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"Critical Tools for Machine Learning" Workshop Framework and Exercises

WS1: Situated Knowledges/Situating

Issue: ML systems are often detached from the socio-political-cultural contexts in which they operate. This detachment, or decontextualization, happens at the levels of data collection and use but also can be reproduced during the design process. This decontextualization enables ML systems to lay claims to objectivity and impartiality. This in turn might cause issues with ascribing accountability when ML systems generate erroneous or harmful results.

Methodology/concept: Situated knowledges and situating. The concept expresses the claim that in practice "pure objectivity" gives way to partial perspectives. Such partial perspectives acknowledge that knowledge always comes from somewhere: specific context, specific bodies, specific forms and instruments that generate it. Grounding knowledge in partiality allows for more accountability since such knowledge is contextualized, i.e., situated. Situated knowledges allow for an increased response-ability: capacity to respond towards their context.

Guiding question: How can ML systems design be situated towards greater acknowledgement of context and better forms of response-ability?

Main activity: Mapping contextual positioning of oneself and constructing shared situatedness.

Additional preparation prompt: List three objects that express something about your significant connections to the world: what kind of communities are significant to you, or do you feel you belong to; what kind of disciplinary or professional background do you have; what kind of materials do you like working with or are you fond of.

Exploratory Exercise 1: Mapping Positionality ("Rooting")

Think about the objects that you selected that represent your relation to the world. Spend some time considering: Why did you chose these specific objects? What kind of relations do they signify for you? What kind of places, people and communities, activities do they relate to? What do they say about your background and the kind of questions and values that are important to you?

Map out your answers in the digital workspace. Your goal is to form a map that represents your rootedness and specific positionality, including:

- Places (for instance, geographic locations, but also other significant background)

- People and communities

- Professional and other significant activities

- Values or questions that are important to you

Exploratory Exercise 2: Mapping Perspectives ("Shifting")

Consider the following questions:

- When I am positioned on my own map, what are the phenomena, issues, situations, or concerns that I can most clearly see or attend to?

- What are the phenomena/questions/concerns that I cannot see or things that are blocked from within this map?

- Which communities/concerns/environments do I feel particularly responsible to? How do the professional or disciplinary tools that I have at my disposal help me or hinder me?

- If I am to position myself slightly differently within this map, how would this list of concerns/questions change?

Spend some time thinking about this and noting down your answers as an annotation to the map that you drew before.

Design Exercise: Situating Towards Collective Systems

See if you can bring your maps together and construct a shared common ground within your group. Draw a map of your own group rootedness. To do that, consider the following questions:

- What are the communities, disciplines, positionalities, or orientations that you share?

- What are the significant differences that allow for diverse perspectives to be kept in mind?

- What positions might be missing?

- Can you identify concerns or problems that are significant to all of you in some way?

Work collectively to construct a shared map. Your goal is to indicate the following on this map:

- Shared contexts and concerns or significant communities

- Shared values and perspectives

- Significant differences

WS2: Figurations/Figuring

Issue: ML systems are perceived as ahistorical, disembodied, neutral tools that are devoid of power relations. Furthermore, being computational, these systems are also perceived as somewhat immaterial, operating in the abstract "digital space". The more material aspects of systems come in through user modelling. Nonetheless, here the explicit attention is usually given to the interaction between the user and the technical system where both are perceived as distinct entities.

Methodology/concept: Figurations a.k.a. conceptual personae. Figurations are mappings of situated, i.e., embedded and embodied, social positions – in other words, material-discursive entities that account for particular historical, political, and material locations. They stitch together meanings and practices. Technologies are materialized figurations that bring together both actual physical technologies and clusters of meaning (narratives, discourses, imaginaries) surrounding them, which together form more or less stable assemblages or configurations.

Guiding question: How can ML systems design be geared towards recognizing and acting from the embodied, embedded and power-laden conditions of its position as well as the effects of ML systems?

Main activity: Building a figuration of ML system.

Exploratory Exercise 1: Figuring Materials

Individually, explore the material that you indicated in your preparatory prompt from the previous day. Try to think about this material as a figuration. To help you do that, consider the following questions: What is it made of? Who made it? What is its history? How does it feel to the touch/taste/smell? What is the context of its use? What kind of emotions does it invoke? What are the stories related to it? What can it be made into? What can it know? Does it have memory? Does it have agency and if so, what kind? What is its body like? If it were animate, how would it see the world? What kind of concerns would it have or point to? What are the ways in which it relates to hierarchies of power? Make notes of your answers in the workspace.

Discuss together: What new perspectives, challenges or ideas does an understanding of this material as a figuration bring you? Is there something that you learned by thinking about it as a figuration?

Exploratory Exercise 2: Figuring Stories

For this exercise, try to weave a figuration as a structuring metaphor or conceptual imaginary that is significant for your shared concerns and/or communities.

First, consider one of the perspectives, communities, or issues that you identified as shared in your group in the Situated Knowledges collective mapping exercise. Consider the following:

- Who are the people playing a role in the definition of this issue or community?

- Are there specific imaginaries or personified figures of speech that appear often in talking about this concern or community?

- What concepts, stories and narratives are associated with this concern or community?

- What mythological, cultural, literary, or other figures are significant for this concern/issue or community?

Note the answers to these questions in the digital workspace: draw, use post-its, images – whatever media you can think of.

Once you have this rough map, try to see if there is a figuration – a structuring metaphor or a character – that emerges from these mappings as a significant concept to think with or as a figuration that embodies some of these items that you mapped out. Discuss and note down the following:

- What kind of stories does this figuration tell about your significant concern or community?

- How does this figuration illuminate, or perhaps even structure, the issue that the community is facing?

Design Exercise 1: Figuring Systems

The goal of this exercise it to work on the ML scenario that you selected and apply the concept of figuration to its design. Spend some time to think as a group about this ML system as a figuration.

First, consider its material base, the "stuff" it would be made of.

- What kind of immaterial and material elements would come together to form this system?

- What would its function be?

- Thinking about the system itself, what would it be able to teach you?

- What is its immediate environment within which it would make a difference?

Use sticky notes, images, digital pens etc. to note this down in the workspace.

Then, consider broader context of this system – the broader "stories" or discursive aspects:

- What historical contexts are important for the workings of this ML system?

- How does it relate to power distributions in society?

- What kind of stories would it tell?

- What kind of impact would it have?

- What would be its name?

See if you can weave a figure visually, by drawing, using images, and otherwise (in however abstract or concrete way) figuring it on the board. Pay attention to its material, discursive elements, and the relations to its context.

Design Exercise 2: Concretizing ML Systems

Based on the work that you did for Situated Knowledges day and Figuring Systems exercise, draw up a rough sketch – a skeleton – of how your envisioned ML system would function and what kind

of design steps would be needed for its development. Consider this exercise to be a drafting of a rough outline and a design plan of your system.

Specifically, define the following:

- The goal or task of your system

- Who would be involved in its design process and what steps would the design process entail

- How would this system work

- A slogan or tag line that describes what the system is trying to do, and its name

WS3: Diffraction

Issue: ML systems design often lacks interdisciplinarity and an in-depth understanding of the effects of its specific perspective. This prevents ML systems from attracting a wider range of expertise (or knowledge practices) and from being seen and understood in broader sociotechnical terms.

Methodology/concept: Diffracting the apparatus and tracing patterns of relations. Diffraction suggests that the apparatus of measurement and the tools of knowledge production themselves play one of the constitutive roles in generating knowledge. Diffraction generates patterns of interference, i.e., patterns of difference and relation, entangling processes of meaning-making and technology.

Guiding question: What are the effects of ML systems as complex apparati of knowledge production?

Main activity: Mapping ML system as a diffractive apparatus.

Design Exercise 1: Clarifying ML System and Its Structure

For this part, continue working on concretizing the idea of your ML system and clarifying its parts. The goal is to start building a kind of info-sheet or portfolio and operational diagram of your ML system, or clarify it (if you have already started building it).

Define the following as clearly as possible by writing down:

1. The task of your ML system

2. Optimization criteria (what counts as good performance of your system, what are you trying to achieve)

3. The data that you would ideally use for this ML system and where would it come from

4. Operational logic of your system (what is the input, output, how would the system ideally work)

5. If you can, consider what kind of model would your system require (a model for classification or regression, for example, or perhaps you can anticipate that it would have to be a specific type of model, e.g., neural network)

Design and Exploratory Exercise Combined: Diffracting ML

Think about how the example of light from quantum physics might help us understand ML systems. When we say that something (e.g., a light diffraction experimental set up with two slits) acts as a diffraction apparatus, what we learned is that the apparatus itself shapes the situation and the outcome. It shapes the problem formulation and the solutions to the problem. That is, the apparatus actively intervenes in the context that it is used in. So, to think diffractively with ML is to begin with an understanding that an ML system (and everything that comes with it) from the very start plays a role in defining the situation and the outcome. This also provides us with a really exciting possibility: what if we changed the diffraction apparatus – could we create the conditions for a different situation and outcome?

The goal of this task is to think of your ML system as a diffraction apparatus and see what can be changed by toggling with its parts. To do that, we will first identify the elements and relations that this apparatus entails and then trace the effects of this apparatus.

An apparatus has both material and immaterial parts, both technical and non-technical elements.

Step 1: To analyze an apparatus, start by identifying these elements:

- Societal/contextual elements

- Technical/disciplinary elements

- Discursive/ value elements

- Operational elements/logic

Step 2: Identify the relations between these elements:

- The relations where one element CONSTRUCTS another

- The relations where one element DISRUPTS another

- The relations where one element INTERFERES WITH another

Step 3: Trace the effects of your ML system

- Based on the elements and relations that you identified, trace what *effects* your ML system would possibly have. For example, would it introduce new values? Change existing values? Intervene into the way we understand certain phenomena? Introduce new relations between communities or phenomena?

- Discuss how you might want to change the characteristics of your system that you drafted during the first part of the day (the operational diagram of your system) based on your understanding of these effects.

WS4: Critical Fabulation and Speculation

Issue: ML systems are thick material-discursive knots, however in design they are regarded as discourse- and story-free objects/systems. Furthermore, biases emerging in ML systems often signal not only negative impacts but exclusions of specific voices, perspectives, and histories.

Methodology/concept: Critical fabulation/speculation. Critical fabulation entails speculative thought and imagination but it positions those activities against the absent imaginaries and loci of power hierarchies. In particular, critical fabulations are methodological tools to address missing imaginaries and missing perspectives. They provide an alternative to "white prototypicality" and the "I-methodology" that is prevalent in technology design.

Guiding question: How can the specific grounded perspectives and forms of collective and personal accountability be addressed in ML systems design? How can these perspectives be designed with more inclusion?

Main activity: Fabulating and prototyping speculative ML systems.

Design and Exploratory Exercise 1: Writing Design Narratives

For this task, the goal is to write your design narrative – a short (~200~300 words) fabulated story on what your ML system is and what it does, how it would be used and by whom.

Make sure that your narrative in some way touches the following questions:

- Who are the anticipated users and who are the other stakeholders?

- How is the system to be used?

- What role does your figuration (from WS2) play?

- What kind of difference does this system make for its users?

Write this story down in the workspace. Try to write collectively, i.e., try to make sure that you all contribute.

Exploratory Exercise 2: Analyzing Narratives

The narratives or fabulations that we create reflect specific situated positions. All narratives are written from somewhere and for someone and in that sense they can reveal both crucial future workings of technology as well as critical missing points.

Look at your narrative again and analyze it more closely:

- What or who are the main protagonists of this narrative? And, by extension, what or who are missing?

- What are the limitations of the figuration and imaginaries that you used in this narrative?

- Whose perspective is this narrative written from? Who does this perspective include or exclude or perhaps completely ignore?

- Does this narrative show what is the broader significance of this technology – i.e., why does it matter? If yes, who is positioned as benefitting from this technology and who might not? If no, reflect on that.

- What are your own stakes in this design – i.e., why are you designing this technology? How does it touch your personal life?

Make notes of your discussions on these questions. Don't be afraid to be critical! Analyzing your own narratives (in the context of this exercise, and more generally) is a valuable tool for understanding own positionality and the positionality of your design projects.

Design Exercise 2: Fabulating with Critical Perspectives

Critical fabulation as a method has a strong political grounding because it asks questions about omissions that matter, accountability for the stories we tell, and construction of the futures that we want to see. Based on the narrative analysis that you did in the previous step, fabulate a narrative with these critical questions and insights in mind. Consider the following:

- How can this system center less heard voices or address their absence?

- What alternative histories or practices can inform this technology and/or its use?

- What forms of collective and (your as designer's) personal responsibility can be introduced or demonstrated?

For this fabulation, try adopting a different perspective than you have in the first narrative (e.g., you could write it from the perspective yourself or your team, or form the perspective of the ML system itself, or perhaps from a member of a population that would be indirectly affected by your ML system). Don't edit the first story but rather write a new one.