INTERACTION WITH AI – MODULE 2

Session 1, September 22, 2020

Asbjørn Følstad, SINTEF
My background:

Human-Chatbot Interaction Design

How to design chatbots?

Supported by IKTPLUSS, Research Council of Norway
My background:

SINTEF, HCl group

Psychology (!?!)

Interaction with AI – module 2

Interaction design

Four sessions

Design of interaction with AI
Asbjørn Følstad
September 22
October 6

Understanding interaction with AI
Morten Goodwin
October 13
October 20
Literature
Literature


Mid-term report (Oct. 23)

Individual assignment

Building on and extending the individual assignment in Module 1. Startup today – finish October 23)

Group assignment

Building on and extending the group assignment in Module 1. Startup today – finish October 23)

+ Task on user and interaction design perspective (startup today – finish October 6, include in mid-term report as Appendix 1)

+ Task on machine learning perspective (startup Oct. 13 – finish Oct. 20, include in mid-term report as Appendix 2)
Midterm report - individual assignment

Three topics:
• Characteristics of AI-infused systems.
• Human-AI interaction design.
• Chatbots / conversational user interfaces.

Language: English or Norwegian.
Max. pages: 6
Min. articles referenced 4.
Midterm report – group assignment

Content – 5-7 pages

• A description of the group, who you are - names.
• A description of what area of “interaction with AI” you are interested in working with.
• (new) Background section: Position your work relative to existing knowledge and practice
• Minimum 1 maximum 2 questions that you want to address. Please write some sentences about the questions. These questions can change and evolve later in the midterm report and in the final report – as you go about investigating your questions.
• (updated) Method section – overall approach, design process (optional, but encouraged), data collection methods
• (new) Sketches and/or prototypes (optional, but encouraged)
• (new) Findings (progress, initial outcomes)
• (updated) Minimum five references to literature.

Appendices – approx. 1 page each

• Appendix 1: Chatbot design task – briefly describe the process and outcome. Detail reflections and lessons learnt.
• Appendix 2: Machine learning task – briefly describe the process and outcome. Detail reflections and lessons learnt.

Brief status on the group task – each group say a few words
Group 1
1. Can a human establish an emotional bond with an AI chatbot?
2. To what extent could an AI chatbot replace a human psychologist?

Group 2
1. How can a chatbot be influenced by people’s behaviour?

Group 3
1. Could AI-powered speech recognition contribute to older adults’ communication with family and friends? And possibly contribute to their autonomy?
2. Additionally, speech recognition is not perfect. How are these incomprehensive handled by systems and users today? How should/could errors be handled?

Group 4
1. Interagerer folk forskjellig med chatbotten når den har et menneske som bilde, enn når den er en tydelig chatbot? Stoler man mer på informasjonen hvis man tror det er et ekte menneske man snakker med?
2. Hva skal til for at en person reagerer over det chatbotten sier og hvordan påvirker dette videre interaksjon? Hva blir atferden etter man har chattet?

Group 5
1. What are the expectations of how an AI should behave?
2. Is it possible to make an AI more human in the way it acts?

Group 6
1. How does the speech pattern differ from human to human interaction?
2. How can design make people understand the capability of their personal assistant?
Group assignment – suggestion (I):

Improve existing design of AI-infused system

- Wonder document
- Interaction design
- Evaluation and trust

- Identify interesting, existing AI-infused system
- Use (selected) guidelines for Human-AI Interaction to discuss interaction design. Identify good design and possible improvements
- Suggest and prototype redesign in response to discussion
- Test with users and refine
Group assignment – suggestion (II):

Develop early prototype of simple AI-infused system

- Wonder document
- Interaction design
- Evaluation and trust

- Identify need for simple AI-infused system (e.g. a chatbot?)
- Concept development and prototype
- Use (selected) guidelines for Human-AI Interaction to motivate design choices.
- Test with users and refine
Group assignment – suggestion (III):

Understand use of AI-infused systems and discuss guidelines

- Wonder document
- Interaction design
- Evaluation and trust

- Identify one or more interesting, existing AI-infused systems
- Set up study to assess or better understand how the system is used or experienced
- Discuss theoretical and practical implications of findings
- Reflect on correspondence between findings and guidelines for Human-AI Interaction. Critical discussion and possible suggestions
Agenda

Today

1. Interacting with AI – an overview
2. Chatbots – interacting with AI in natural language

Next

3. User-centred design of AI
4. User-centred design of chatbots
Interaction with AI - overview
AI?
AI?
Artificial super intelligence

Artificial general intelligence

Artificial narrow intelligence

Devs (2020)

Artificial super intelligence

Artificial general intelligence

Artificial narrow intelligence

Artificial super intelligence

Artificial general intelligence

Artificial narrow intelligence

Interaction with AI, and designing for interactions with AI, concerns artificial narrow intelligence (narrow AI)

Artificial super intelligence

Artificial general intelligence

Artificial narrow intelligence

Interaction with AI, and designing for interactions with AI, concerns artificial narrow intelligence (narrow AI)

Need to know:

- Characteristics of narrow AI
- Opportunities and limitations of narrow AI

... from now on, when talking about AI we mean narrow AI
AI with recent advances due to progress in machine learning
AI with recent advances due to progress in machine learning

Two drivers:

- Large datasets
- Computational power
AI with recent advances due to progress in machine learning

An understanding of recent AI systems may be:

Computer systems learning and improving on the basis of large data sources
AI with recent advances due to progress in machine learning
AI with recent advances due to progress in machine learning

Second machine age
- Phase 1: Computers drives productivity
- Phase 2: Computers can do work we never thought of as programmed or routine

Michael Polanyi on tacit knowledge - “We know more than we can tell.” (Polanyis paradox)

Computers now taking on tasks reflecting Polanyis paradox

The board game Go paramount example
AI with recent advances due to progress in machine learning
De fleste datasett som kan brukes til å trene dype nett til å bli gode på en eller annen funksjon, er kjempestore.

[...]

Et nytt triks som mange bedrifter nå bruker, er å først designe en tjeneste som mange brukere vil ha. [...] Gjennom bruken av tjenesten gir brukerne fra seg verdifulle data som igjen brukes til å trene nett for å gi brukerne nye funksjoner de setter pris på.

En datafelle er begrepet som brukes om Teslas særege tilnærming til datainnsamling.

Google-eier Alphabet og deres selskap Waymo har nå brukt ti år bare på å samle inn data om mange nok ulike trafikksituasjoner. (menneskelige sjåfører i selvkjørende biler klare til å ta over)

Elon Musk og Tesla hadde slett ikke 10 år til overs. I stedet etablerte de en datafelle. [...] Her eneste nye Tesla-eier er nå med i dette gigantiske datainnsamlings-prosjektet (shadowmode)

What types of systems are we designing when designing for interaction with AI?

AI-infused systems
"Systems that have features harnessing AI capabilities that are directly exposed to the end user."

AI-infused systems

- favourite examples?
COLLECTION

AI Experiments

AI Experiments is a showcase for simple experiments that make it easier for anyone to start exploring machine learning, through pictures, drawings, language, music, and more.

AI + Learning

https://experiments.withgoogle.com/collection/ai
New Project

- ![Image Project](image.png)
  Teach based on images, from files or your webcam.

- ![Audio Project](audio.png)
  Teach based on one-second-long sounds, from files or your microphone.

- ![Pose Project](pose.png)
  Teach based on images, from files or your webcam.

More coming soon

More models will appear here as they're developed.
Teachable Machine

wave
23 Image Samples

smile
35 Image Samples

sleep
37 Image Samples

Training
Model Trained

Output
wave
smile
sleep
100%

Add a class
Can a neural network learn to recognize doodling?

Help teach it by adding your drawings to the world’s largest doodling data set, shared publicly to help with machine learning research.
What do 50 million drawings look like?

Over 15 million players have contributed millions of drawings playing Quick, Draw! These doodles are a unique data set that can help developers train new neural networks, help researchers see patterns in how people around the world draw, and help artists create things we haven’t begun to think of. That’s why we’re open-sourcing them, for anyone to play with.
Draw
television
in under 20 seconds
Oh I know, it's television!
You were asked to draw television

You drew this, and the neural net recognized it.

It also thought your drawing looked like these:
Cartoonify

August 2018 | By Eric Lu

Turn a photo into a cartoon with a neural network

LAUNCH EXPERIMENT  GET THE CODE
From a user perspective – how does AI-infused systems differ from other computer systems?
Learning | Improving | Black box | Fuelled by large data sets

Dynamic | Mistakes inevitable | Opaque | Data gathering through interaction

You were asked to draw television

You drew this, and the neural net recognized it.

It also thought your drawing looked like these:

- Correct: small television
- 2nd closest: radio
- 3rd closest: helicopter

VS.

Calculator with buttons for different mathematical functions.
Amershi et al (2019)

Definition of AI-infused systems: Systems that have features harnessing AI capabilities that are directly exposed to the end user

Uncertainty -> errors common, both false positives and negatives

Inconsistency -> sensitive to context and small changes in input

Behind the scenes personalization (e.g. automated filtering) -> potentially costly information hiding
Kocielnik et al (2019)

**Probabilistic** – almost always operate at less than perfect accuracy

**Impacted by user actions** – such as user-generated content

**Transparency issues** – how to mitigate? e.g. by showing decision rules
Chatbots – interacting with AI in natural language
Chatbots?

https://woebot.io
Chatbots?
One definition of chatbots:

... machine agents that serve as natural language user interfaces to data and services through text or voice.

Meaning of term evolving

Social chatter  Tasks
Your chatbot experience?
Hvor ofte har du brukt chatbots (prateroboter) på en nettside eller på en meldingstjeneste?

Variasjon med alder (16-34 | 35-54 | 55 - )
Chatbots area of sharply increasing research interest
Different chatbots for different purposes

• Customer service
• Content curation and eCommerce
• Assistants
• Guides
• Social relations
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Chatbots always there for you

Always supportive and caring
Chatbots always there for you

Always supportive and caring

... but not without its issues
Chatbots always there for you

Always supportive and caring

... but not without its issues

Sorry! I do not know the answer to that one yet.
Chatbots always there for you

Always supportive and caring

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Chatbots always there for you

Always supportive and caring

... but not without its issues
A race towards human likeness?

Google Duper – help to make reservations through conversation

Presented at I/O 2018

Available as service for selected areas

https://youtu.be/GoXp1IeA5Qc
A race towards human likeness?

Google Meena – January 2020

Open domain chatbot based on machine learning – single model

Trained on 40B words from open social media conversations
A race towards human likeness?

Facebook Blender – April 2020

Open domain chatbot based on machine learning - blended model

Trained on 1,5B Reddit comments.
Chatbot development platforms

• DIY

• Platform and assistance
Chatbot development platforms

• DIY

• Platform and assistance
Different types of chatbots

• Generative
• Intents and actions
• Scripted
Different types of chatbots

• Generative
• Intents and actions
• Scripted
Different types of chatbots

• Generative
• Intents and actions
• Scripted
Interaction design and training

• Generative
• Intents and actions
• Scripted
Interaction design and training

• Generative
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Interaction design and training

• Generative
• Intents and actions
• Scripted
Group task – for October 6
(Appendix 1 in mid-term report)

Prototype a chatbot for a self-decided purpose

... using Chatteron

(... or Chatfuel if you want to use one of the most popular platforms for FB Messenger chatbots)

(... or Dialogflow if you want more flexibility and challenge)

Keep it simple and early-phase (4-8 hours work?)

Make brief (approx 1 minute) video capture of dialogue – upload to Vortex
Build Chat bots in under 5 minutes!

The best AI platform for building chat bots.
1. Embed Code

Please paste the below code after the </body> tag on your website to display a widget in the bottom right corner.

```html
<script defer>
    function loadChatWidget() {
        chatteron.init({
            clientID: "h7F8f1cc39x7oX0Bhx_q"
        });
    }
</script>
<script defer src="https://web.leana.ai/scripts/sdk.js" on=load="loadChatWidget();">
</script>
```

**Customize chat widget parameters**

**You can change the above parameters like theme color, label etc. by editing their values in the code above.**

2. Web Chat URL

You can also have a WebChat URL to display a bot on a separate URL.

```url
https://web.leana.ai/?clientID=H7F8f1cc39x7oX0Bhx_q
```

**You can change the theme color and label by editing the themeColor value and parameter value in the URL above.**
Welcome message

When constructing your bot, it is good to refer to Chatfuel's Help Documents library: http://docs.chatfuel.com/

Another good resource to consult is the 'Design Best Practices' guide from the Messenger Team: https://developers.facebook.com/docs/messenger-platform/introduction/general-best-practices

Hi, (first name)! Good to meet you :-)
End 1