The Reflective Practitioner: How Professionals Think in Action.* (The United States of America, Basic Books Inc., 1983), 78-79.

3 Statement by Jack Schulze of Schulze and Webb, presented during Matt Web’s Reboot talk. From https://www.core77.com/posts/13905/design-is-not-about-solving-problems-13905 29.11.21

My research follows three different phases. Together these different phases form a mode of design research that actively take part in the exploration, communication and reflection of machine learning.

EXPERIMENTATION → COMMUNICATION → REFLECTION

EXPERIMENTATION	COMMUNICATION	REFLECTION
Research possible datasets Collect data - scans, photo, text Clean and prepare data Train Model Test Iterate Document observations	Develop visual concept Print production Design and develop website Articulate and refine observations Test Iterate	Conversations / interviews Document reflections Iterate on communication

EXPERIMENTATION

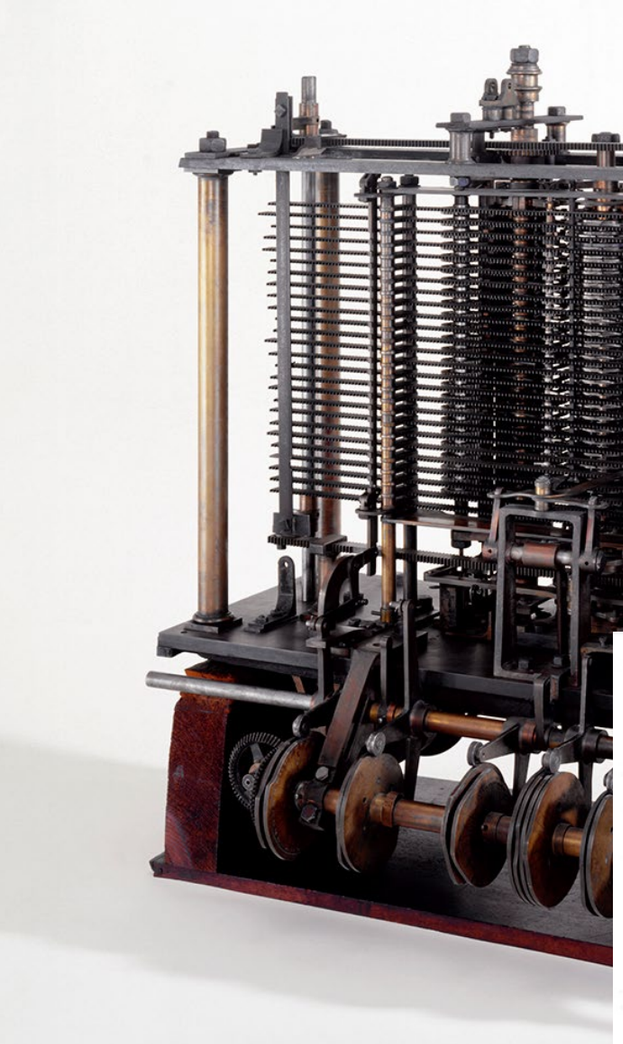
In the first phase of the process, I explore and experiment with the machine learning model. I see this experiment as a way of unpacking the different steps that go into working with machine learning. I create a dataset from scratch, train the GPT-2 model on this data, and study the outputs that the model produces based on this training. An important part of this work was to document my observations and reflections. I continuously recorded my thoughts through text - by keeping a process diary - and image - by taking screen-shots, scans from the original archive, photographs.

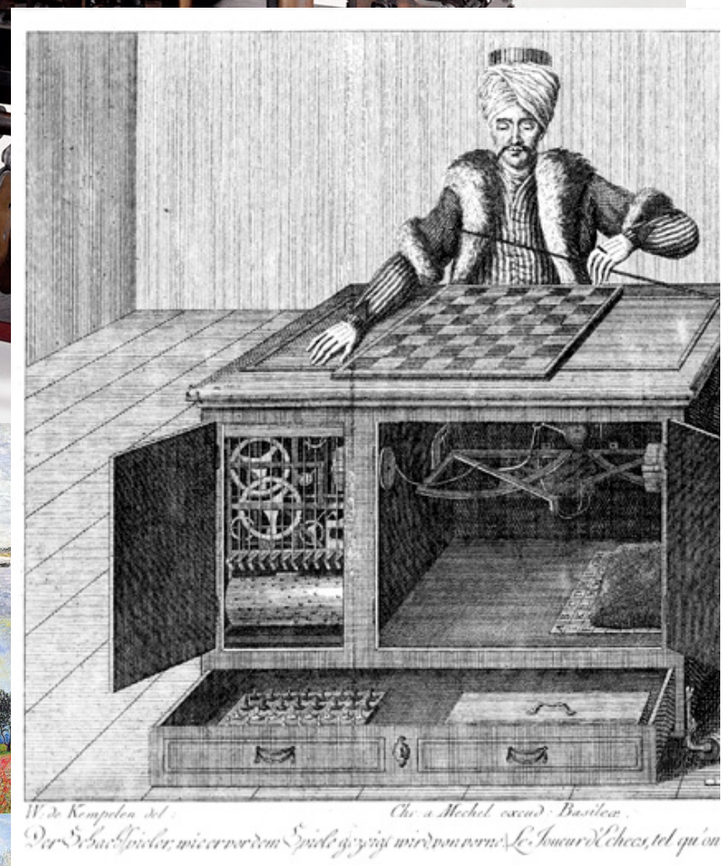
COMMUNICATION

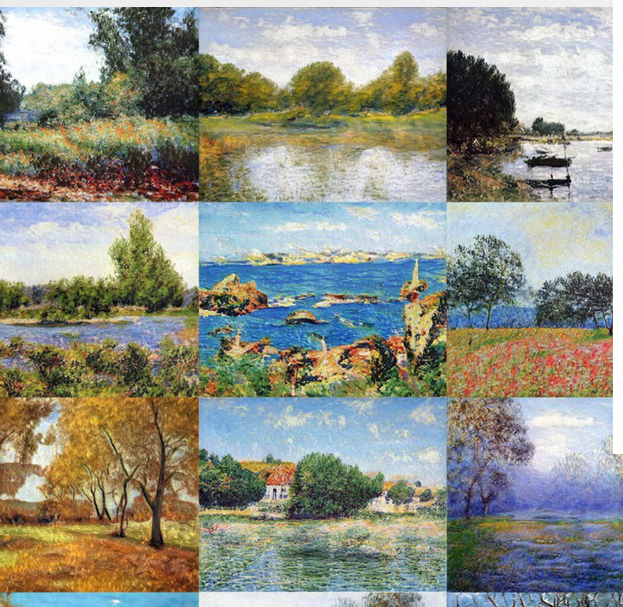
The second phase of the project revolves around communicating the materials, observations and knowledge from the experiment. This is manifested through different artifacts - three books, plus a website. Together these artifacts make out a framework for reflection and conversation.

REFLECTION

The third phase of the project revolves around using this framework to discuss and reflect upon machine learning. I use the artifacts as conversational tools, as starting point to discuss ML with different practitioners. This final step was important for evaluating the outcome and process of the two first steps.







Machine Learning

This project started from a personal captivation with machine learning. Even though several different disciplines deal with machine learning, I find that conversations within machine learning discourse is largely dominated by software engineers and developers. With this project I saw an opportunity to explore - how might I, as a designer and non-developer, participate in this discourse? As Balsamo puts it, technology “no longer properly belongs to the special few (the philosophers, the engineers). Instead this suggests that thinkers in several disciplines might have something important to contribute to our collective understanding of the “nature” of technology.” [4]

As my knowledge as a designer is situated [5], this naturally influences the way I understand and talk about machine learning. I work with machine learning in a designerly manner. I have explored machine learning in previous projects duing my master studies, and I am familiar with some coding languages. However, I am no software enigneer or machine learning expert. Seeing as my own technical knowledge is somewhat limited, it has been important for me to discuss the project with other practitioners with relevant competence. Having Audun Mathias Øygard - who is a data scientist with expertise in machine learning - as my external supervisor has helped me scope and evaluate the project thoughout the process.

Machine learning can be described as «the process by way of which algorithms are taught to recognize patterns in the world, through the automated analysis of very large data sets.» [6] Machine Learning is seen as a subset of Artificial Intelligence, but these terms are often used interchangeably. [7]

4 Balsamo, Anne. «Notes toward a reproductive theory of technology.» In *Playing dolly; techno cultural formations, fantasies, and fictions of assisted reproduction,* 87-97. Rutgers University Press, 1999.

5 Haraway, Donna. «Situated Knowledges: The Science Question in Feminism and the Privilege of Partial Perspective.» 575-599.

6 Greenfield, Adam. *Radical Technologies: The Design of Everyday Life.* (London, Verso, 2017), 181.

7 *Brown, «Machine Learning, explained». MIT Sloan School of Management. 26.11.21. https://mitsloan.mit.edu/ideas-made-to-matter/machine-learning-explained*

Today, machine learning systems are everywhere beneath the surface of contemporary life. Machine learning algorithms are used to determine who is hired for a job (fig. 1), it is used to control what narratives we see in social media (fig. 2) and to recommend what movies we should watch or products we should buy (fig.3). It is shaping our language and the way we communicate with each other. (fig. 4)

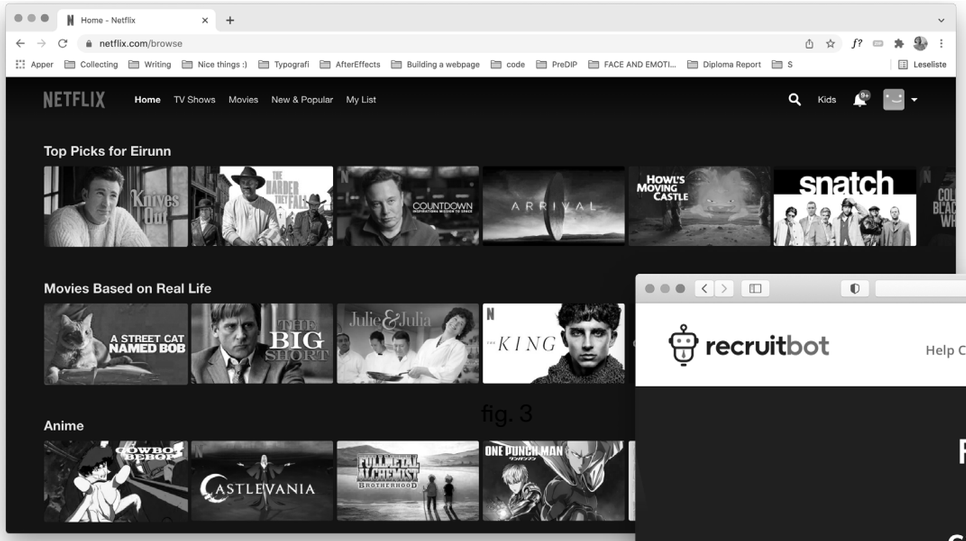


fig. 3

fig. 1

fig. 2

fig. 4

1 Screenshot from *recruitbot.com*
2 Screenshot from *instagram.com*
3 Screenshot from *netflix.com*
4 Screenshot from *chat.dnb.no*

These systems are infusing computers with a wide range of human-like powers. Using machine learning, computers can generate content - for example photos of celebrities (fig.5), academic research papers(fig.6) and newspaper articles(fig.7) - of convincingly human-like quality. As our world is increasingly being created by machines, it is also becoming hard for us to sort out where the human influence is. What is really the difference between a text written by a machine and that written by a human? As Cade Metz writes in an article for the New York Times, «For better and worse, humans are only improving their ability to deceive themselves with technology.»[8]

8 Metz, Cade. *«How Will We Outsmart A.I. Liars?»*

1 Screenshot from *https://www.nytimes.com/interactive/2018/01/02/technology/ai-generated-photos.html?searchResultPosition=4*

2 Screenshot from *https://news.mit.edu/2015/how-three-mit-students-fooled-scientific-journals-0414*

3 Screenshot from *https://www.wired.com/story/ai-text-generator-gpt-3-learning-language-fitfully/*

fig. 5

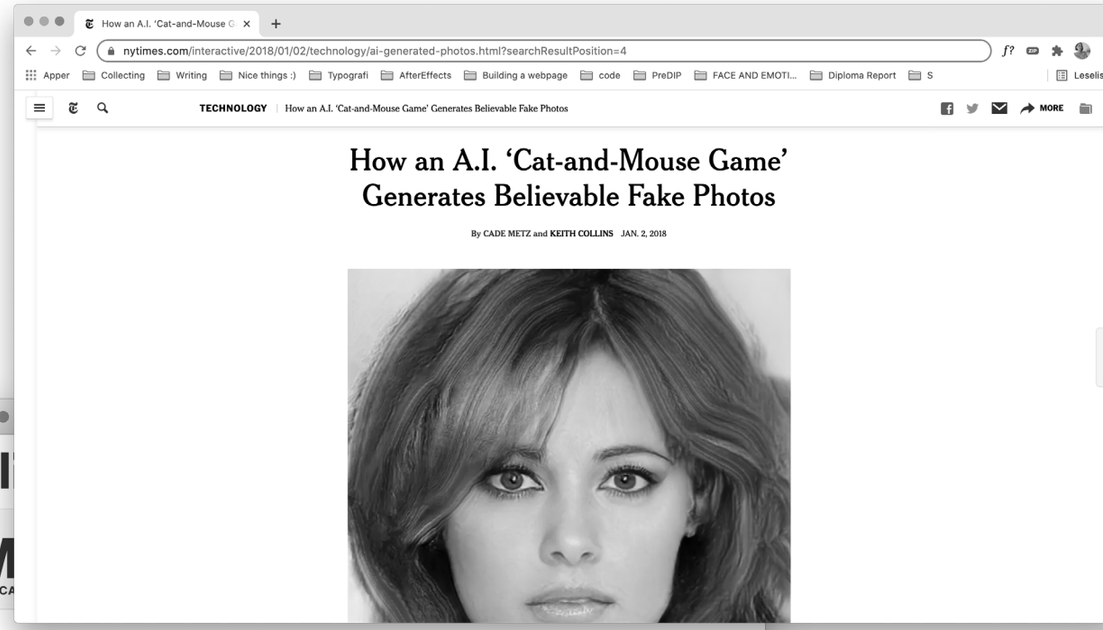


fig. 6

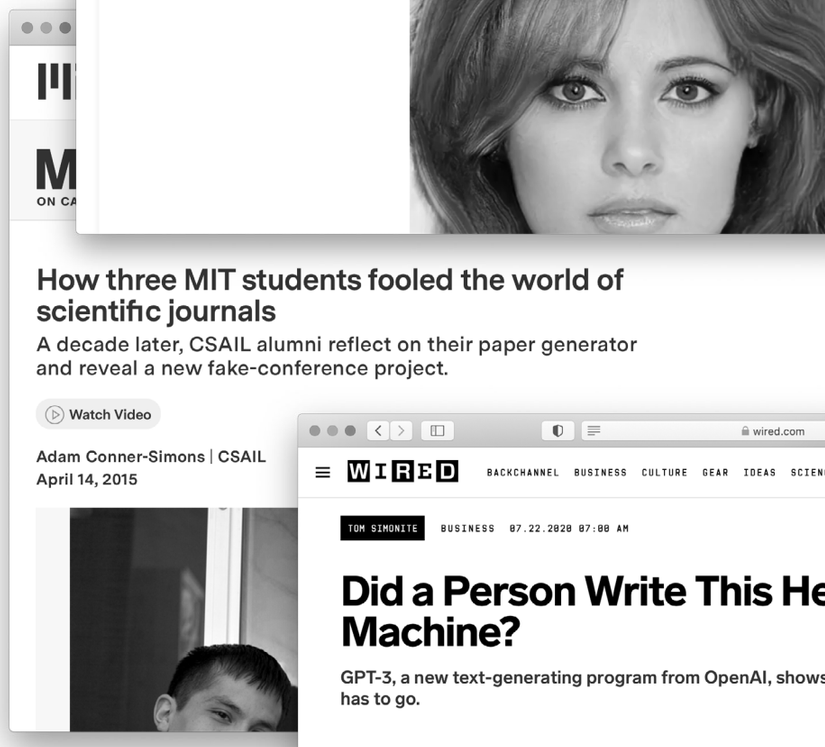


fig. 7

As these systems are becoming more and more widespread, they are also becoming more and more invisible to us. Francis Tseng writes that «In its pervasiveness, machine learning is becoming infrastructural. Like all infrastructure, once it matures it will become invisible.»[9] Machine Learning systems are growing more and more powerful. But at the same time they are gradually becoming too smooth for us to notice them. And as we stop noticing them, we also stop challenging them and questioning them. As a designer working in the intersection between graphic design and interaction design I am fascinated by the fact that there are so many aspects of machine learning that are invisible to us.

9 Tseng, Francis. *«Monkeywrenching the Machine»*

Understanding materials has long been considered to be an essential part of the skillset of a designer. As interaction design has matured as a design discipline, discussions around materials and materiality have become increasingly important. How might we frame the software, interactions and code that interaction designers work with as design materials?

When we think about machine learning within interaction design, we often associate it with productivity and efficiency. Machine learning is used to improve things like recommendations, search results, notifications and ads. Implementing machine learning can be a powerful way of improving and personalizing the user experience. This way of approaching machine learning largely focuses on usability, efficiency and productivity. While I recognize this as an important field within interaction design, my approach in this project is somehow different. In stead, I frame machine learning as a design material, and my research focuses on exploration and experimentation. I see this as a way of unpacking the processes that go into working with machine learning.

My approach has partly been inspired by other designers and projects that explore digital software as design materials.

The design studio Bakken&Bæck have done several projects where they experiment with machine learning. In 2016, they created a robot journalist using machine learning - “a digital football reporter that writes articles like a human.”[10]

Anna Ridler is an artist with a background in information experience design. In her work she actively works with self-generated datasets and the creative potential of machine learning. Ridler’s way of working with and thinking about machine learning have inspired my own way of working in this project.

“Making Visible: Mediating the material of emerging technology” is a PhD project by Timo Arnall. While Timo’s research explores a completely different technology, his thoughts and reflections on materiality within interaction design have inspired this project. [11]

Anna Ridler

10 Waldal, Espen *«Building a Robot Journalist » Medium. 21.08.21 https://medium.com/bakken-b%C3%A6ck/building-a-robot-journalist-171554a68fa8*

11 Arnall, Timo. *Making Visible - Mediating the material of emerging technology.* PhD Thesis. Oslo School of Architecture and Design. 2013.

How can we talk about machine learning as a design material? While it is tempting to compare machine learning to more conventional design materials, this comparison quickly falls short. Machine learning is different from other design materials because we cannot properly understand how it behaves. When working with a piece of wood, it is easy for us to understand and explain how the material behaves the way it does - for example why it expands with increased humidity. With machine learning, the behaviors and characteristics of the material are often more opaque and unclear. This is largely why machine learning systems are often referred to as black boxes. Data goes in and a result comes out, but the processes between input and output are often opaque and unclear. Machine learning is also more unpredictable than more typical design materials.

“(...) framing machine learning as a design material is an appropriate way of working with it. (...) Compared to traditional design materials, machine learning is more unpredictable, emergent, and “alive”””[12]

Because aspects of the software are inexplicable, unpredictable or opaque, challenges of understanding and explaining are often central when working with this technology. While it is uniquely different from more conventional design materials, there are still aspects of machine learning that designers can work and experiment with. As I write more closely about in my reflections, there is a lot we can learn from exploring and studying training datasets, or the outputs that machine learning models produces.

12 Luciani, Lindvall, Lövgren. «Machine learning as a design material: a curated collection of exemplars for visual interaction»

Boswells. And she never compained.

Your Mother was a very specia l l
in ther great Dr Schweizer's "respect
the tiny weeds forcing their way thro
paving stones, she used to say "They'
I think you have inherited her g
With love to you a nd Jorunn and
R unar, and all the lovely families in
genes from your Mum andmyself,

WILLIAM LITHGOW

Lo, here's mine Effigy, and Turkish Suit;
My Staff, and Shafts, as I did Asia foot:
Blood in old Ilium, Priam's Scepter shralls:
The Grecian Camp design'd; lost Dardan falls.
Girdwith Small Simois, Ida's tops, a Gate;
Two fatal Tombs, an Eagle, sackt Troy's State.

EUROPE, ASIA, a
FOR NINETEE
CONTAIN
An Account of the Religion,
Laws, Cuſtoms, Trade, &c
tries through which the Auth
ſcription of Jeruſalem, and
places mentioned in Sacred a
A L S
A Narrative of the tortures he
Inquiſition, and of his mirac
thoſe cruelties.
By WILLIAM
The ELEVENTH
Embelliſhed with COPPERPLAT
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For J. MEUROS, Boo
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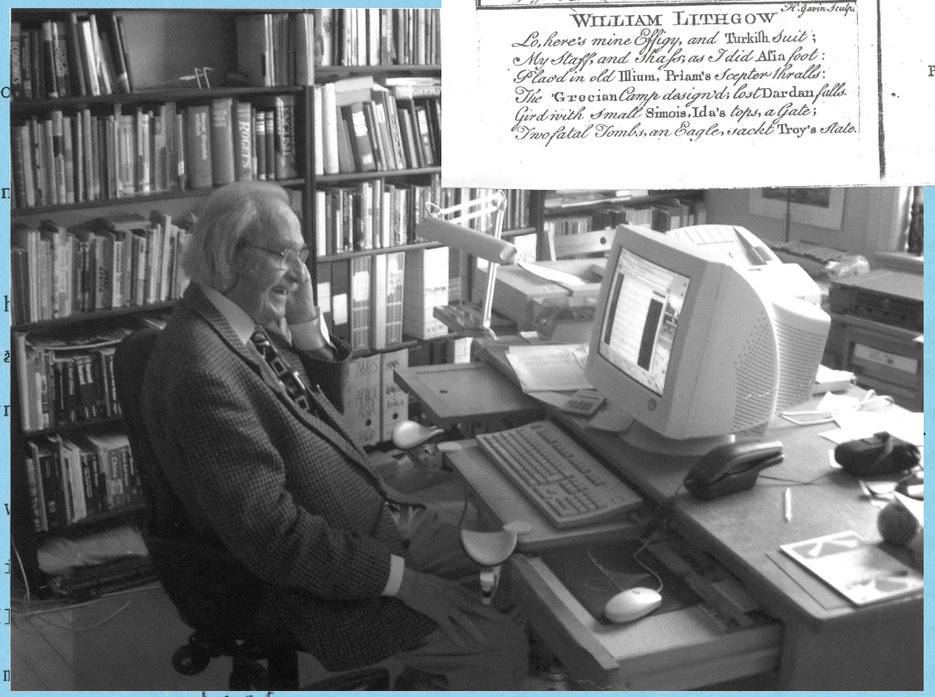

I love sh
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xx xxx
on my own
round in
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Nini
up THE HI
From

STUPENDOUS BOOK. TO ~~torod~~T It I looked up Isaac Ba sheVis Singer
on e of my favour rites. He was a Polish Jew who went t New York,
w rote in Yiddish and won the Nobel Prize 8n 1978. I am going to
buy it on the Internet as it is invaluable.

While Ninian was i n Falkirk I prepasr ed cabbage fo r my
tea. He desn't like cabbage, but I do.

With much love to you all.
Wend

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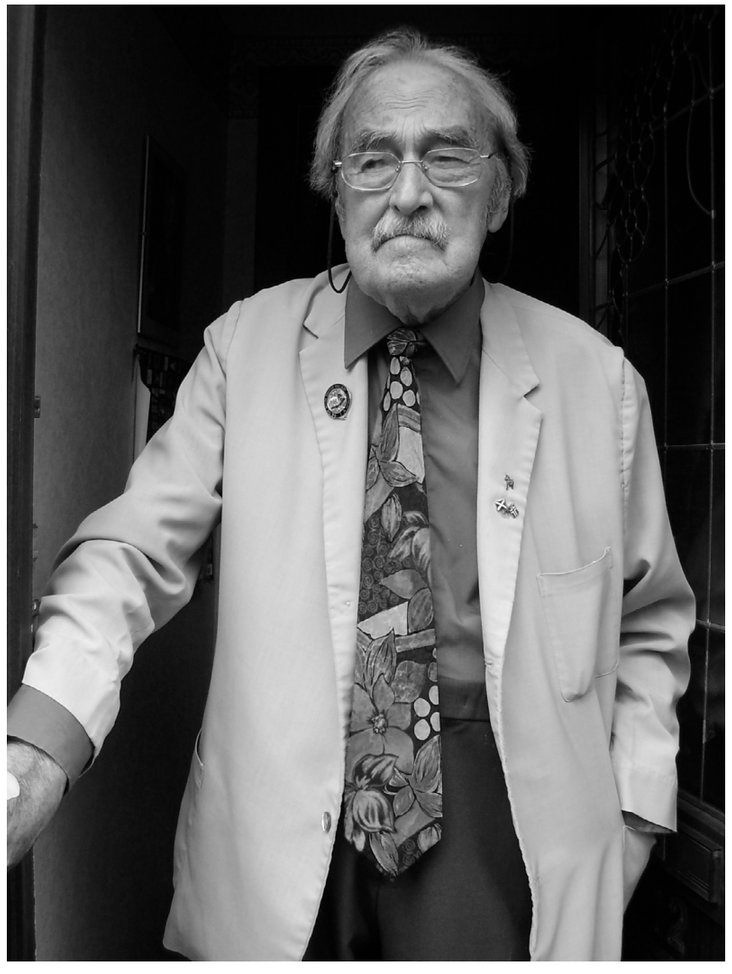
Scope and Narrative

In this diploma I consciously chose to work with machine learning through a narrow scope - by using a design experiment as a starting point. The initial idea for this project was to do a series of smaller experiments - exploring different machine learning models and different datasets. In stead, I decided to focus on only one particular machine learning model using one particular dataset. My hypothesis was that this would allow me to delve deeper into the material and to reflect upon larger, over-arching themes within machine learning, but to do so in a manageable way. Scoping down my focus was therefore a conscious choice, made quite early in the process.

After mapping and researching possible models and datasets, I chose to work with GPT-2 using an archive of letters written by my great-grandfather.

On the following pages I write a few words about the dataset that I work with, and the reason for choosing this scope.



My great grandfather, at 91 years old. Scotland, 2007.

The dataset that this experiment is based upon is an archive of personal letters written by my great grandfather David Fergus.

The letters are part of a letter correspondence between David and my grandfather Michael Fergus, spanning over a period of 40 years, from 1965 to 2007. David lived in Linlithgow, a small town in Scotland, and Michael lived in Oslo, Norway. Writing letters was their primary means of communication, their way of staying in touch. The two sent each other letters at regular intervals, about three times a week. In these letters they would write about their daily acitivities, their friends and family, politics, culture, and anything else that might interest them at the time.

The letter correspondence consists of 31 heavy ring-binders consisting of around 8,000 hand-written and typed letters, approximately 15,000 pages in total. Each letter is between 1-3 written pages in length.

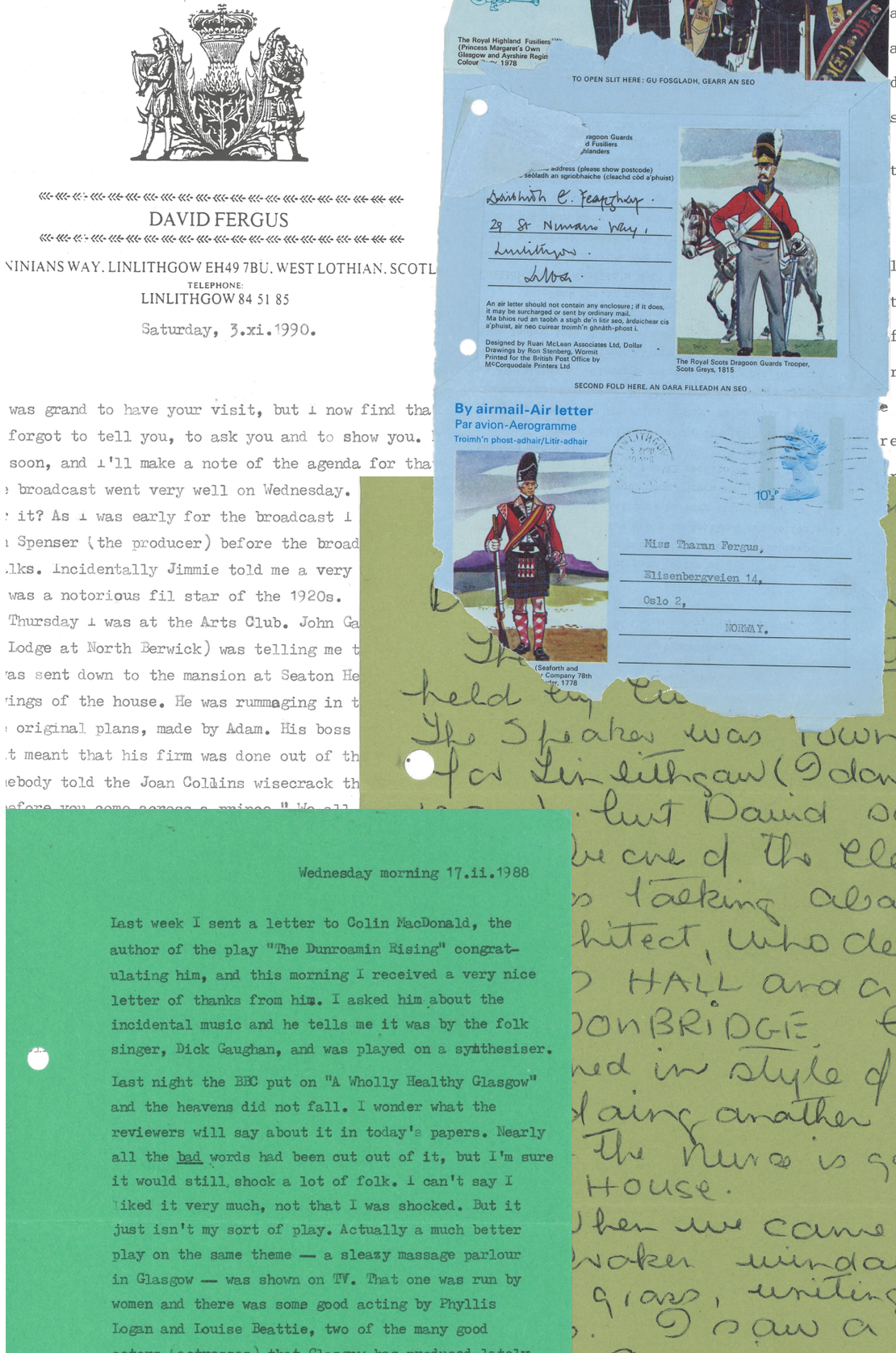
The material and visual qualities of the letters vary widely. It is a diverse collection of different paper qualities, formats, layouts, colors, typographic styles and printing techniques. The letters carry traces of the context they have been created in. Like most old letters, they are marked by small imperfections and flaws - water marks, scribblings, ink stains, errors in print, words that are crossed out, misspelled or underlined.

There are several reasons why I chose to work with this letter archive as a basis for the dataset.

First of all, I wanted to go through the process of collecting my own data from scratch. There are seveal datasets avaiable online that are already cleaned and formatted properly for machine learning training - collections of poems, Lord of the Rings, Shakespeare. I could, of course, train the model on one of these readily prepared datasets. However, I conciously chose to collect my own data from scratch as I was curious about what I could potentially learn from this process.

The letter archive contains a very personal material. These letters tell the life story of my great grandfather. But they also partly tell the story of my family - the pages are filled with different anecdotes and stories about family members (myself included). I was interested in the implications of training a machine learning model on such a personal material. Is it really possible for a machine to recreate the language of my great-grandfather? Could a machine possibly replicate his sense of humor or unique style of writing? What stories might the machine generate?

As a designer I was naturally drawn towards the visual qualities of the letters; the typography, materials, colors and printing techniques. I enjoy working across both analogue and digital formats, and was curious about how I could work with these analogue letters as a digital material. What does it mean to translate this messy, analogue archive of letters into data? What does this process look like and what could it possibly tell me about machine learning?


DAVID FERGUS

NINIANS WAY. LINLITHGOW EH49 7BU. WEST LOTHIAN. SCOTL

TELEPHONE:
LINLITHGOW 84 51 85

Saturday, 3.xi.1990.

was grand to have your visit, but I now find tha
forgot to tell you, to ask you and to show you.
soon, and I'll make a note of the agenda for tha
broadcast went very well on Wednesday.
it? As I was early for the broadcast I
Spenser (the producer) before the broad
lks. Incidentally Jimmie told me a very
was a notorious fil star of the 1920s.
Thursday I was at the Arts Club. John Ga
Lodge at North Berwick) was telling me t
as sent down to the mansion at Seaton He
ings of the house. He was rummaging in t
original plans, made by Adam. His boss
t meant that his firm was done out of th
ebody told the Joan Collins wisecrack th

The Royal Highland Fusiliers (Princess Margaret's Own Glasgow and Ayrshire Regin
Colour ... 1978

TO OPEN SLIT HERE: GU FOSGLADH, GEARR AN SEO

ragoon Guards
d Fusiliers
hlanders

address (please show postcode)
seòladh an sgrìobhaiche (cleachd còd a'phuist)

Dairbhidh C. Feargheas.
29 St Ninians Way,
Linlithgow.
EH49 7BU.

An air letter should not contain any enclosure; if it does, it may be surcharged or sent by ordinary mail.
Ma bhios rud an taobh a stigh de'n litir seo, àrdaichear cis a'phuist, air neo cuirear troimh'n ghnàth-phost i.

Designed by Ruari McLean Associates Ltd, Dollar
Drawings by Ron Stenberg, Wormit
Printed for the British Post Office by McCorquodale Printers Ltd

The Royal Scots Dragoon Guards Trooper, Scots Greys, 1815

SECOND FOLD HERE. AN DARA FILLEADH AN SEO

By airmail-Air letter
Par avion-Aerogramme
Troimh'n phost-adhair/Litir-adhair

10½p

Miss Tharan Fergus,
Elisenbergveien 14,
Oslo 2,
NORWAY.

(Seaforth and ... Company 78th ... 1778

held ... Ca
The Speaker was Town Plann
of Linlithgow (I don't know
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DONBRIDGE. Lyawa
ned in style of Lyond
laing another lectur
The Nurse is going To
HOUSE.
When we came here
broken windows, fra
glass, writing a
I saw a Hogan

Wednesday morning 17.ii.1988

Last week I sent a letter to Colin MacDonald, the author of the play "The Dunroamin Rising" congratulating him, and this morning I received a very nice letter of thanks from him. I asked him about the incidental music and he tells me it was by the folk singer, Dick Gaughan, and was played on a synthesiser.

Last night the BBC put on "A Wholly Healthy Glasgow" and the heavens did not fall. I wonder what the reviewers will say about it in today's papers. Nearly all the bad words had been cut out of it, but I'm sure it would still shock a lot of folk. I can't say I liked it very much, not that I was shocked. But it just isn't my sort of play. Actually a much better play on the same theme — a sleazy massage parlour in Glasgow — was shown on TV. That one was run by women and there was some good acting by Phyllis Logan and Louise Beattie, two of the many good

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I saw a Hogan

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water from Jordan and brought into

Cz

mmobile whici is vey hard goimg.

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here and once I getball my books im

pay you and Ninian who has beeb a

Likewise foot.

nd Carolyn anf Fergie

y Norsk progeny.

that evening is very vague

Jim had a vast painting by Philipson hanging on the wall of his stairway and somebody who called on him (a future thief?) remarked, "That s konnie xphotie).bonnie photie).

I used to be rather bemused by the fact that when Jim was in his late eighties he ordered a new suit. Why, I was wondered, when he will soon be dead. It is only now, when I am in my nineties that i understand.We all know we are going to die, bu t we refuse to believe it.

I have all Jim's autobigraphical writins, and his Mother's too. I think his niece* is trying to get them published in England. He was a good poet but a rott en dramatist. But a very good and kno wledgeable friend. I remember when I couldn't identify some lines of poetry thatkept running in my head. I phoned Jim weho immediately recognised them as Major Fantock by Edith Sitwell.

Poor Jim was often in hospital with arthritis. Latter left Clermiston and lived wih his niece,the potter, at Ros was there that he died, very peacefully, in his ninetieth He was mt best friend. He did not watch television.

* Margaret Longstaffe
His mothers autobiography is a masterpiece about Edinburgh in the late 19th century

down the Longmore Hospital (breast cancer), the Sick Children's Hospital, Woodlands Hospital Haddington, and God knows what others. God knows they'll have to SAVE ahell of a lot as they are losing millions in this ridiculous poll-tax fiasco. In Edinburgh the poll tax people are going to have to rent offices at £ 2½ m a year to cope with the work. God knows how it is going to end.

This should be waiting for you when you get home. So, all the best and love to all the family and yourself,

Dad

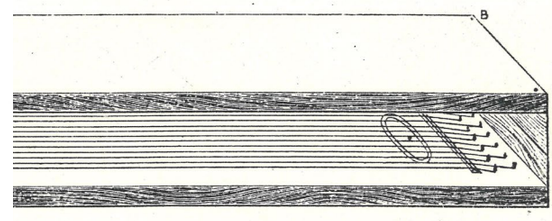
are stretched. Sound holes are cut as shown in

attaching the strings are the same as those used
gs at the opposite end are the ordinary wooden
y be of catgut, steel, or brass and can be of any

101

to allow air to blow over them when the harp is
he bottom sash being lowered on to this roof. We
sually all tuned to the orchestral 'A'.

ticated model of such a harp, called by the designer
p'. In effect, it is two harps placed top and bottom
diagram, the top harp, being under the lid, is not
is obtained by making each harp slope from the
ds the inside, so that when the box is placed under
into the room rather than flow smoothly over the
d be the exact length of the window into which it is
entering the room passes over the strings. This con-
economical with the materials for his pegs, for French
r the fixed end, while ordinary round-headed screws
t the other.



n harp

DARIUS MILHAUD (1892-1974)

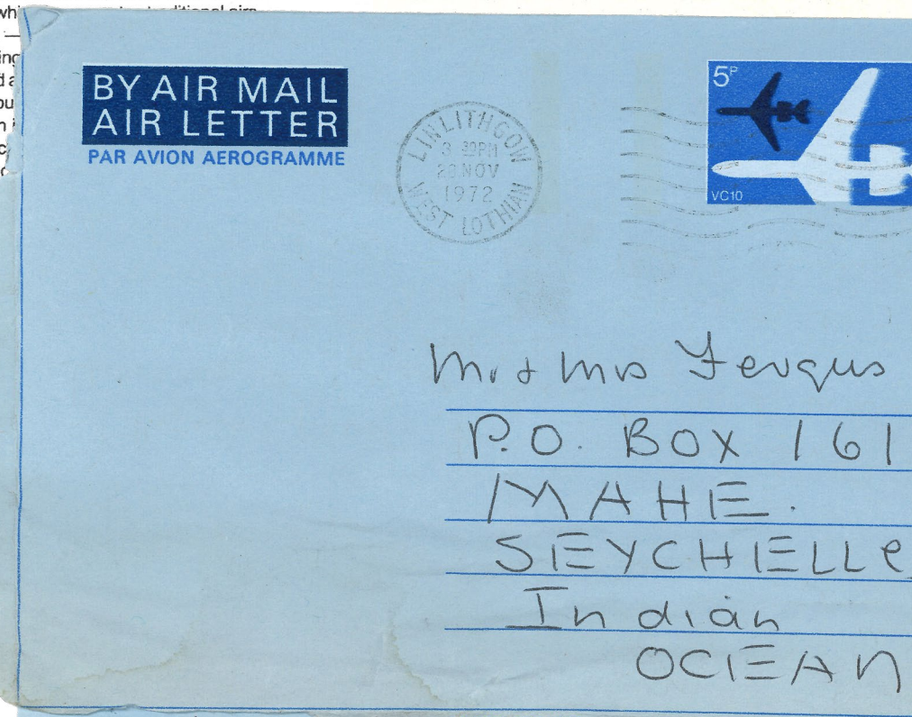
"Le Carnaval de Londres"

Various influences come to bear on Milhaud's compositional style, not least the extensive travelling he undertook during his lifetime, especially to America and Latin-America. While a Harlem night club was the source of inspiration for the jazz element in *La Creation du Monde*, a trip to Rio de Janeiro undoubtedly brought him close to the Latin-American dance forms which colour such works as *Le boeuf sur le toit.* Nevertheless it takes a certain flippancy of character to remain so easily receptive to such wide-ranging influences, and that Milhaud possessed such a nature is evident from his association in Paris with "Les Six" and its unconventional approach.

Yet despite this near nomadic existence, he felt forever drawn to his native Aix-en-Provence, and it was at nearby Marsailles that Milhaud first saw a performance of *The Beggar's Opera*: an 18th century English ballad opera wh... arranged by Pepusch. Milhaud was so enchanted by it — ... utilised both ends of the Salon Pins, the audience being ... around from one scene to the next — that he harmonised a ... the opera for the producer, Louis Ducreux. In 1937 he pu... title *Le Carnaval de Londres*, from which this selection ... match the chronology of the opera, but is rather a set of c... freely from either the characters themselves, or from danc... Many of the tunes are instantly recognisable, though ... every page, his particularly idiosyncratic scoring (strin... — in which the saxophone replaces the horn — with ... harmonies with an added piquancy. Then there ... opening *Bal — Ouverture*, a rumba setting of ... perhaps that "Le Carnaval de Londres" even ...

Each movement is based on one of the tra...

Bal-Ouverture:	"Over the h...
Polly:	"Thomas, I...
Filch:	"the bonny ...
Danse de Filch I:	"Pray fair o...
II:	"O, Londor...
Mazurka:	"Grim King ...
Lucy:	"Come, sw...
Masques:	"Irish Howl...
Gigue:	"One even ...
Romance:	"New pond...
Danse des Gueux:	"Cotillon"
Arrêt du Cortège	"Packingto...
Petit March:	"March fron...
La tour de Londres:	"Bonny Dunde...
Final:	"Fill every glass ...



ttled and thereafter to
'ness Cemetery
iving at 1.15pm.

AULD
January 10, 2006,
ugie.
ife's a long song,
ou may be gone, but
ot forgotten.
Colin, Elspeth and
ily.
rom Druids Heath
id The Sounds of
sterday,
ou kept the beat
ong the way.
ays friends - John
ling.

BELL
denly, but peace-
y, on January 12,
2006, at Stirling Royal Infirmary, Martha, aged 69 years, beloved wife of Alex, much loved mum of George, devoted granny of Alexander, Louise, George, Martin, William and Faye and a dear sister of John.

BRYCE
Peacefully at Stirling Royal Infirmary, Jenny Martin dear sister of Lizzie and aunt of the family.

CONNOR
Peacefully, at the Heatherfield Nursing

Acknowledgements

LEA
The family of the late Anne would like to thank relatives, friends and neighbours for the support they have shown throughout these sad times; also a special mention to Alexander & Easton, Funeral Directors, Rev. Gordon Reid, also a special mention to Sharon for her tremendous help in getting us through it.

SMITH
Aitken and family thank everyone most warmly for the many expressions of sympathy and the sharing of happy memories of Betty, they also thank staff at Stirling Royal Infirmary for their care, Ross Fraser of Thomas Cuthell and Sons for efficient and courteous funeral arrangements; the Rev. R. Gordon Reid for comforting services; Jessie and Kevin of the Riverview for catering and all who paid respects at the Church and Crematorium.

Birthday Memories

you sung,
They bring a sm...
more often a tea...
But always a wi...
you were here.
- Loving hu...
Andrew and famil...

SCOBIE
Precious memor...
my dear son G...
died January 19, 1...
Life is very empt...
without you, nev...
be the same aga...
Truly missed eve...
single day.
Love always - Mu...
nephew Michael. ...

WILKINSO...
With love we rem...
Ronnie, a dear da...
partner, who ...
tragically Januar...
1997.
A starman waitin...
the sky.
- Joyce. x
There is a place ...
away only you c...
find,
This place I see i...
always there, but...
you can find,
I close my eyes a...
drift away, to the...
of hope and drea...
'Cause one day c...
I'll find that place...
only you can find...
- Stephanie. x
To know him was ...
greatest gift of al...
Simply the Best I...

Michael, Ninian and Everyone!

Christopher, only son of Helen, Bo'ness. With love and best wishes from both families.

HUNTER
Happy 21st birthday Fiona
on January 25
'Oor wee Fiona is
twenty one,

Marriages

WILSON - ADAMS
At St. Andrew's

The machine learning model that I work with is called GPT-2. GPT-2 (short for Generative Pre-trained Transformer 2) is an open-source artificial intelligence created by OpenAI in February 2019.[13] It is a natural language processing algorithm trained with a simple objective: to predict the next word, given all the previous words within a given text. One of its most popular characteristics is its ability to generate coherent passages of text that feel close to human quality. Train the model on the entire corpus of the Harry Potter books, and the machine will in turn generate new chapters in the exact same style of writing as J.K.Rowling.

> “Give it a fake headline, and it’ll write the rest of the article, complete with fake quotations and statistics. Feed it the first line of a short story, and it’ll tell you what happens to your character next. It can even write fan fiction, given the right prompt.”[14]

Even though it is uncertain exactly what GPT-2 will be used for in the future, the release of the model has caused a lot of discussions. What does it mean that machines can generate human-like text?

There are several reasons why I chose to work with GPT-2. I have always been interested in the relationship between design, language and writing. As an interaction designer I am interested in how new emerging technologies shape written communication and language. In previous projects I have explored language algorithms that are similar to GPT-2. My practice as a visual designer largely revolves around giving shape to written language.

I find GPT-2 interesting because it roughly works in the same way as other generative models - such as machine learning models that can generate fake images, video or audio. My hypothesis was therefore that using GPT-2 as a starting point could allow me to also comment upon other, similar machine learning models.

There are language models similar to GPT-2 that are significantly more powerful (for example GPT-3, the later and more sophisticated successor of GPT-2). I chose to work specifically with GPT-2 because it is available through RunwayML.* Using Runway has allowed me to easily work with the model without spending too much time on coding.

13 OpenAI. «Better Language Models and Their Implications»

14 Vincent, James. «OpenAI’s new multitalented AI writes, translates, and slanders»

* RunwayML is a platform for creatives to use machine learning tools in intuitive ways without too extensive prior coding experience

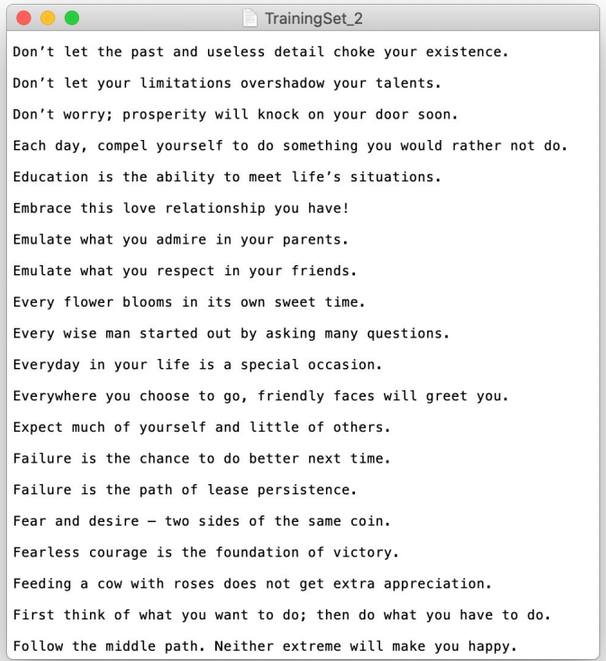
Prelude

(A MINI EXPERIMENT)

In order to get to know GPT-2 a little bit better, I did a small experiment. Inspired by a Chinese fortune cookie I got from a friend, I wanted to see if I could train the GPT2 model to tell fortunes. What would it feel like to have your fortune told by a neural network? Could the algorithm possibly tell fortunes that made sense?

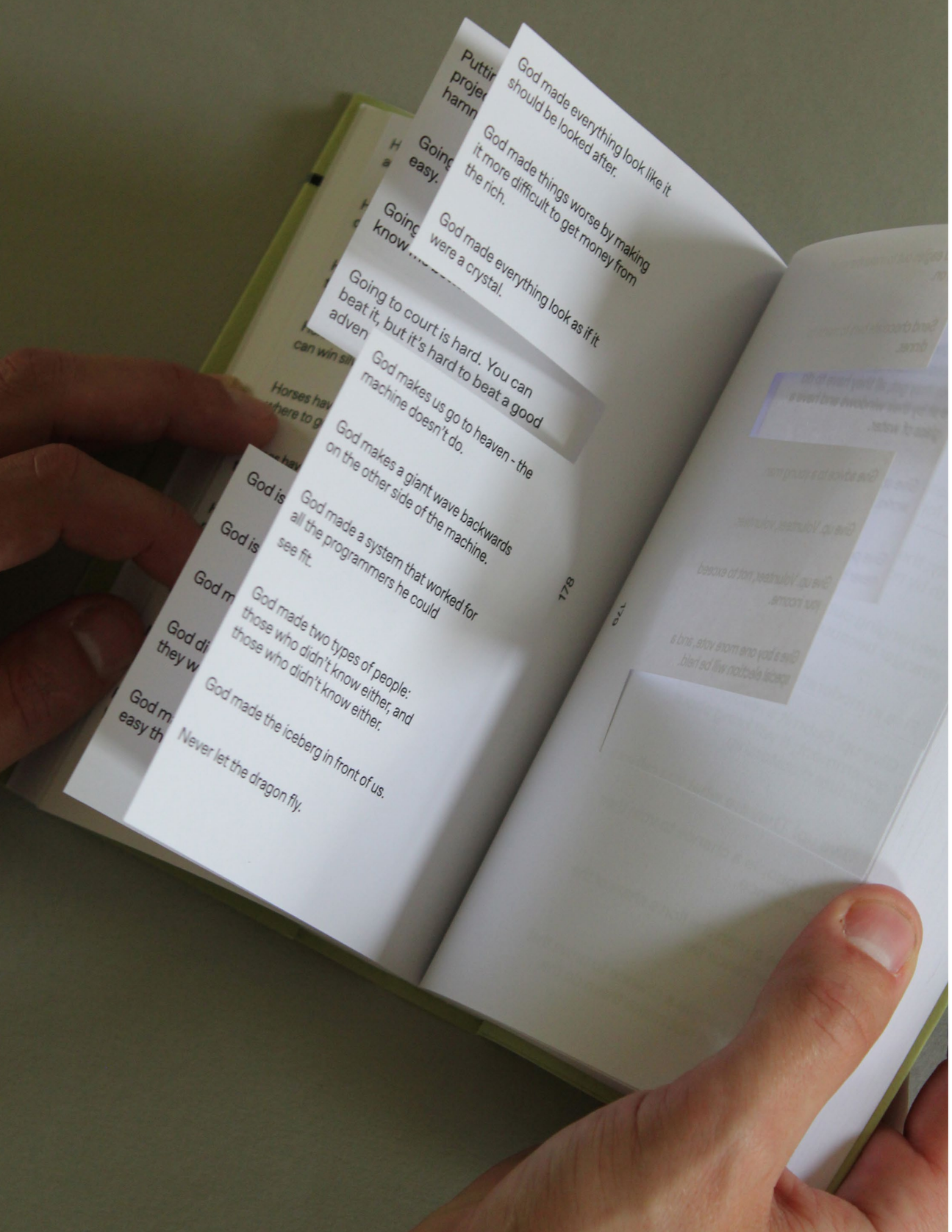
I collected a dataset of fortunes that I found on the internet, fortunes that are all written by humans, and trained the GPT2 model on this dataset.

The outcome of this small experiment is this small book called Fortune Cookie, which compiles 2127 fortunes that are written by GPT-2. This was a quick experiment that allowed me to get to know the GPT-2 model a little bit better. It also resulted in a physical object that was useful to discuss and communicate my project with others.



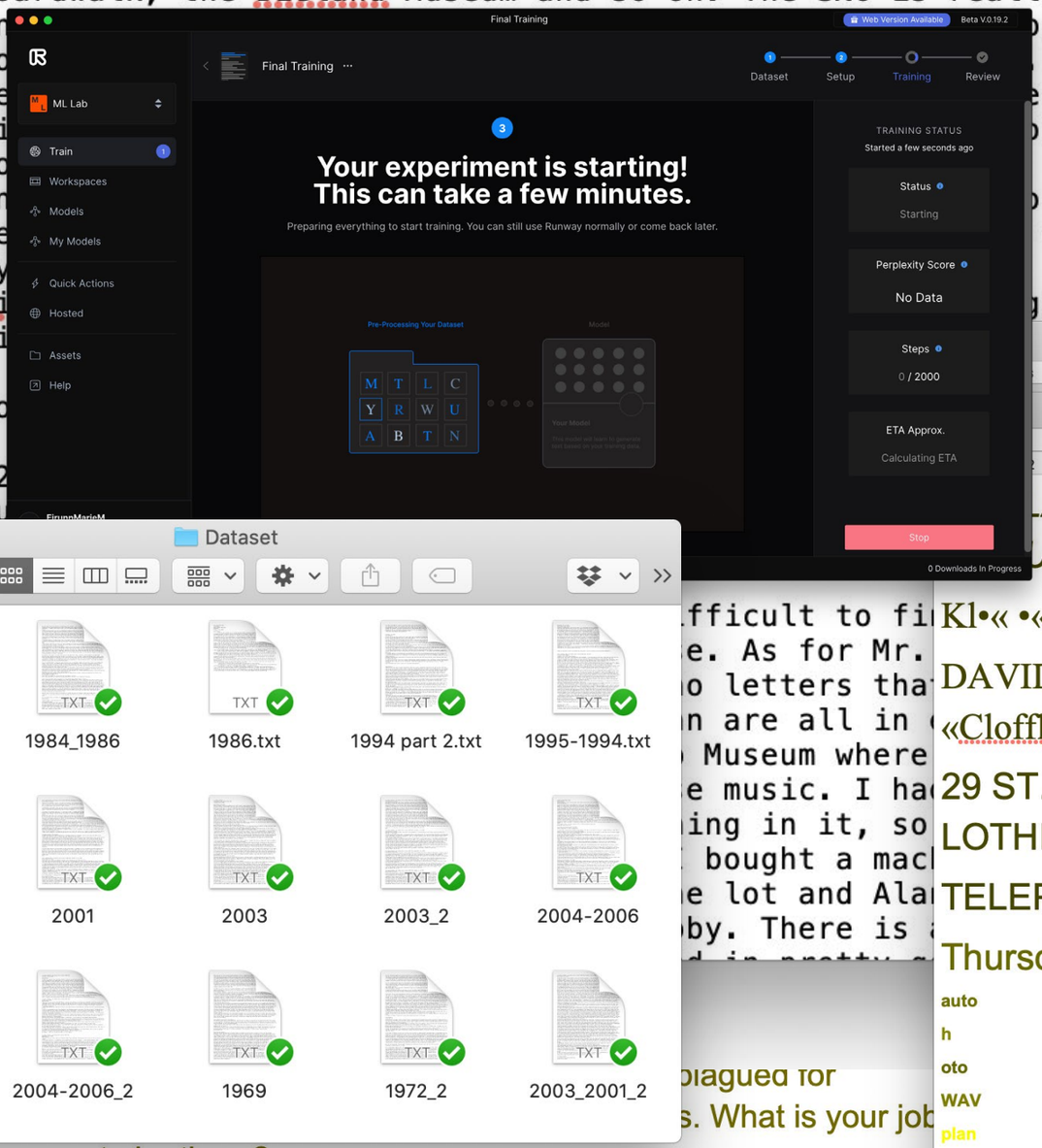

FORTUNE
COOKIE


FORTUNE COOKIE



The book is designed so that the fortunes can be cut out.

Experiment



to be there?

I think that's my lot for tonight. Do you notice how many mistakes there are in the typing? I need a typewriter that will automatically correct the errors.

Love to all the family and yourself,

Dad

Normal

DAVID FERGUS KI

«Clofflo file «t fit Kf

29 ST.VINIANS WA

LOTHI..V. SCOTLA

TELEPHONE: LINI

Thursday night: 1.x

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Hezne de

Dear Michael:

Your fine long

as I was prepa

The design experiment itself spanned over around eight weeks. Most of the time was spent collecting and preparing data.

There are three main stages when working with an experiment like this. Firstly, data collection and preparation. Secondly, training the model on the data. Thirdly, observing the output that the model produces based on the data. As I wanted to prioritize experimentation and research, I moved back and forth in between these three steps. I tested the model on several different amounts of data. Through small iterations and tests I tried to answer different questions I had regarding the model.

I continuously moved in between experimentation and reflection. I would for example test the model on a small part of the dataset, and write down my reflections and observations. I tried to document as much as possible, by writing, taking screen-shots and photos.

My reflections and insights from the experiment are articulated as six main observations. You can choose to continue reading here, or you can move to

→ www.writingwiththemachine.com

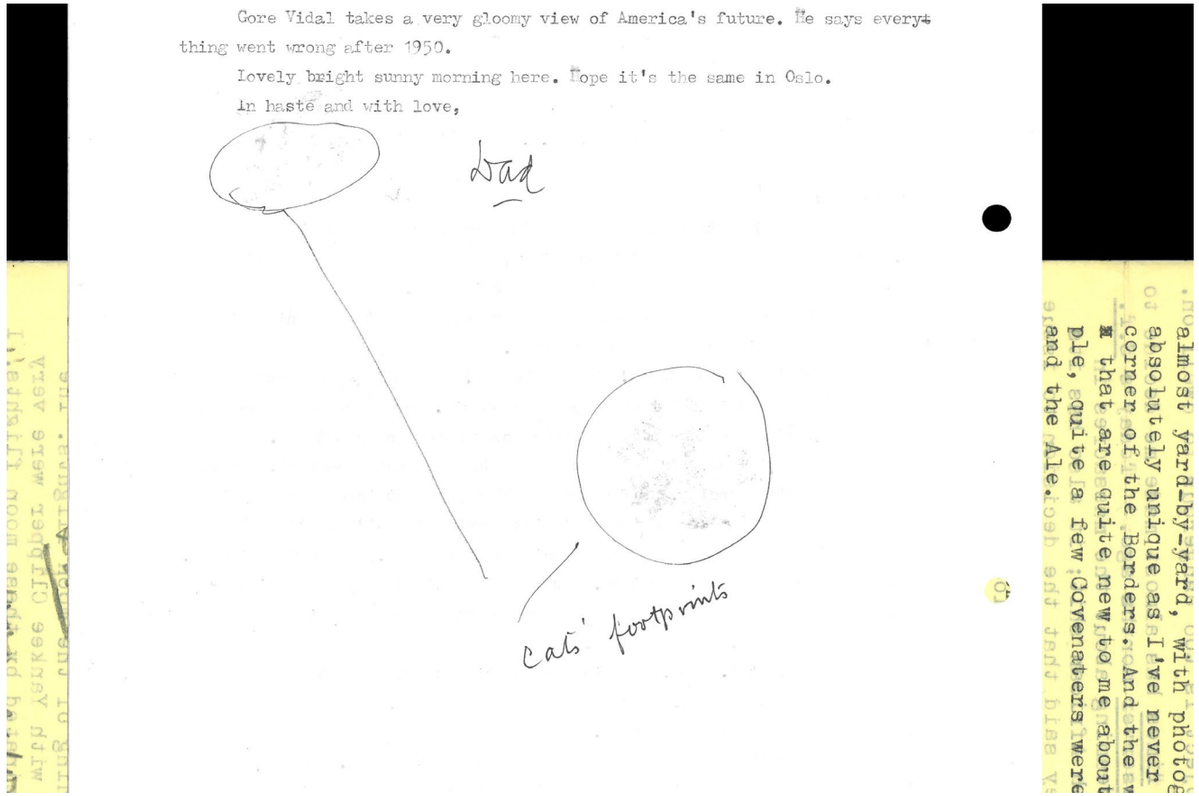
to read the observations here. The text on the website is also linked to the different works and texts that I have used in my research.

If you choose to visit the website, you can continue reading this report by moving to the next chapter on page 69.

01 DATASET

It is interesting to think about everything that gets lost in the translation, or transcription, of a set of data like these letters. There is so much more to these letters than the plain text that is left after it has been transcribed and cleaned. Scribblings that my great-grandfather would make, images or news clippings he would attach, water marks, coffee stains, small drawings.

Sometimes the print wheel of my great-grandfather's typewriter would refuse to print a particular letter, and he would write about how he had to go into town to buy a new one. Over periods he would write on incredibly thin paper. One of the letters have a cat's footprints on it - presumably his cat walked across the desk and left her footprints on the paper. Another letter is marked by "traces of breakfast", as my great-grandfather probably spilled some of his food on the page.



Detail from the dataset. A letter marked by the cats footprints.

As a designer I find all of these material qualities visually interesting. But more importantly, these details can remind us that the raw material that training sets for machine learning draw from are always products of people. The imperfections give us small hints about the context in which these letters have been created.

It is sometimes easy to forget in this digital world, that what we see on our screens once started out in the real world. While machine learning systems might have different cultural or social contexts, the data that they are built upon is always human.

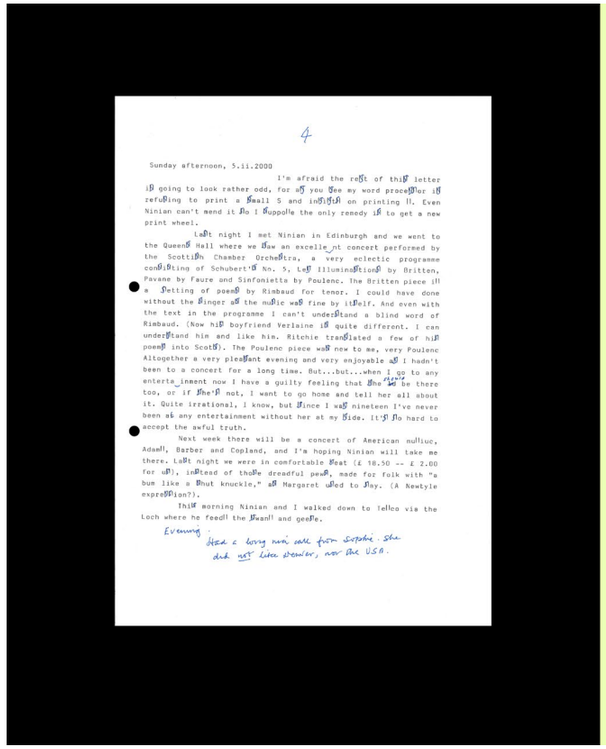
02 CREATING DATA

Before I could train GPT2 on the archive of letters, the letters had to be digitized and transcribed into a format that is legible to the model. More specifically, I had to transcribe all of the text in these letters into plain text, formatted as txt-files.

As I wanted to collect as much data as possible, I had to find a way to do so efficiently. By using Optical Character Recognition*, I could convert images and scans of the original letters into machine encoded text. After testing several different OCR converters online, I found that using the OCR function in Google Docs was the best option to work with, as it allowed me to easily edit, correct and collect the text as I converted each original letter.

As you can tell from the images on the right, the OCR converter returns a transcription of what it thinks it sees. However, smudges, errors in print, hand written scribbles or outdated typographic styles make it hard for the technology to sort out the words. Once the text becomes smudged or skewed, the machine no longs knows what it is looking at.

* Optical Character Recognition is the electronic conversion of images of typed, handwritten or printed text into machine-encoded text.



4

Sunday afternoon, 5.ii.2000

I'm afraid the relt of this letter in going to look rather odd, for all you see my word procelhor ill refulling to print a small 5 and initsi on printing 1. Even Ninian can't mend it no I bluppolle the only remedy is to get a new print wheel.

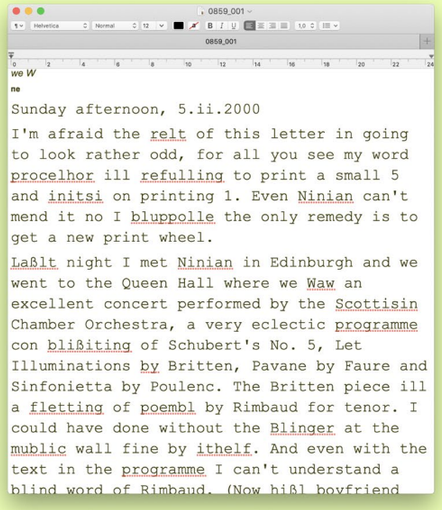
Laßlt night I met Ninian in Edinburgh and we went to the Queen Hall where we Waw an excellent concert performed by the Scottisin Chamber Orchestra, a very eclectic programme con blißiting of Schubert's No. 5, Let Illuminations by Britten, Pavane by Faure and Sinfonietta by Poulenc. The Britten piece ill a fletting of poembl by Rimbaud for tenor. I could have done without the Blinger at the mublic wall fine by ithelf. And even with the text in the programme I can't understand a blind word of Rimbaud. (Now hißl boyfriend Verlaine is quite different. I can understand him and like him. Ritchie translated a few of hil poems into Scotß). The Poulenc piece waß new to me, very Poulenc Altogether a very pleaßant evening and very enjoyable aß I hadn't been to a concert for a long time. But...but...when I go to any enterta_inment now I have a guilty feeling that Shee ßhe ßhould be there too, or if ßhe'ß not, I want to go hone and tell her all about it. Quite irrational, I know, but ßince I waß nineteen I've never been at any entertainment without her at my ßide. It'ß ßo hard to accept the awful truth.

Next week there will be a concert of American nußic, Adaell, Barber and Copland, and I'm hoping Ninian will take me there. Laßt night we were in comfortable ßeat (£ 18.50 -- £ 2.00 for uß), inßtead of thoße dreadful penß, made for folk with "a bum like a ßhut knuckle," aß Margaret ußed to ßay. (A Newtyle expreßßion?).

Thiß morning Ninian and I walked down to Ielloo via the Loch where he feedß the ßwanß and geeße.

Evening.

Had a long wail call from Sotheby. She did not like Sweden, nor the USA.



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Sunday afternoon, 5.ii.2000

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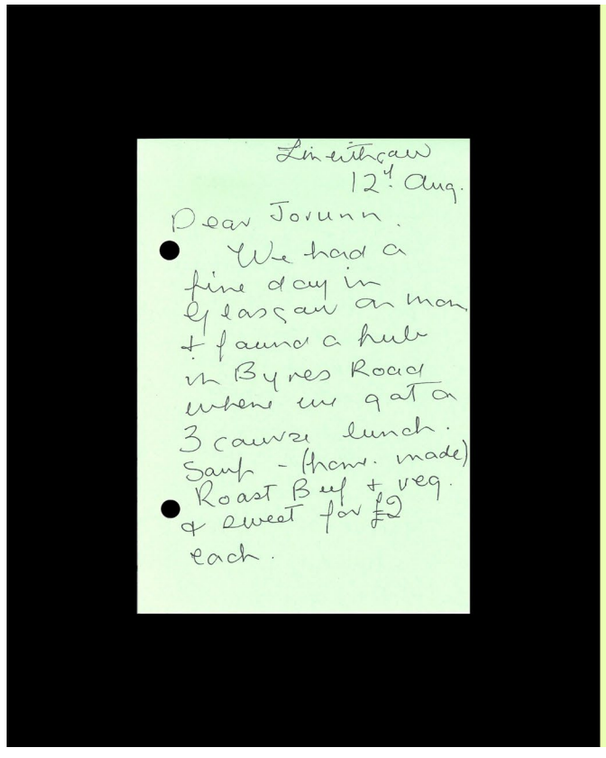
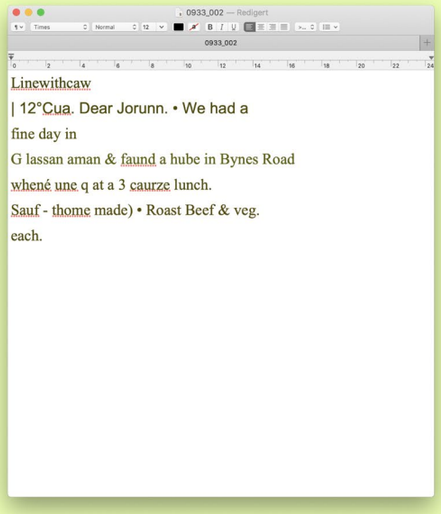


Linewithcaw
12th Aug.

Dear Jorunn.

We had a fine day in Glassan aman + faund a hube in Bynes Road whené une q at a 3 caurze lunch. Sauf - (thome. made) Roast Beef + veg. + sweet for £2 each.



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0933_002

Linewithcaw

| 12°Cua. Dear Jorunn. • We had a

fine day in

G lassan aman & faund a hube in Bynes Road

whené une q at a 3 caurze lunch.

Sauf - thome made) • Roast Beef & veg.

each.

The process of transcribing and cleaning a dataset from scratch was extremely time-consuming, repetitive, messy and mildly exhausting. This experience made it clear to me how data is never raw - it has to be created. In order for GPT2 to be able to make sense of this archive of old letters, I had to recreate them as txt-files - in short, I had to create data. As writer Adam Greenfield puts it

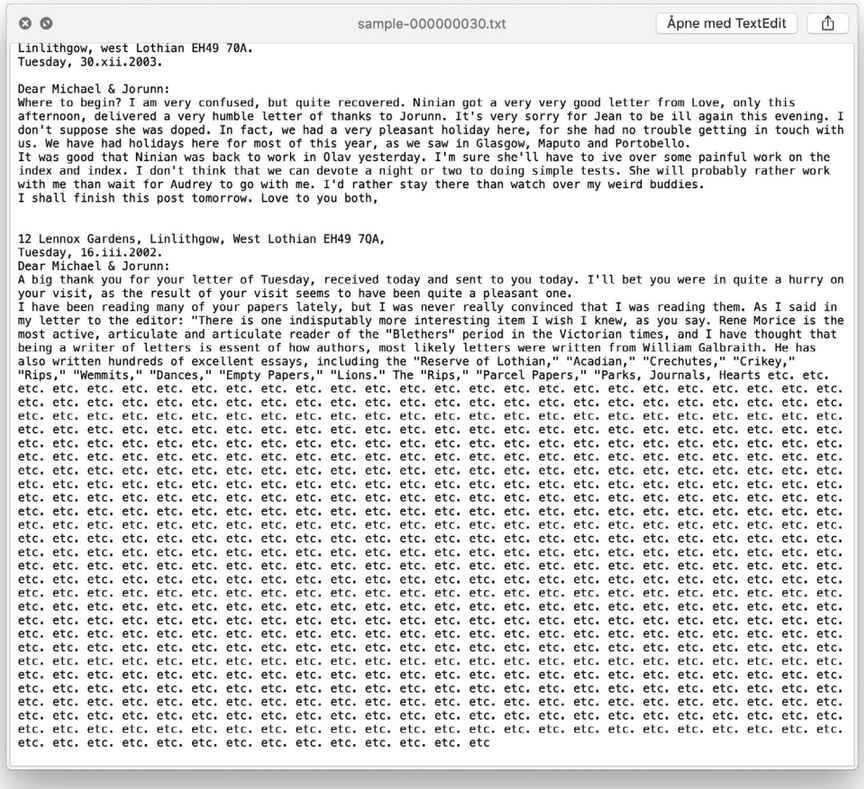
> “ (...) there is no such thing as «raw data». Whatever data we measure and retain with our sensors, as with our bodily senses, is invariably a selection from the far broader array available to us; perception itself is already a process of editing and curation.” [15]

Data does not simply exist, it has to be collected, cleaned and organized. And more importantly, doing so requires a lot of human effort. The machine could never have transcribed these letters all by itself - I manually had to edit and correct the text that the OCR-scanner transcribed.

15 Greenfield, Adam. *Radical Technologies: The Design of Everyday Life.* (London, Verso, 2017), 177.

03 GHOST LABOUR

When creating the dataset, I made a frustrating but crucial discovery: I would need a *lot* of data in order for the model to preform well. Simply training the model on a few letters from the archive did not work - the model would just repeat certain sentences or phrases and the text was unpredictable and inconsistent. As I gradually collected more data, I tested how the model preformed with different amounts of data. And as the dataset grew larger, the output that the model produced got better accordingly.


sample-000000030.txt
Åpne med TextEdit
Linlithgow, west Lothian EH49 70A.
Tuesday, 30.xii.2003.
Dear Michael & Jorunn:
Where to begin? I am very confused, but quite recovered. Ninian got a very very good letter from Love, only this afternoon, delivered a very humble letter of thanks to Jorunn. It's very sorry for Jean to be ill again this evening. I don't suppose she was doped. In fact, we had a very pleasant holiday here, for she had no trouble getting in touch with us. We have had holidays here for most of this year, as we saw in Glasgow, Maputo and Portobello.
It was good that Ninian was back to work in Olav yesterday. I'm sure she'll have to ive over some painful work on the index and index. I don't think that we can devote a night or two to doing simple tests. She will probably rather work with me than wait for Audrey to go with me. I'd rather stay there than watch over my weird buddies.
I shall finish this post tomorrow. Love to you both,
12 Lennox Gardens, Linlithgow, West Lothian EH49 7QA,
Tuesday, 16.iii.2002.
Dear Michael & Jorunn:
A big thank you for your letter of Tuesday, received today and sent to you today. I'll bet you were in quite a hurry on your visit, as the result of your visit seems to have been quite a pleasant one.
I have been reading many of your papers lately, but I was never really convinced that I was reading them. As I said in my letter to the editor: "There is one indisputably more interesting item I wish I knew, as you say. Rene Morice is the most active, articulate and articulate reader of the "Blethers" period in the Victorian times, and I have thought that being a writer of letters is essent of how authors, most likely letters were written from William Galbraith. He has also written hundreds of excellent essays, including the "Reserve of Lothian," "Acadian," "Crechutes," "Crikey," "Rips," "Wemmits," "Dances," "Empty Papers," "Lions." The "Rips," "Parcel Papers," "Parks, Journals, Hearts etc. etc.
etc etc etc

The process of putting together this data was time-consuming, repetitive and monotonous. By the end of four intense weeks, I had collected a dataset of 3.4 MB of plain text, neatly organized as txt-files within a folder on my computer.

Most machine learning models require excessive amounts of data. Machine learning datasets are usually enormous and consist of millions of images or pages of text. As I experienced in my own experiment, data quantity largely influences how well the model performs. Within the field of machine learning, it seems like the general view is that the more data, the better.

Because machine learning require extremely large datasets that also have to be properly formatted and cleaned for training, a lot of time and effort goes into data preparation. Today, up to 80% of the time spent on machine learning is allocated to data-related tasks.[16] This shows the importance of data preparation in machine learning. In the case of my own experiment, I spent most of my time preparing and formatting the data for training.

Preparing data

Training model

As the process of creating datasets is time-consuming and laborious, it is usually outsourced to human workers. Even though this labour is crucial in order to build and maintain machine learning systems, it is usually very poorly compensated. Anthropologist Mary Gray and computer scientist Sid Suri refer to such hidden labour as “ghost work”.[17]

Human workers at the headquarters of Ruijin Technology Company in Jiaxian. They identify objects in images to help artificial intelligence make sense of the world.

“One of the less recognized facts of artificial intelligence is how many underpaid workers are required to help build, maintain and test AI systems.” [18]

16 Heller, «Data Labelling: AI’s Human Bottleneck»

17 Gray, Suri, *Ghost Work* (Boston: Mariner Books, 2019)

18 Crawford, *Atlas of AI* (United States of America: Yale University Press, 2021), 63.

04 SUBJECTIVITY AND BIAS

By collecting, cleaning and preparing my own dataset from scratch, it became clear to me how many decisions that go into creating a dataset. There were a lot of decisions I had to make when putting everything together. Even though I tried to do be as «objective» as possible, I still had to make decisions about what text to remove or include, and how to put everything together, etc.

Data labelling is a similar example of how human decisions are a central part of building machine learning datasets. Data labelling is the process of identifying raw data and adding meaningful labels so that the machine learning model can learn from it. To build an image recognition system that can, for example, recognize the difference between a horse and a dog, a person has to collect, label and train a neural network on thousands of labelled images of cats and dogs. As images don't describe themselves, humans have to explain and label them so that the machine can make sense of them. When teaching machines how to make sense of the world, we also teach them our own way of making sense of the world - we teach them our values and norms. As Cassie Kozyrkov writes

> "When we create machine systems based on data, we teach them a sense of our values." [19]

We have a tendency to think about datasets as objective and neutral. There is a common myth that machine learning systems and the datasets they are built upon are objective and scientific descriptions of the world.[20] However, unpacking and studying the processes that go into building them, can show us that creating data for machine learning involves a lot of human subjectivity. Because machine learning datasets are built by people, they also quite naturally come to repeat and enshrine the outlook of those who have put them together.

> "(...) gathering and labelling data about the world is a social and political intervention, even as it masquerades as a purely technical one. The way data is understood, captured, classified, and named is fundamentally an act of world-making and containment." [21]

19 Kozyrkov, «What is "Ground Truth" in AI? (A warning.)».

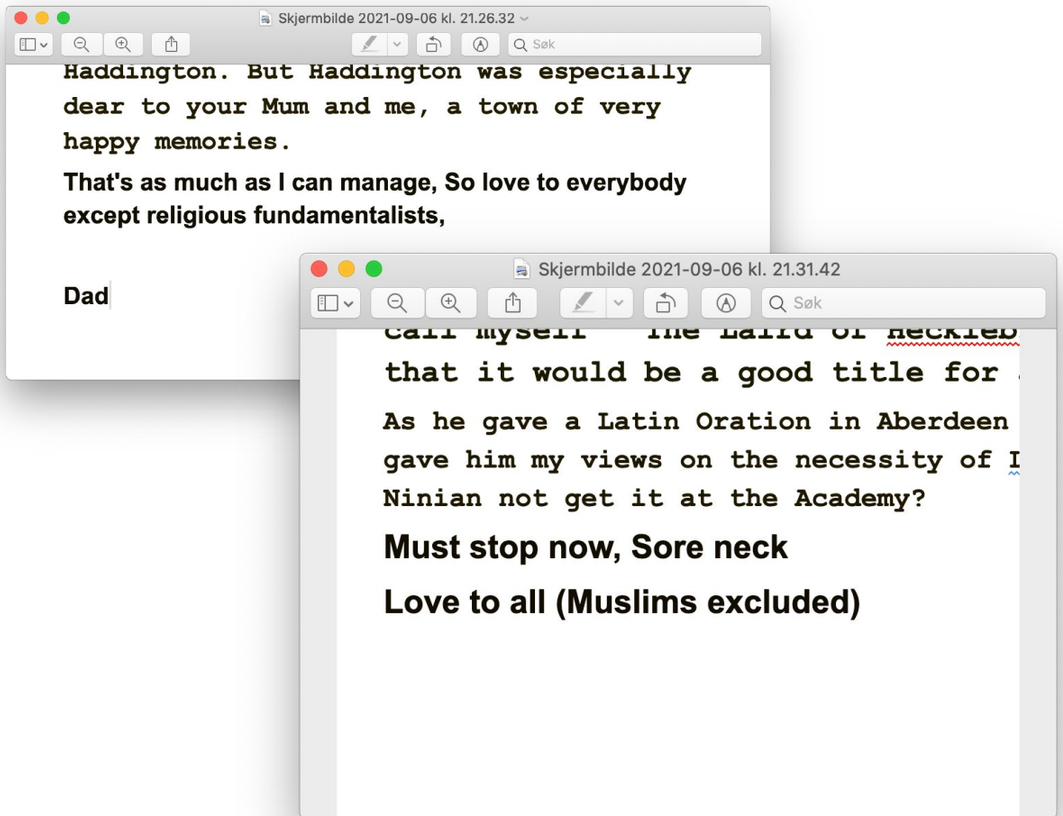
20 Crawford, Paglen, «Excavating AI: The Politics of Images in Machine Learning Training Sets».

21 Crawford, *Atlas of AI* (United States of America: Yale University Press, 2021), 121.

There are also other ways that machine learning systems can come to express human objectivity and bias. The original material that datasets are built upon might contain biases in itself, even before it is translated into data and used for machine learning.

When going through the letters written by my great-grandfather, it became clear to me how his writing clearly mirrored his way of viewing the world. The letters reveal how he was evidently a product of his time.

There are certain phrases (as the ones above) that are very outdated. I chose to include these in the dataset as I wanted to sensor the text as little as possible.



Language models are trained on enormous corpuses of text, usually millions of text documents that are gathered from the internet. GPT-3, for example, the successor of GPT-2, was trained with data from CommonCrawl, WebText, Wikipedia, and a corpus of books.[22] As Meghan O'Gieblyn writes, it is frightening to think about what is included in this corpus - «the holy books of every major religion, most of world philosophy, Naruto fanfic, cooking blogs, air mattress reviews, supreme court transcripts, breeding erotica, NoFap subreddits, the manifestos of mass murderers, newspaper archives, coding manuals, all of Wikipedia, Facebook, and Twitter.»[23] Naturally, the model will inherit the biases and values that are expressed in these texts.

There are several different ways that machine learning systems can come to mirror human subjectivity and bias. The model I have built naturally mirrors my great-grandfathers biases - it is trained on a material that expresses his values and beliefs. It is also shaped by my own subjective way of editing and putting it together. Because people are always involved in one way or the other, machine learning models naturally come to enshrine human attitudes.

Most machine learning systems are a lot larger and more complex than the one I have built. Because of the sheer complexity and size of machine learning datasets, it is hard to sort out where the biases originate from. Datasets are often owned by private companies and it is hard to track down the process of how they were built.

22 Romero, «A Complete Overview of GPT-3 — The Largest Neural Network Ever Created».

23 O'Gieblyn, "Babel - Could a machine have an unconscious?"

05 UNPACKING BLACK BOXES

After putting together my dataset, I could finally train the GPT-2 algorithm on it. I trained the model in RunwayML. Training the model on 3.5 MB of data took about 2 hours. Training the model was the part of the process where I had the least control over what was really happening. I uploaded the dataset, and received a notification when the training was over. What happened in between these two steps is difficult for me to understand and explain.

Machine learning is often referred to as a black box - data goes in and a result comes out, but the processes between input and output are often opaque and unclear. As writer James Bridle puts it :

> “Despite increasingly sophisticated systems of both computation and visualization, we are no closer today to truly understanding exactly how machine learning does what it does; we can only adjudicate the results.” [24]

We can explain the logic that these models are built upon, and to a certain extent understand how they operate. But it is impossible to have a perfectly clear understanding of the connections between input and output.

Certain aspects of machine learning might always be inexplicable to us. My experience from experimenting with GPT-2 is that there is a lot we can learn from simply observing the dataset that these systems are built upon, the process that goes into creating them and the outputs they produce.

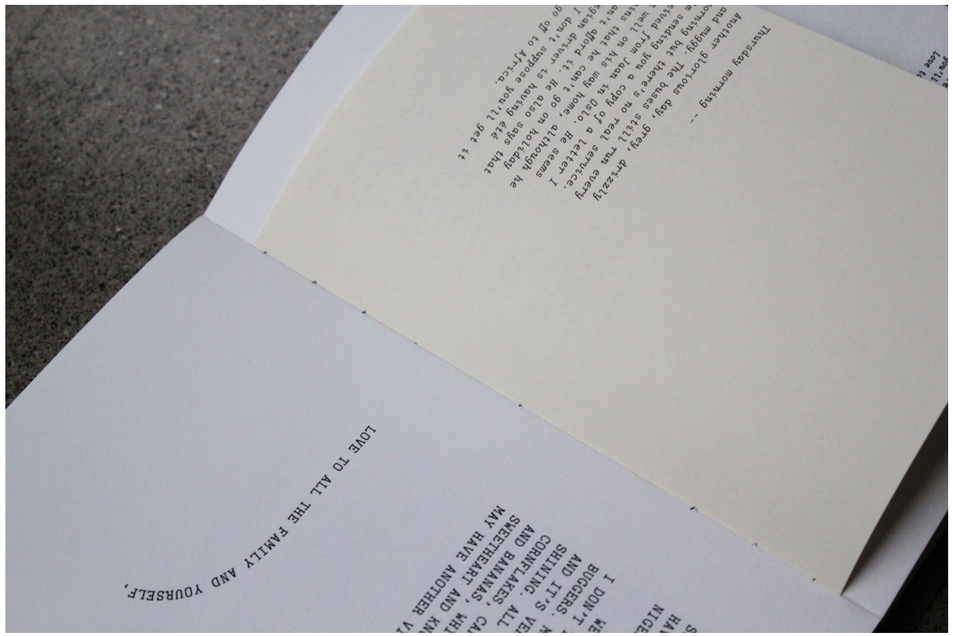
In a paper called “Datasheets for Datasets” a group of scientists proposes that all datasets should “be accompanied with a datasheet that documents its motivation, composition, collection process, recommended uses, and so on.”[25] Being more open about what material datasets are built upon and how they are created, might increase transparency and accountability. It might allow for more openness around biases, subjectivity and the labour that goes into creating these systems. This might be a good way of starting to unpacking the black box.

24 Bridle, *New Dark Age: Technology and the End of the Future* (Croydon, Verso Books, 2018) 119.

25 Gebru, Morgenstern, Vecchione, Vaughan, Wallach, Daumé III, Crawford, «Datasheets for Datasets»

06 DREAM-LIKE IMPERFECTIONS

Although coherent, based on the input, the synthetic letters that the GPT2 model produces are somehow warped and imperfect reflections of the original letters, generating uncanny and curious moments. At first glance, skimming quickly through them, they might come across as letters written by my great-grandfather. But as you start reading them more thoroughly, you quite quickly start to notice small glitches and imperfections in the text. While the vocabulary and style of writing in the synthetic letters is very similar to the original dataset, there are certain sentences that the model generates that are completely non-sensical.



26 Ridler, Ward Dyer. «Fairy Tales and Machine Learning: Retelling, Reflecting, Repeating, Recreating»

Georgia Ward Dyer and Anna Ridler writes about this dream-like quality of generative machine learning

> “Our waking life experience equates to the machine learning program’s ‘training set’. When we dream, our brain uses this sensory data as the raw material from which to recreate a detailed and internally coherent world, just as the program takes from its training set to build up its own picture of the world and what it means.”[26]

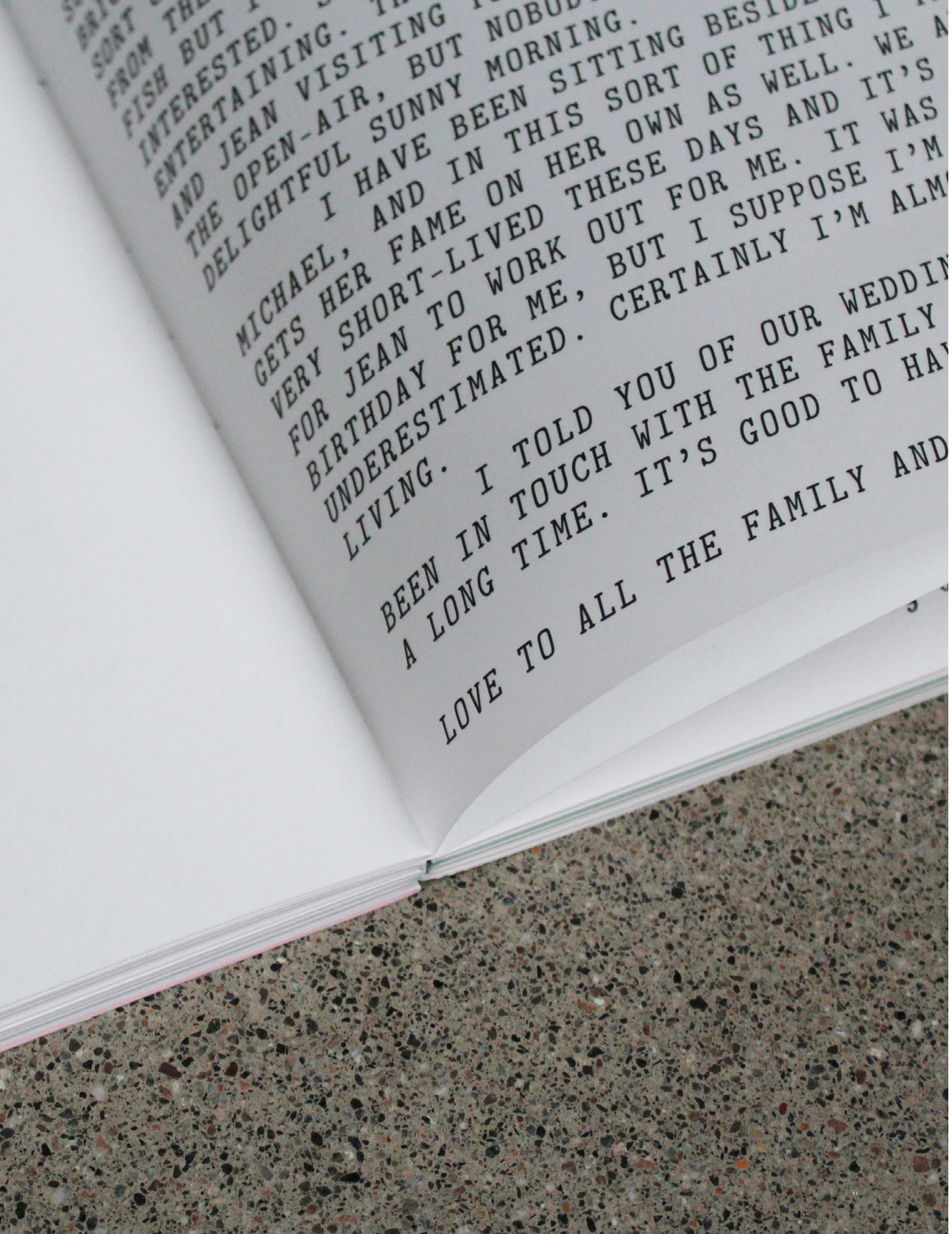
Even though machine learning systems can produce content that is very close to human quality, it is inaccurate to think that they understand the world in the same way that we do. When shown a picture of an elephant, the model does not see an elephant, but rather patterns, pixels and data. GPT-2 does not understand the meaning of the sentences it generates, nor the meaning of the text it is trained on.

The model generates seemingly realistic stories about the same topics, people and places that my great-grandfather wrote about. However, small glitches in the text reveal how the machine has no real understanding or knowledge about the things it is writing about. Because GPT-2 has no sensory access to the world and no programmed understanding of spatial relationships, it often does mistakes that no human ever would.

The dream-like and imperfect qualities of the material that these models produces are captivating - as they often reveal the machine's flawed understanding of the world. They often spark curiosity. These imperfections have some of the same qualities of other ML generated content, like for example generated images or video.

Images of dogs, dreamt up by BigGAN. These images have the same dream-like quality as the letters generated by GPT-2.

Machine learning systems will most likely improve their performance over time. As these systems gradually get more powerful, they also get better at deceiving us. Once the imperfections and glitches disappear, it will be even harder for us to sort out the difference between material written by a human and material written by the machine.



Communication

The design experiment resulted in a lot of new materials, observations, reflections and knowledge. My computer was filled with scans, screen-shots and images, and my notebooks were filled with scribbles and observations from the process. I now had to find a way to communicate this body of work. After sketching briefly on different possible formats, I decided to create three different books, alongside a website.

The main purpose of the three books is to showcase materials from the experiment. Each book shows material from separate stages of the experiment. By creating three separate books I wanted to highlight how the text changes throughout the experiment - the original archive of letters, the digitized letters, and the new, machine generated letters. The books allow for the reader to browse, compare and explore materials from the different stages. Each book is bound and printed slightly different. I chose to create books because I wanted to showcase materials from the experiment through a printed, physical format.

The website highlights observations and reflections from the project. I chose to create a website as it is easy to distribute and share. I also wanted the website to function as a resource with links to the research that the project is built upon.

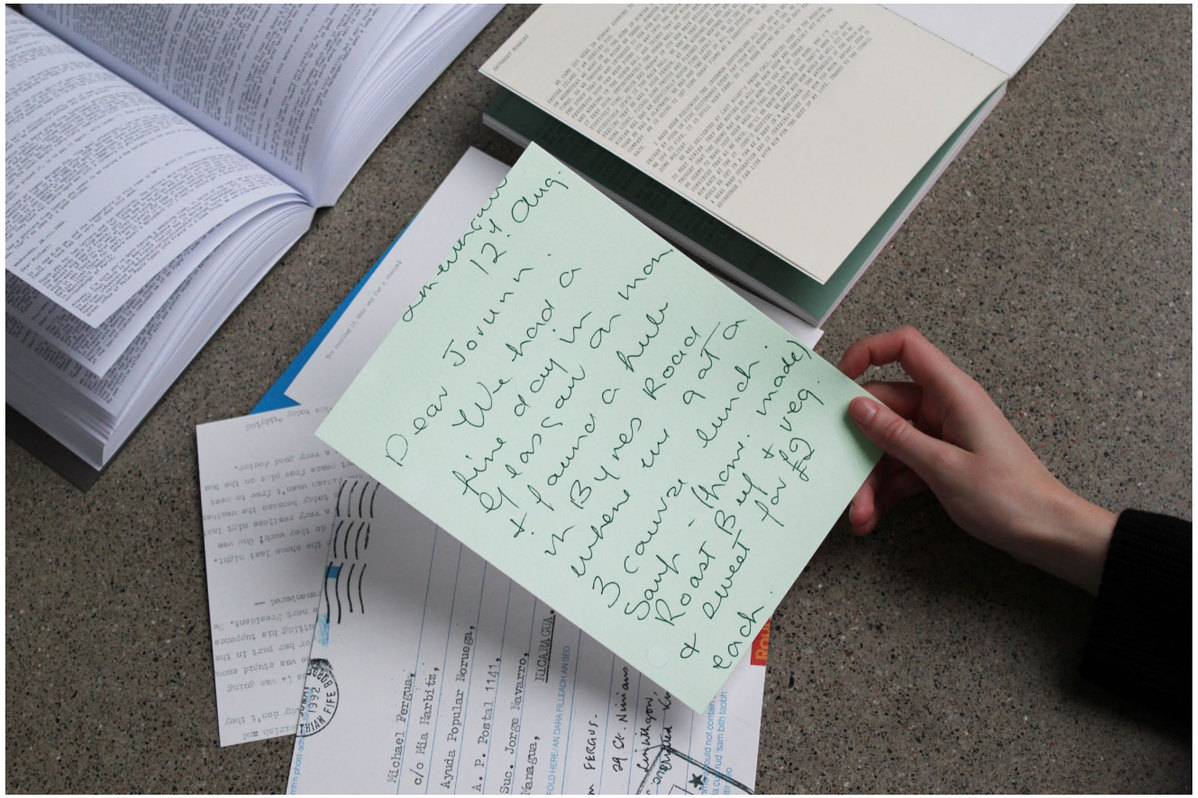

29 ST. NINIANS WAY, LINLITHGOW, WEST LOT, EH49 7BU,
SCOTLAND, TUESDAY, 5.VII.2001.
DEAR MICHAEL & JORUNN:
THANK YOU FOR THE LETTER FROM LINLITHGOW AND FOR THE
POSTCARD FROM MACEDONIA AND KAZAKHSTAN. THE POSTCARDS ARE
COMING FROM KAZAKHSTAN, THE POSTCARDS FROM NORWAY AND
SOFIA, BUT THEY'LL BE SENT FROM VIETNAM, ETC. I THINK YOU
HAVE HAD A LOT OF FUN LOOKING FORWARD TO YOUR VISIT FROM
NIGERIA, TANZANIA, AND GREAT BRITAIN.
WE'LL HAVE A LOOK AT THE TELEGRAPH ON TUESDAY EVENING.
I DON'T THINK I'LL BE COMING OUT HERE MUCH UNTIL MONDAY,
BUGGERS. MOST OF THE COUNTRY HAS A BLOODY PURPLE CLOUD,
AND IT'S VERY DEPRESSING TO SEE THAT THE SUN IS STILL
SHINING. ALL THE FOOD IN THE STORE IS BUGGERED, WITH
CORNFLAKES, CARROTS, GREEN PEAS, FRITTERS, FRAGRANT BANANAS
AND BANANAS, WHICH I THINK ARE GOOD. ANYWAY, NINIAN IS A
SWEETHEART AND KNOWS IT'S GOING TO BE A GOOD WEEK. AND WE
MAY HAVE ANOTHER VISIT ON THURSDAY.
LOVE TO ALL THE FAMILY AND YOURSELF,
Thursday morning --
Another glorious day, grey, drizzly
and muggy. The buses still run every
morning but there's no real service.
I'm sending you a copy of a letter I
received from Jaan in Oslo. He seems
to be well on his way home, although he
complains that he can't go on holiday
as he can't afford it. He also says that
his Norwegian driver is having été
troubles. I don't suppose you'll get it
before you go off to Africa.
Love to all,
Yours faithfully,
Book 01
Arhive

BOOK 1

ARCHIVE

The first book compiles a selection of scans from the original archive of letters. With this book I wanted to highlight the material qualities of the original dataset. By cropping and enlarging the scans, I bring the readers attention to particular details of the letters - outlined words, coffee stains, hand-written scribblings. The book includes my own notes and remarks about the letters, keywords that I noted down as I was working with the letters.

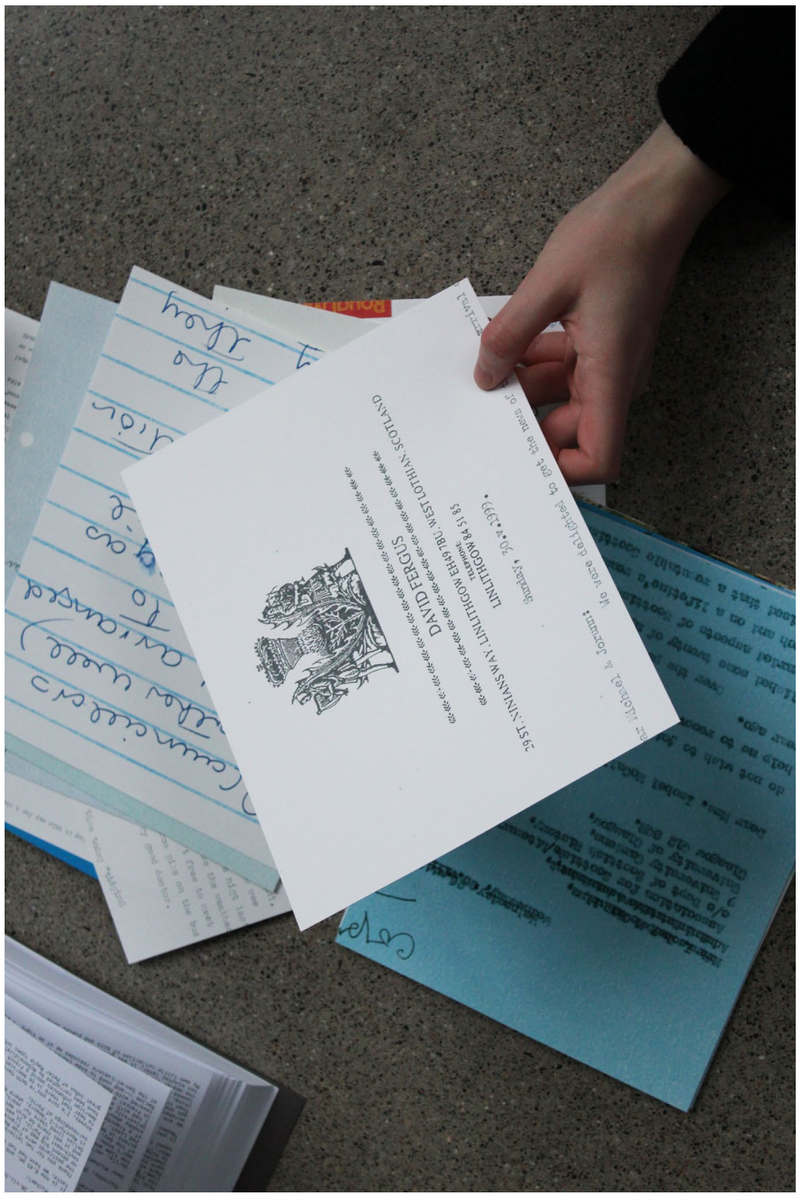
The pages in the book are organized as unbound, loose sheets. I wanted the interaction to resemble the feeling of browsing through the original letter archive - as the original letters were organized as piles of loose pages, so are the pages in this book. The reader can easily take out the pages and explore, pass them around, compare them to the other books etc.



12th Aug

Dear Jorunn.

We had a
fine day in
Edinburgh
+ found a hub
in Byres Road
where we got a
3 course lunch.
Soup - (hom. made)
Roast Beef + veg.
& sweet for £9
each.



DAVID FERGUS

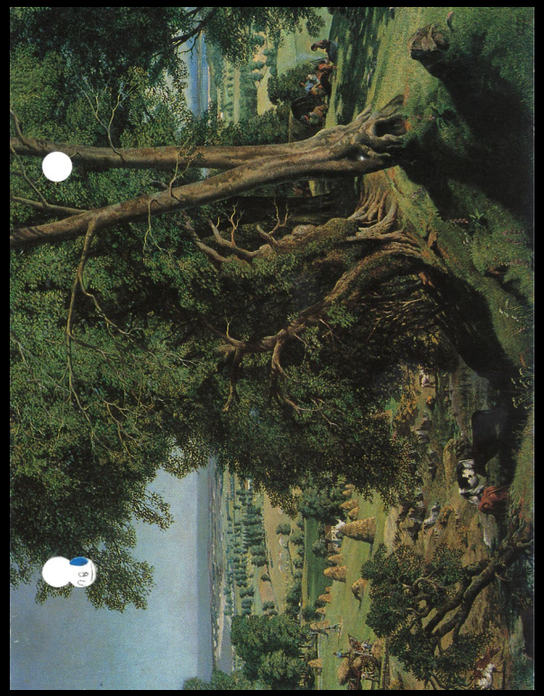
29 ST. NINIANS WAY. LINLITHGOW EH49 7BU. WEST LOTHIAN. SCOTLAND

TELEPHONE:
LINLITHGOW 84 51 85

Sunday, 30.v.1999.

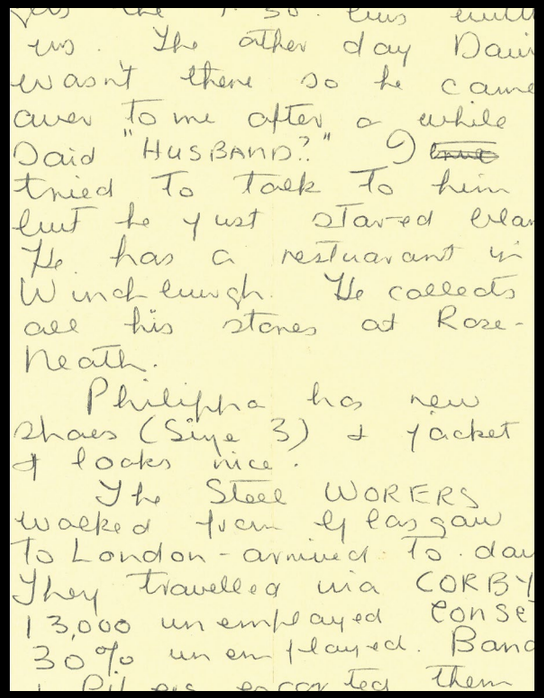
Michael & Jorunn:

We were delighted to get the news of the safe arrival



02

Postcard attachment.
Punch holes.



46

Handwriting on yellow paper.

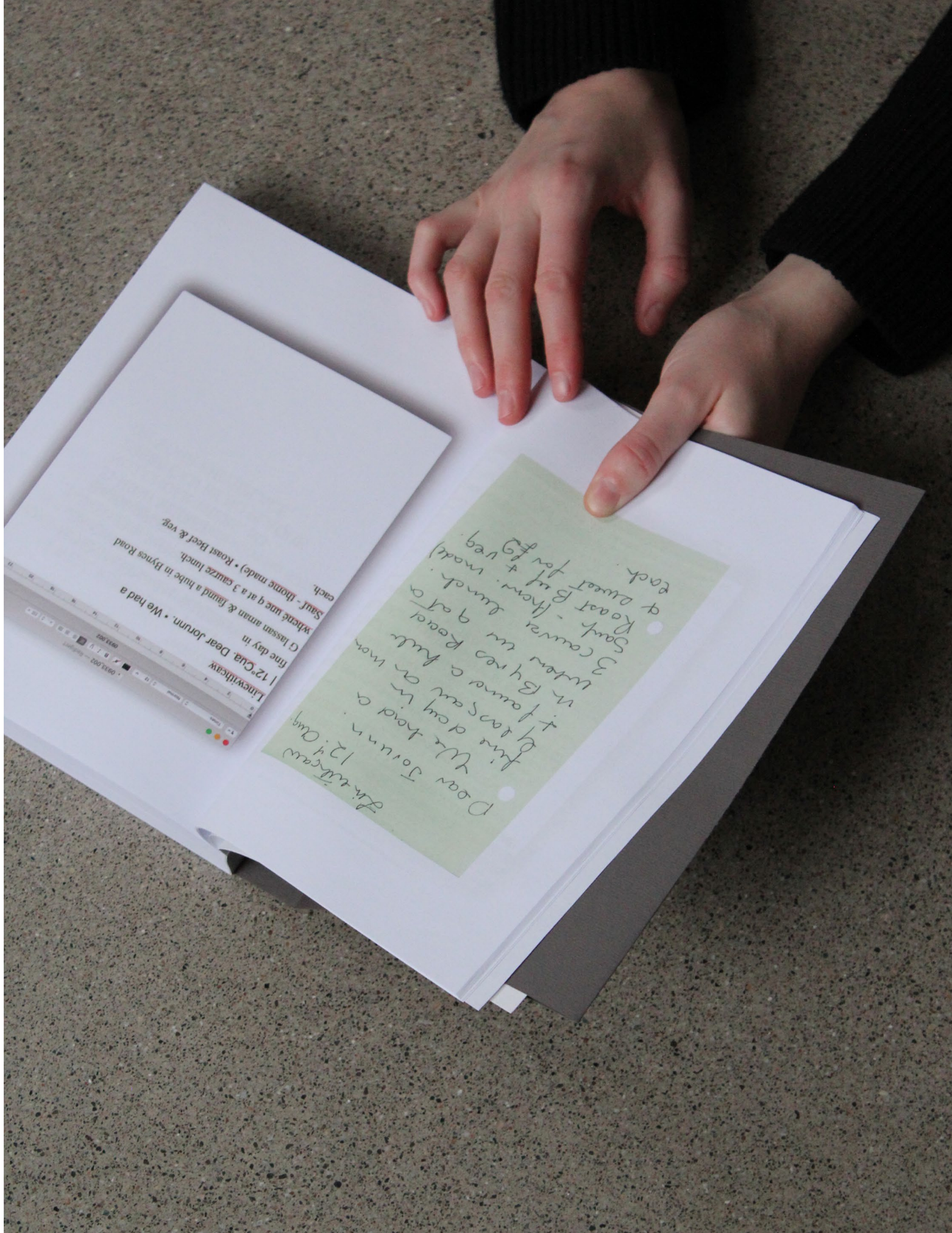
BOOK 2

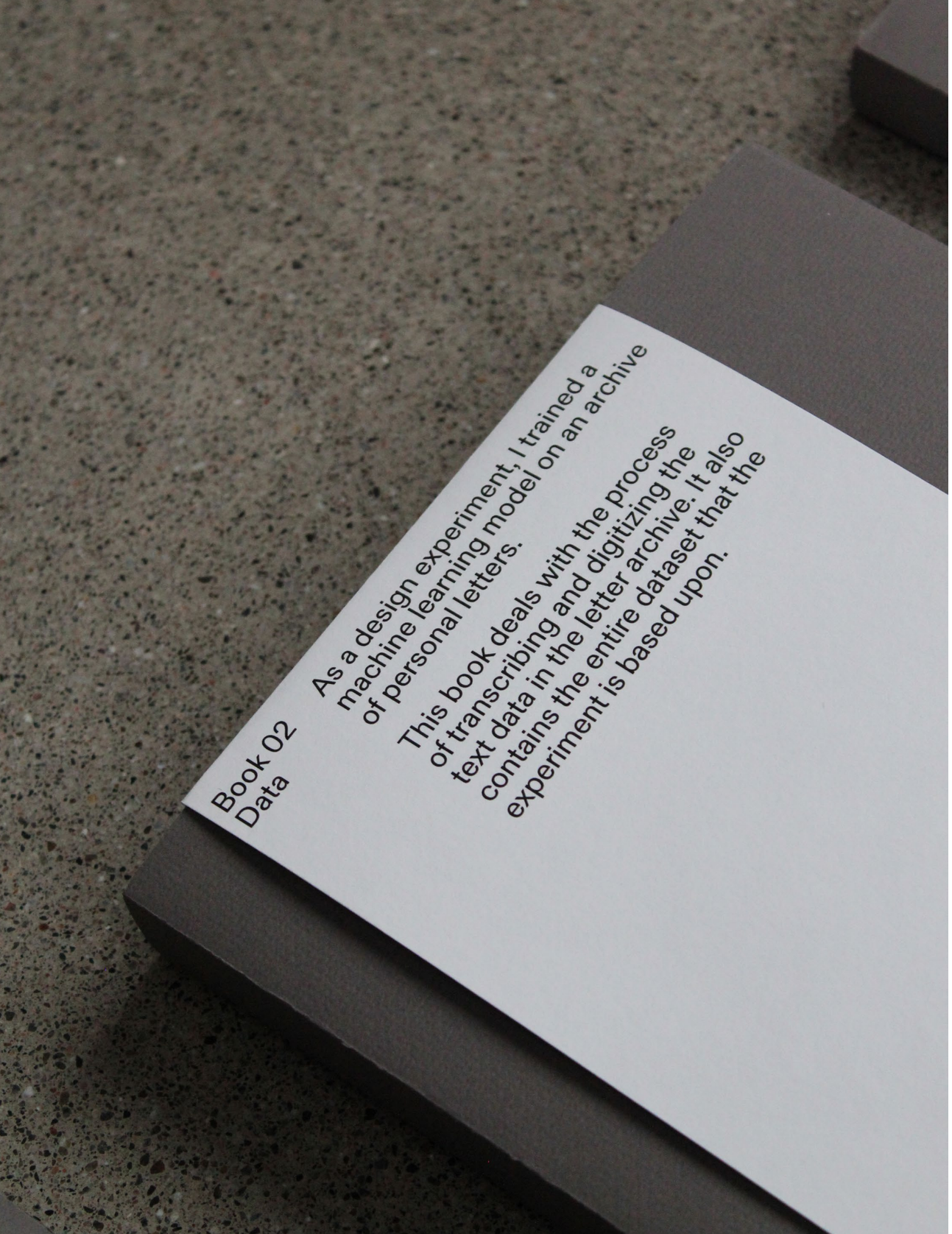
DATA

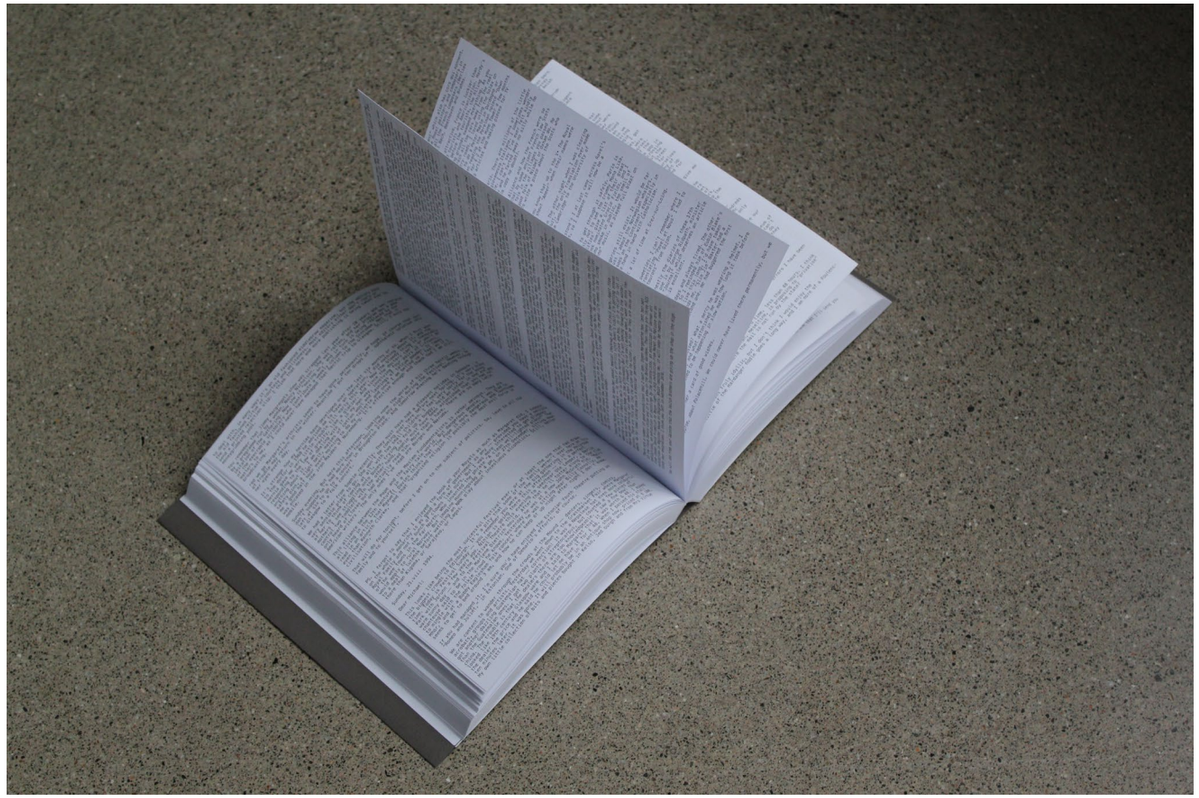
The second book deals with the process of transcribing and digitizing the text data in the letter archive. I wanted to show snippets from the digitization process - for example how the OCR technology (mis)interprets the letters.

The book also contains the entire dataset that the experiment is based upon. I wanted to give the reader an idea of the actual size and length of the dataset. What is the physical size of 3.4 MB of data?

The text in this book is set in Menlo, a monospaced sans-serif typeface designed by Jim Lyles. Menlo is the default font in macOS TextEdit, and is often used in programming. Menlo therefore felt like an appropriate typeface for this book, as it is the same typeface that the txt-files from the dataset are set in. The book is printed on 80gsm paper, bound as a simple paperback.




Book 02
Data
As a design experiment, I trained a
machine learning model on an archive
of personal letters.
This book deals with the process
of transcribing and digitizing the
text data in the letter archive. It also
contains the entire dataset that the
experiment is based upon.



BOOK 3

SYNTHETIC LETTERS

The third book presents a selection of the synthetic letters that the GPT2 algorithm generates. This is the outcome that the model produces based on the training. All of the text is entirely machine generated.

The layout and design of this book is a reinterpretation of the original archive of letters. Based on the letter archive I developed a graphic manual with a set of design principles for typography, spacing, layout etc.

The different typefaces are all variants of the typeface family Computer Modern, designed by computer scientist and mathematician Donald Knuth. The design of Computer Modern was influenced by the desire to achieve the «classic style» of books printed in metal type. The style therefore resembles the typographic style of the original letter archive - as most of the letters my grandfather wrote were written on his typewriter.

McIsaac, so we had an interesting conversation.

Yesterday I had a letter from Anvil Press. They think that Gaspard is rather recherche, which I think is a fair enough judgment. Still, I thought they published recherche poetry. They have published translations of Gerard de Nerval, Guillaume Apollinaire, Baudelaire, Laforgue and the Norwegian Olav H. Hauge. They suggest that I may be "interested in submitting extracts of the translation for possible publication in Poetry World, a twice-yearly journal of poetry published by Anvil Press." It is a very pricey affair costing £ 5.95. There seems to be some connection with the University of Iowa. I don't know if I should bother. I'm busy enough gathering stuff from the chapbooks. Last week, for instance, I prin ed in Newton Stewart. here are concerts of every Swedish fiddle music and

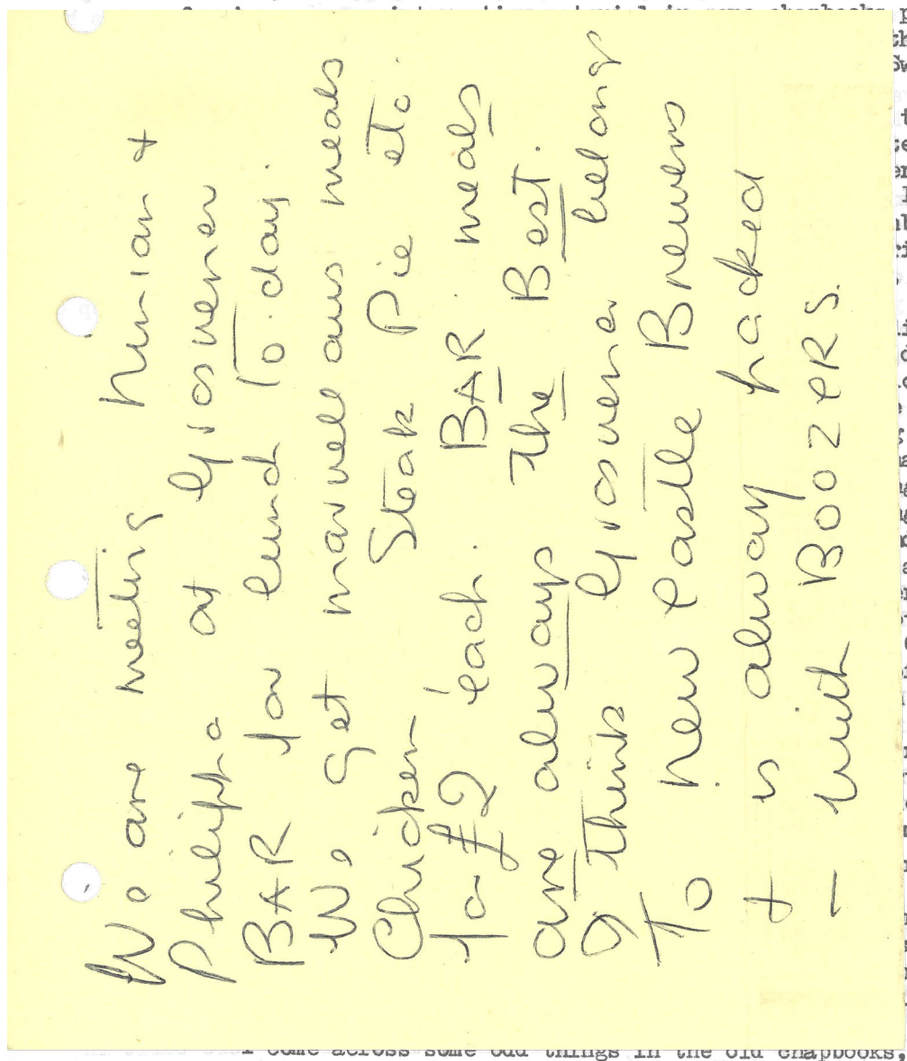
today. They will be working er that. Philippa is not ening. Still, it's a nice But it's still bloody cold. b over Easter, but Edin- inces Street was swarming Virgin Records was doing

ifferent nations within doing extremely well, crowave ovens, compact Highlands. It's the of the unemployed, the ave, and the Old Age g over £ 400 a week can g systematically made d charges go up. As from alone add about £ 3 or nerosity, our pension will t complaining. We can Old Age Pension or Social f cold. This is what is my head off if I read that

nasty for the Loony Cowboy. t a war, preferably in etnam, I suppose the m off.

day night: 31.iii.1986.

g. As I said, this has been from England and Glasgow. to town stretching away nd parking places in the



I came across some odd things in the old chapbooks, including a bitter anti-Hanoverian poem in a chapbook published in Newton Stewart. I think that the chapbook idea is more likely to find a publisher than poor old Gaspard.

I'll post this in Edinburgh tomorrow. Let me know how long it takes to reach Kenya. Love and all the best,

Dad

think, Darwin's Moon, but I never came across the Malay Archi

I looked up Calophyllum, inophyllum etc. in the Good Book Sanders) but they are not listed, which means that they are no ot grown in this country, not even in the stove-houses on entlemen's seats. The Dragon Tree is listed. If you can send t dd seed, I'd be very glad to try it. A few weeks ago I nicked utting in the Botanics of a tropical thing called manettia, an as rooted nicely. I also have a miniature forest of jacarandas oming up.

I cannot say I'm attracted by 90° with 80% humidity. It s ellish. Ommanney didn't like the climate of the Seychelles. He idn't like anything very much about the Seychelles, except the istant prospect of the islands from the sea.

The information about the coconuts and Vasco da Gama is plendidly useless, and I shall treasure it along with my knowl f Coxinga, the British bombardment of Petropavlovsk and the fa hat the word "talk" is related to a word in Lithuanian and no ndo-European language.

Tell Tharan that I am sending on some stuff about Tutankh or her scrapbook. There is a series on BBC 2 about Tut. and An gypt that would interest here very much.

It was pleasant today to hear that Karume in Zanzibar had ssassinated, although it will probably result in a bloodbath. shambles of a place!

The BBC series on the British Empire has ended, and it ha een a success. Every episode was written by some trendy Lefty people like Stuart Hood and James Cameron) who judge history b tandards of Hampstead Lefties of 1972. The result has been to e, and thousands of other folk, staunch imperialists. The fina pisode was written by that alcoholic, Cameron, and dealt with hodesia, Cyprus and Ulster. You can imagine what it was like. remember reading somewhere an Indian who said that Kipling ga ar truer picture of India than ever E. M. Forster did.

Since we have been away from Linlithgow, the demolition o eighbouring property has started. Brock's warehouse is gone, a octors' old surgery, next door to the Windsor Buffet will be a ext weekend. By the time you come back there will be new block lats there.

Seychelles music, what I've heard of it, is quite pleasan 'd certainly be glad to have a record, if you can send one. Th robably is a Portuguese influence, although the Portuguese wer

The different colors and paper qualities are inspired by the original letters. The book is bound by hand using classic kettle stitch bookbinding.

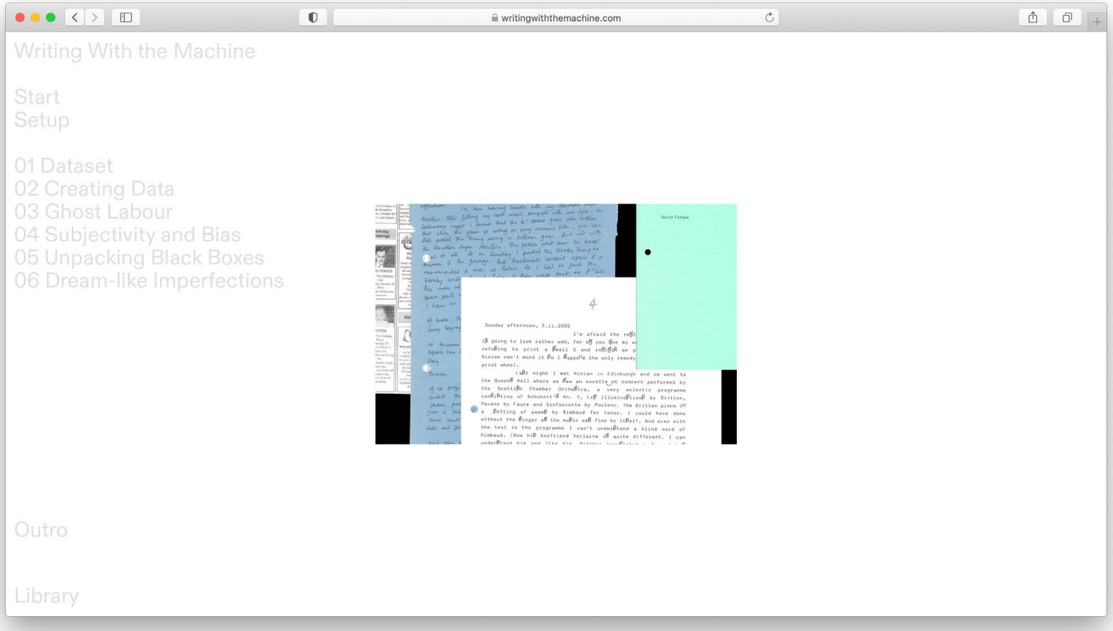
WEBSITE

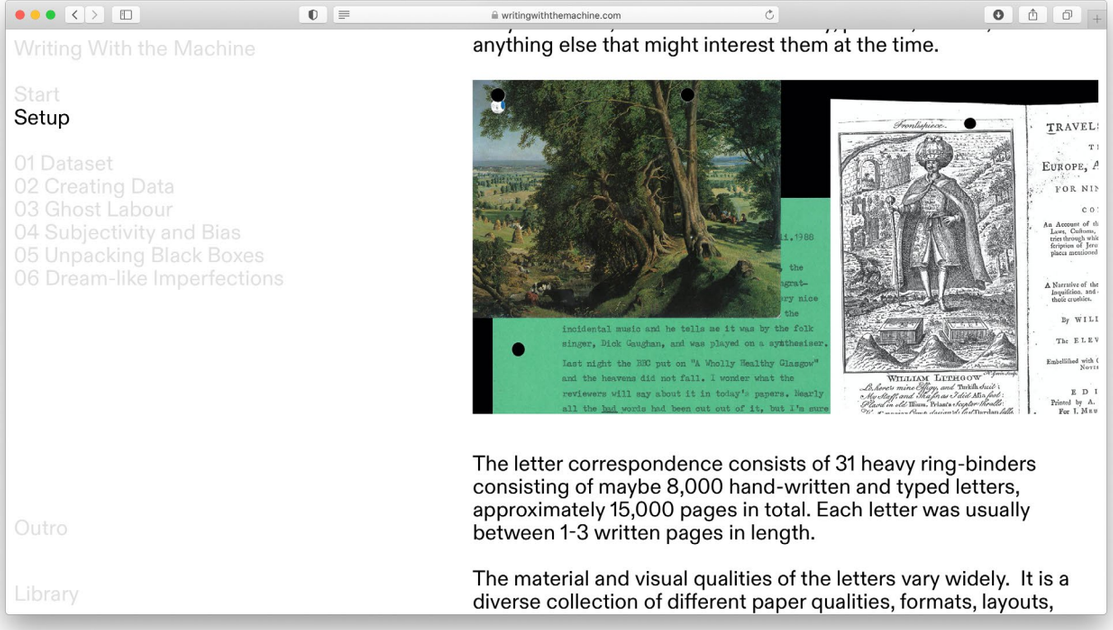
www.writingwiththemachine.com

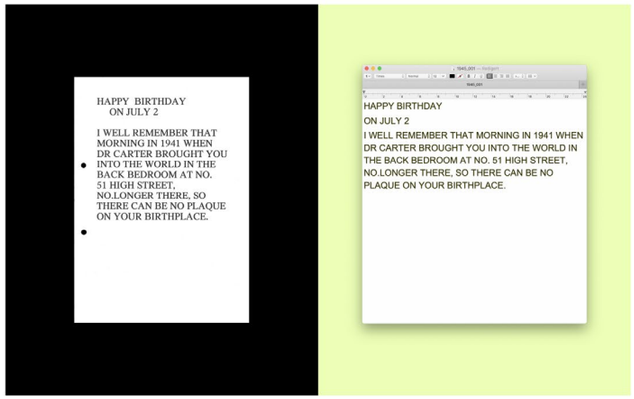
The website highlights observations and reflections from the project. After a brief introduction to the setup of the experiment, six observations are presented in an order that follows the process - from the dataset in the very beginning, to the output that the model produces. Each observation is illustrated with images and examples from the experiment. I found that there were several observations that corresponded well with the research I had done earlier in the project. The findings and quotes from my research are incorporated to support my own observations.

A side menu makes it easy to navigate in between the different pages.

All quotes are linked, so that the reader can easily trace the works and references that this project is built upon. I wanted the webstie to be a platform for sharing texts and works I have used throughout the project, as this might be of interest to other designers who are interested in exploring machine learning. In the Library section I have compiled a list of works that have inspired the project - directly or indirectly.



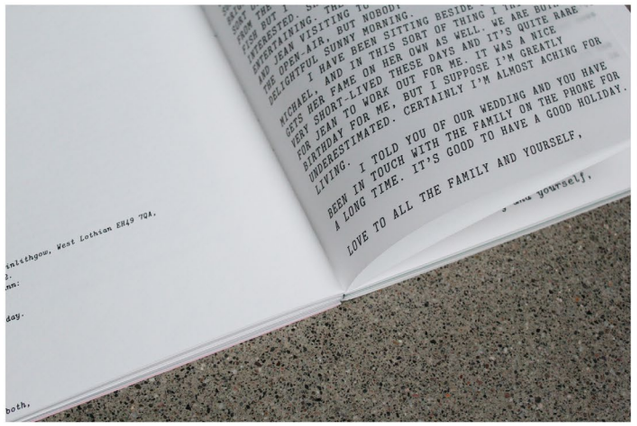




1/6

These images show how the OCR technology interprets the original letters. On the left side, the original letter. On the right, the text that the OCR transcribes. This text had to be edited and cleaned.

As you can see from the images above, the OCR converter returns a transcription of what it thinks it sees. However, smudges, errors in print, hand written scribbles or outdated typographic styles make it hard for the technology to sort out the words. Once the text becomes smudged or skewed, the machine no longer knows



The letters that the machine learning model generates.

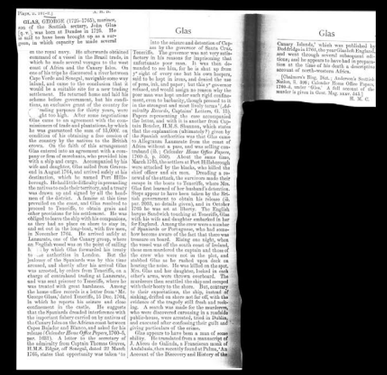
Although coherent, based on the input, the synthetic letters that the GPT2 model produces are somehow warped and imperfect reflections of the original letters, generating uncanny and curious moments. At first glance, skimming quickly through them, they might come across as letters written by my great-grandfather. But

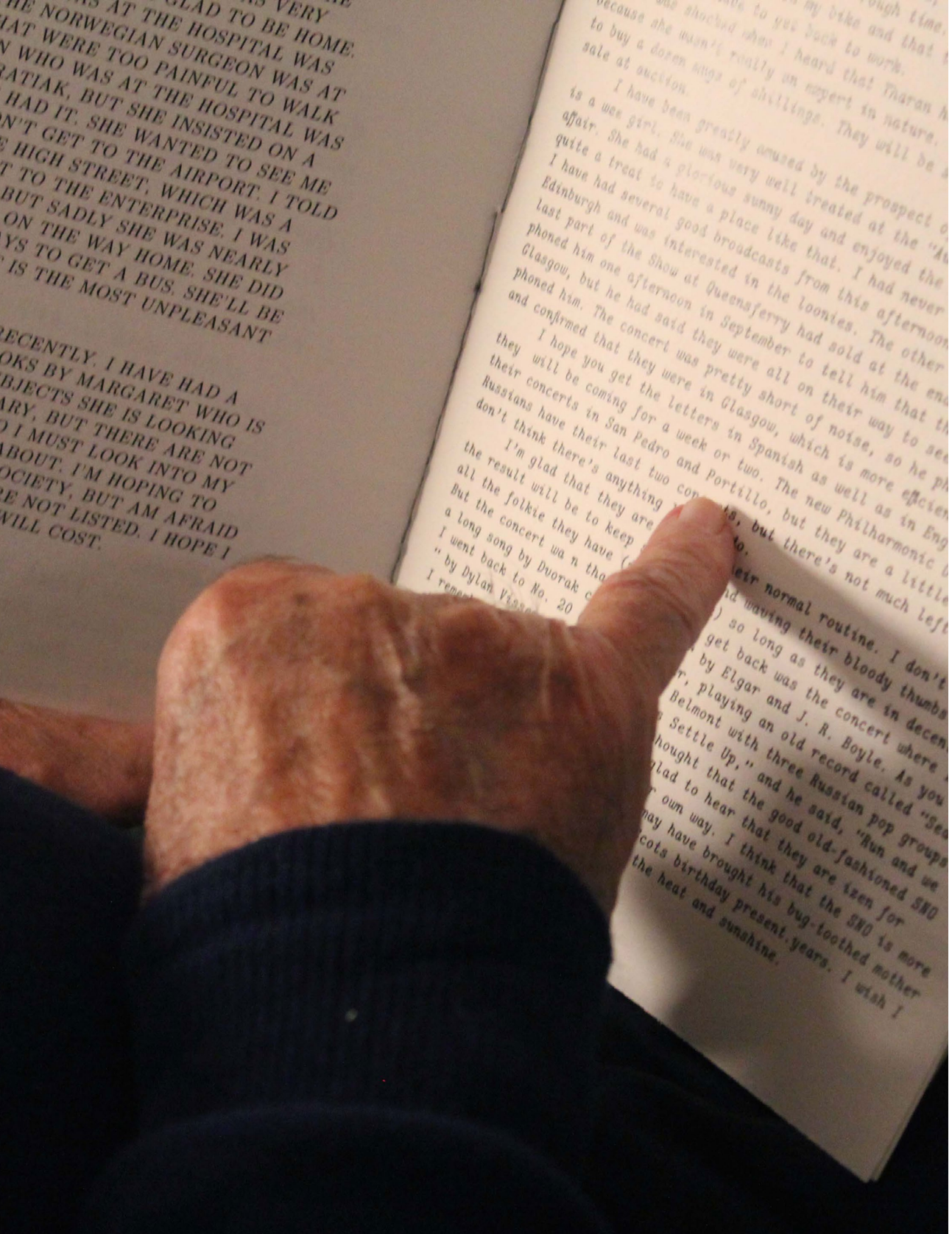
If you want to further explore material from the project, you can browse more scans from the letter archive here →

Below is a selection of links to works that have inspired the project in one way or the other. The projects span across different fields and formats.

Name ↓	Author ↓	Format ↓
AI Aesthetics	Lev Manovich	Book
Atlas of AI	Kate Crawford	Book
Cloud Index	James Bridle	Artwork
Could a machine have an unconscious?	Mehgan O'Geiblyn	Essay
creative-ai.org	Creative AI Lab	Resource
Critical of what?	Ramia Maze	Essay
Dark New Age	James Bridle	Book
Data Feminism	D'Ignazio and F. Klein	Book
Data Labeling; AI's Human Bottleneck	Matthias Heller	Article
Datasheets for Datasets	Multiple Authors	Article
Designerly Ways of Knowing	Nigel Cross	Book
DIGITAL TYPOGRAPHY	Donald Erving Knuth	Essay
Disembodied Machine Learning	Waseem, Bingel, Lulz, Augenstein	Academic Paper
Excavating AI	Crawford and Paglen	Essay
fAIry Tales	Andreas Refsgaard	Art Project

Exit





Reflection and Conversation

In order to evaluate my designs, I did a series of conversations. I see these conversations as ‘communication tests’, to validate whether people understood what I had done and to see what reactions and discussions the designs could initiate. Using my designs as a conversational framework, I spoke to six different practitioners. To collect different perspectives, I talked with people from slightly different fields and backgrounds.

AUDUN MATHIAS ØYGARD

External Supervisor. Data scientist at Abelee, with expertise in deep learning, computer vision and machine learning.

Audun has been an external supervisor for this diploma, and we have had several conversations throughout the process. As my own technical knowledge of machine learning is limited, it has been very valuable to review the material together with Audun at different stages of the project. This has helped me scope and plan my process. Audun has helped me understand how GPT-2 behaves the way it does, and has helped me answer technical questions regarding the material.

TIMO ARNALL

Timo is co-founder of Playdeo and Ottica. He has a PhD in interaction design from AHO. Timo’s work revolves around (amongst other things) developing and explaining emerging technologies through different media.

I met Timo for a coffee in Oslo. Using the three books as a starting point, we talked about language models and generative text, machine learning and creativity, design and communication. We also discussed how we can frame digital technologies or software as design materials. It was a very fruitful conversation which gave me a lot of valuable feedback that I used to iterate on the design of the books.

ARJA KARHUMAA

Arja is a graphic designer and text artist, assistant professor and head of Visual Communication Design at Aalto University. Her work spans across typography, design, and experimental writing.

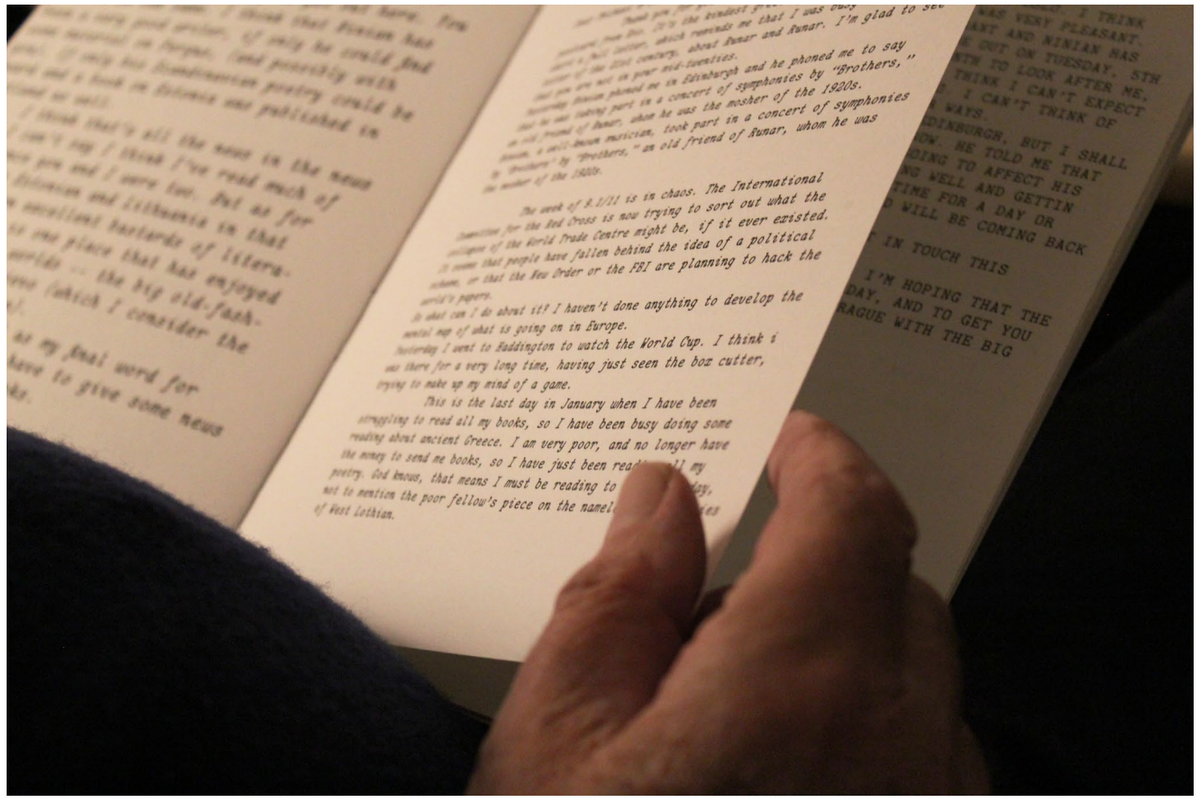
I met Arja for a coffee over Zoom. Arja lives in Helsinki, so I sent material for her to review by post before our conversation. Using the material I sent as a starting point, we talked about the material and generative aspects of text, design as a conversational tool. We discussed the relationship between humans and machines and how to tell the difference between text written by a human, and that by a machine.

MICHAEL FERGUS

Michael is my grandfather, and the person who originally received the letters that my great grandfather wrote.

It was particularly interesting to get my grandfathers view on the third book - the machine-generated letters. How similar were they to the original letters? Is the machine really capable of recreating my great-grandfathers style of writing? As my grandfather actually received the original letters, and knew my great-grandfather very well - he could interpret the generated letters for me. The letters are filled with cryptic names of either people, places, or books that are completely alien to me. However, my grandfather could tell me the story behind each of these elements.

According to Michael, the generated letters are quite successful in mimicking the original letters. All of the elements that my great-grandfather wrote about are there - it is impressing how many different details and anecdotes that the machine manages to include. However, it's apparent that the machine does not have any real understanding of the sentences it generates. In the same way that it has no understanding of spatial relationships, it doesn't have any programmed understanding of my great-grandfathers life or the context and meaning behind the stories my great-grandfather wrote about. However, it does a good job in faking it.



EVEN WESTVANG

Even is the co-founder of Sanity.io, and has several years of experience working with technology and design.

With Even I talked about GPT-2 and language models. We discussed the absurd and dream-like qualities of the content that machine learning systems produce, and how these systems might affect creativity and the future of creative professions.

TOBIAS BÆCK

Tobias is co-founder of Bakken&Bæck, a design studio working in the intersection between technology and design.

It was interesting to hear Tobias' perspectives on how design studios and commercial actors can work with complex technologies like machine learning. Even though Bakken&Bæck mostly do commercial work, they also do projects that focuses more on exploration and research.

We also discussed how different disciplines can collaborate when working with emerging digital technologies. Tobias told me that B&B always strives to work across disciplines. Their previous projects that deal with machine learning have all been collaborations between people within different fields. As different professions have different ways of seeing and approaching machine learning, collaboration is important in order to deal with complexity.

THOUGHTS AND REFLECTIONS AFTER THE CONVERSATIONS

In each of these conversations I brought the books with me, using them as a starting point for the conversation. I found that using the material as a conversational prop was useful, as it led to several interesting conversations on machine learning, but also on design as a discipline. People would often point to details in the material and ask questions, or refer to the books as an example when talking about an aspect of machine learning. The books sparked curiosity. People found the material to be an unusual and refreshing way of approaching machine learning.

In the first conversations, I only brought the books with me. In the last conversations, I also sent the website beforehand. I found that when only using the books, the conversation would often end up in unexpected places and topics. When using the website in addition to the books, the conversation was more focused around the observations and reflections. The six observations presented on the website became the main areas that the conversation circulated around. The website was therefore helpful in steering the conversation in the direction I wanted.

It was interesting to see how people from different backgrounds understood and saw the material differently. All of the people I talked to noticed and commented on different details in the designs. For example, with Arja I mostly talked about the material aspects of text and the communicative qualities of visual design, while with Even I discussed more technical aspects of how generative text works.

I found that presenting the material through three separate books created a structure that made a lot of sense to people. The third book was particularly entertaining - people found the machine generated letters intriguing and amusing.

In these conversations I also noticed how people would take time to observe and read the material. Both the books and the website requires that you take some to go through it. You have to do a bit of reading before you can properly get something out of the experience. Even though the books are not meant to be read from beginning to end, they still require that you take some time to sit with the material, and take some time to observe and reflect upon it.

possible to tell what breed of dog an owner has simply by looking at the human face. I saw one woman who could have been the mother of her bulldog, and a man who looked like the big brother of the Alsatian he was leading.

I'll be writing again after your letter arrives.

Love to all the family,

Dad

the skiff in February.

You'll have forgotten all about TV? The programmes aren't very good during the summer. Blue Peter is still going strong, but there are very few Tom and Jerrys. Nothing very funny at all, in fact.

I took 47 kids in a bus to Stirling. Nobody sang "Y canny shove yer grannie aff the bus" and nobody was sick, for sat with a gun in my hands ready to shoot the first one to si or vomit.

If I can't get a Willie book for you I'll send you life-size model of Valerie Singleton, made out of expanded seaweed.

Love from Grannie and me,

Grampa

m the sound of St ,

from Jordan and brought into th

le whici is vey hard goimg.

DAVID FERGUS

29 St.Ninian's Way, Linlithgow, West Lothian, EH49 7BU, Scot
TELEPHONE: 01506844 5185

Saturday, 10.vi.2000.

Dear Michael & Jorunn:

Thanks for the letter from Luanda, dated 30th May. I had to sign for it and the envelope had seven different stamps (not postage stamps) on it. These Portuguese colonial towns across the world must be most attractive. The Portuguese brought good architecture wherever they went. There must be books about their colonial architecture from Macao to Bahia.

You know from our telephone conversations the present state of the demolition threat. I'm waiting to get the minutes -- if any -- of that meeting on Wednesday night, to see if I can get it in writing that the two blocks in St Ninians Way are safe and in no danger of falling down. I really don't know why I'm bothering about it as I'm sure I shall be dead long before the business will be settled. Like all Cooncil affairs there is a nasty smell about it, of money. Everybody agrees that the reason these flats were jerry-built was that Harruson had the Cooncil of thirty years ago in his pocket and they closed their eyes to the shoddy workmanship in the buildings.

I don't know what I'll be doing today. Ninian is going to the Folky meeting at Dunkeld. I shall certainly go into town as usual, and wander around wherever the buses take me. Yesterday I took a bus to Newhaven and walked along the Corniche for a bit. I passed Starbank Park, and remembered sitting on a bench there with Margaret, at least thirty years ago, watching the yachts out on the Forth. I wasalong at Granton Square and remembered how Margaret and I had explored the little hidden village of Wardie Square, and of how we had gone over on the hydrofoil with NInian to Burntisland several times. We had so many happy days together. I am lost without her.

I don't read much these days, apart from the newspaper rubbish. I read a book of essays by Graham Greene. Poor stuff, not worth reprinting. However he mentioned a writer, Constance Sitwell, a relation (by marriage) of the Sitwells. I took one of her books from the Library. The word "vapid" might have been invented to describe it. However, yesterday I got an excellent, and very heavy book from the Library. it is "The Illustrated Directory of Film Comedy Stars," and it's fascinating for me as I remember the old silent comics -- Ford Sterling, Larry Semon, Fatty Arbuckle, Mabel Normand et al. To my mind the createstever film comics were Laurel and Hardy. They were geniuses and I wish TV would revive some of their old films. I detest some of the modern comics. I cannot stand Ben Elton and David Baddiel, two slimy Jews, and Harry Enfield.

I don't think I'll go to Dundee on Tuesday. The weather seems to be set into a pattern of bright sunny mornings followed by grey rainy afternoons and I don't fancy being stuck for hours in Dundee in the rain. I may go to the pictures in Edinburgh. I don't think Ninian is meaning to come out forythe Mairches. I couldn't bear to stay inLinlithgow that day.

I wonder how long it will be before the hernias finish me off. When I have a bath and look at my body I think I am in the same class as the Elephant Man and the Hunchback of Notre Dame, a physical freak.

That will do for today. Love to you both and to all the family,

Dad

Austrylia.) Humphries is very funny indeed. As a female i is nearly as good as Danny La Rue, but not so pretty, of

Ninian bought two new records this week: Richard Sprach Zarathustra with Don Juan, and Handel's Water Mus Music. He has very catholic tastes. The last few record included a Brazilian record of Bossa Novas ar Belafonte.

I think that's all my dose of news for the the family,

Dad

I'm on a 1000 calorie - a - day

of Grieg's piano music.

Tomorrow the details will be issued of Heath's beat inflation. About time.

Love to the family and yourself,

Dad

by public transport, unless we try to get there on our way back from Moroc from Algeciras or Gibraltar. Of course if you hang on for a couple of days you can give us a hurl to Algeciras or Gibraltar!

This broken collar bone is proving to be a bit of a bind, and it doesn't seem to be mending properly. I've to go back to the Infirmary this Tuesday, and it seems likely that I'll have to have it broken again, to allow it to mend properly. It hasn't been put in plaster, which means that the tiniest jolt proves agonising. It also seems to have scuppered my plan of going to Dublin next week for the Ireland versus Scotland match, which is a great pity as it only costs £43 return by train.

Tharan must have told you that she couldn't find the Baedeker of Constantinople. I was consoled the other day by finding a Murray's Handbook for Syria and Palestine for 1892, and it only cost £4. So keep looking out on my behalf; it doesn't matter what language they are in.

There's nothing else to add, but keep me informed as to what tap you are after, as there is still quite a lot of change out of the £25!

All the best,

Ninian

Final Reflections

While I am content with where the project has landed after these months, there are several aspects of this diploma that I would like to research further. There are areas and ideas that I would have liked to look more into, but there was simply not enough time. Below are some different thoughts on what I would have liked to investigate further. There are areas I plan to research further after the delivery.

It would be interesting to look into the possibility of programming the design of the generated letters. There are several typographic details in the original letter archive that I would have liked to have explored further. The visual qualities of the original letter archive can be translated into code - colors, typography and layout. Programming a software to design the letters would be an interesting way of collaborating with the machine.

I would have liked to collect even more data - and to transcribe the entire collection of letters. Even though I am satisfied with the amount of data I managed to collect within this short amount of time, transcribing all of the letters would give an even more accurate representation of the original archive.

My great-grandfathers letters are only the first half of the letter archive, as they are part of a correspondence with my grandfather. It would be interesting to train an algorithm on the second half of the archive - the letters that are written by my grandfather

- and to program the different models to communicate with each other. Creating such a letter-writing machine is possible, but doing so would be quite time-consuming - as it would require a lot more data, and a bit more technical knowledge and tinkering.

As mentioned previously, my way of working with machine learning is in a very designerly manner. While I know some coding languages to a certain extent, I am no programmer. I have tried to embrace my own technical limitations and scoped the project accordingly. However, I believe that I could benefit from working even more closely with a programmer or a person with more specialized knowledge within machine learning. It would be interesting to explore other machine learning models using the same dataset. This could also open up possibilities for implementing the model into other outputs than printed books. It would be interesting to implement the model into a more interactive design.

ON MY OWN PRATICE

Is it somehow difficult to reach a conclusion by the end of a project that has spanned in so many different directions. My process has been sprawling, at times reaching in several possible directions.

The project has allowed me to expand and challenge my design skills and to reflect upon several different aspects of machine learning. I have learned a lot about machine learning systems and the process that goes into building them. The project has also allowed me to reflect upon my own discipline, design. I have truly enjoyed combining and experimenting with tools and methods that I have acquired throughout five years of design studies. I believe that this has helped me mature and strengthen my skillset as a designer.

ON THE METHOD

Using the design experiment as a framework for the project turned out to be very helpful. Narrowing the scope in this way made it possible for me to dive deeply into the material, allowing me to work with details, and to explore, experiment and iterate. Framing machine learning as a design material and exploring in it through a hands-on approach made it possible for me to learn a lot within a short time frame. Iterating in between experimentation and research allowed me to reflect upon over-arching themes within the field of machine learning in a designerly manner. There are several observations I could not have made by simply creating wireframes or mock-ups in Figma or XD. I had to go though the extensive process of building my own dataset, and experimenting with this material in order to be able to do these observations.

ON MATERIALITY

Materiality has been a recurring theme throughout the project - this was also a recurring topic in my conversations. Understanding materials is considered to be essential for designers. There is a long tradition of materiality within design discourse, but this tradition largely focuses on conventional and physical design materials. I believe that there is a lot we can learn from applying material approaches within digital design as well. Framing the software and digital systems that we design with as design materials might invite us to be more curious and aware of how they are constructed and how they work. It can help us better see and understand new aspects of seemingly complex technologies.

ON COMMUNICATION

Explaining and articulating the project has been a recurring challenge in this project. Because machine learning is a complex technology, it has been a challenge to find the right balance in how to explain the project. What technical details should I explain, and what should I leave out? When do too many technical details get too confusing? As the project is primarily meant for people who already have a certain level of knowledge about machine learning, I have tried to tailor the communication accordingly. All of the conversations I did throughout the project were very helpful in prototyping how to articulate the project. They helped me figure out whether people understood what I had done and to understand how to explain and communicate my process.

Pointing to examples, details and observations from the experiment was an effective way of sparking conversation about different aspects of machine learning. I found that using the letter archive as a starting point for the experiment was very useful because it allowed me to build an engaging narrative that sparked curiosity. Working with the visual elements of this archive was a process I throughly enjoyed - especially designing the third book as a reinterpretation of the original letter archive.

CONCLUDING REFLECTIONS

The main ambition of this project was to investigate how design might be used to explore and communicate different aspects of machine learning. I find that machine learning can be approached through a combination of material experimentation and communication. While machine learning is uniquely different from other more conventional design materials, there are still aspects of it that designers can experiment creatively with.

The designerly way of approaching machine learning is uniquely different from that of other fields - such as engineering, linguistics or sociology. I do not mean to claim that this approach is any better or more superior to that of other fields. On the contrary, I believe that collaborating across disciplines is crucial when working with machine learning.

With the ability to communicate, visualize and to evoke emotion, designers can offer unique ways of seeing and thinking about new emerging technologies. I believe that this approach can be a valuable and unique contribution to technology discourse, as it might allow for more diverse and nuanced conversations.

Thank you

Lars Marcus Vedeler for providing me with constructive feedback, inspiration and support throughout the project.

Audun Matias Øygaard for sharing your knowledge and expertise.

Michael Fergus for sharing the letter archive with me, and for discussions and reflections.

Arja Karhumaa, Timo Arnall, Even Westvang and Tobias Bæck for sharing your perspectives and for taking the time to reflect upon the project together with me.

Mikkel Jøraandstad for feedback and support

Litterature

Arnall, Timo. *Making Visible - Mediating the material of emerging technology.* PhD Thesis. Oslo School of Architecture and Design. 2013.

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Page 14

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Page 25

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Page 57

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