

## LINKS:

[GitHub](https://github.com/Kijid/Group-9-Project.git) Repository: ( <https://github.com/Kijid/Group-9-Project.git> )

[Deepnote](#) Machine Learning Workstation

[Canva](#) Netnography Link:

<https://www.canva.com/design/DAF4deRZoZo/8WNDxkAnVVniltSsl5lSCg/edit>

## METHODOLOGICAL STATEMENT

Within the context of our group project, we focused on two communities: those who fear artificial intelligence (AI) and those who do not. Our goal was to explore these different sentiments towards AI and how its insights can contribute to the problem of AI governance. On the whole, our research methodology is rooted in an embedded design format, where machine learning techniques are strategically used to inform netnographic analysis. Additionally, we integrate cartography to further contextualise and synthesise concerns present in sentiments within AI.

To begin with, we started by identifying key subreddit communities relevant to our research inquiry using keywords associated with AI and sentiments of fear and fearlessness. We aimed for a balance between representativeness and diversity of thoughts, backgrounds and interests by inquiring into several sub-reddit communities. This resulted in a table with important information like post title, link, and number of comments. This provided an easily accessible source for NLP explorations while enhancing the level of flexibility and clarity we had in making changes and evaluating outputs. From here onwards the two core methods ran in parallel to each other to shape our understanding and research and the cartography was built on top.

## NETNOGRAPHY DETAILS

r/singularity - members are a key group interested in future technologies, particularly AI and its societal implications

We chose netnography in its ability to reveal the contextual factors influencing perceptions of AI and individual sentiments. We began by scoping Reddit's r/singularity for posts reflecting a spectrum of AI perspectives. In order to facilitate a parallel approach to our netnographic and machine learning investigations, we created a table of posts with key information for ease of analysis.

We organised our netnography on a 2D axis, plotting posts by sentiment and engagement to capture the community's emotional investment and identify prevalent concerns. Themes were depicted as nodes on the visual map, clearly illustrating the engagement levels of each topic. This approach highlighted how certain themes, such as job displacement and human exploitation, sparked considerable debate amongst both communities. User analysis was also conducted to allow us to understand the nuances of individual and community responses to AI, providing deeper insight into the fears, hopes and personal experiences.

Through the analysis of this method, we noticed recurring themes that reflected the community's opinions, however, since the corpus consists mainly of English-speaking members, specifically from the US, there may be a regional bias and a predominantly Western perspective on AI.

## **MACHINE LEARNING DETAILS:**

This method was deployed to analyse data in mass and provide a contrasting approach to that of the highly qualitative lens that netnography centres itself around. Upon evaluating each of the subreddit posts and communities for suitability for this method, a list of potential links were marked for later integration into the code. Due to the tendency of people to oppose the sentiment and thought expressed within a particular post we intentionally selected a range of posts with for and against sentiments towards AI and analysed them together. While contrarians are inescapable, this was sometimes clearly done gently to ease anxieties of those with excessive worry.

For the majority of this method's development a sample of the wider data we wanted to inquire into was extracted and worked with. From the very beginning, our approach prioritised data quality and the clarity of code to ensure we were able to iterate towards a successful final product that provided a holistic understanding of discussions related to AI and technology on Reddit. To achieve this we employed a combination of natural language processing and machine learning techniques including data cleaning, pre-processing, word embeddings, sentiment analysis, topic modelling, and NER. Following are the details.

We programmatically accessed Reddit's API using the Python PRAW library and applied a filtering criteria to exclude comments with a length above a certain threshold. This was to ensure only comments of manageable size were considered, allowed us to capture more comments, and limited the skewing of our results with no one comment contributing over a set number of lemmas for analysis. Once the remaining notebooks were finalised and ready to be scaled the code had to be altered slightly to not exceed Reddit's api limit. Explorations were conducted to find optimum link size in order to capture enough sentiments to justify machine learning while ensuring patterns weren't lost.

Data quality was ensured through removing duplicates, missing values, and the usual noise that interferes with analysis. We then employed Word2Vec, an unsupervised learning technique, to capture semantic relationships between words and assess their impact on sentiment. Next, VAD scores were assigned to words in the corpus to measure sentiment, a core goal of our analysis. We also utilised LDA, a probabilistic topic modelling technique, to identify latent topics and uncover any hidden thematic structures in the text data. Employing spaCy, NER was also experimented with to extract key entity types and entities.

Finally, throughout the research process we used data visualisation libraries such as Matplotlib and Plotly to create graphs and plots – they functioned as a key access point to insights.

## **CARTOGRAPHY DETAILS**

To continue with our holistic intentions, whilst also recognising that even amongst well-versed members of the AI-inspired communities we were focusing on were struggling with some of the concerns that are growing in those spaces, we decided we would attempt to map out AI. By using cartography, we were able to create a catalogue of AI,

encompassing the past and present, while also addressing some of the future concerns, in a way that it could allow those who understand less to gain a more level playing field.

The map needed to be diverse in nature: for the historical aspects, we turned to encyclopaedias and timelines in order to establish some key points in AI development history; we explored fiction to find a range of characters relevant to the discussion, both for and against AI as a concept, as well as Asimov's "Three Laws of Robotics"; for the understanding of how AI models work, we explored the websites of leading AI companies, such as OpenAI; and for the ethical contributions we turned to our previous NLP and Netnography analysis, as well as news headlines.

The decision to map onto a computer was made due to the clear relationship between AI and computers. Different topics within AI were placed in certain places due to the similarities we felt they shared. The History of AI matches with the battery, as 70 years of research provides a backbone that powers the rest of the research that is done today. Fiction sits on the RAM, as ideas that can be drawn on by other components. Consequences connect to the fan, as with rising environmental costs to run AI and cool down computer systems, the fan is vital to consider, and without it, things can go up in flames.

### **NOTE ON ETHICS:**

The challenge of anonymity was a key consideration, especially in machine learning and netnography with its heavy reliance on open source data. In machine learning usernames are not extracted since we didn't have a need to tag comments and all data is analysed as lemmas so this limits any google searches of comments. However, within netnography there was no suitable parallel intervention since phrases and interactions were analysed. While our work is limited to educational purposes this concern should be addressed before any publication of netnographic content.

### **OVERVIEW:**

Overall, our methodology was guided by the principles of data-driven research; human-centric analysis with empathy at its heart; and contextualisation of insights through historical understandings, present facts and future speculations. We leveraged a combination of NLP techniques in combination with Netnographic analysis and cartographic mapping to inform our output.