Chapter 3 Context:

## 3.1 Software Development Methodology:

Agile development was undoubtedly going to be the best methodology initially for this project based off prior knowledge of how well it works with sprints but deeper research has solidified this choice the paper "Agile Software Development: Current Research and Future Directions" emphasises agiles core principles, iterative development, adaptability and stakeholder collaboration (Dingsøyr et al., 2010). The Research paper “Comparative Study on Agile Software Development” goes in detail in comparing agile over more traditional models like waterfall. Their analysis shows Agile’s strengths in environments requiring rapid feedback cycles like a projects user testing phase. The study compares different type of Agile methodologies like Scrum, Kanban and Extreme Programming, highlighting that Scrum’s structured and flexibility in sprints was particularly effective for people with defined short term goals which aligns with the projects approach of mostly 2-3 week sprints. A risk they talked about when using Agile is the reliance of continuous communication, which will be mitigated through constant communication with my supervisor (Moniruzzaman & Hossain, 2013).

## 3.2 Social Media Analytics

The research “Social Media Analytics: Literature Review and Directions for Future Research “ (Rathore et al. 2017) discusses the challenges and opportunities in social media analytics, which informs the foundation of this project. The work done shows the persistent issues of existing analytics tools, focusing more on superficial metrics like sentiment analysis at the loss of deeper relational insights. The argument they make is while social media platforms are able to create vast datasets, most tools fail to meaningfully analyse the association between users and content which is a gap that this project will try address by adding deeper analysis with follower interaction analysis and shared interest identification. The authors emphasise the need for robust preprocessing pipelines to manage noisy data like removing URLs and hashtags which is something the project aims to do. They talk about future research directions and one big thing they discussed was integrating machine learning to enhance predictive and interpretive capabilities which aligns with the projects use of pre trained language models.

## 3.3 Technical and Ethical considerations in Data Collection with API

Lomborg and Bechmann's (2014) "Using APIs for Data Collection on Social Media" provides a framework for understanding the technical and ethical difficulties of manipulating social media APIs. The authors emphasise that although APIs normalises access to social media data, they have structural limitations like rate limits and restricted endpoints, this influenced the decision to use multiple social media APIs in the project. They highlight the “invisibility” of users whose data is obtained via APIs, raising concerns about informed consent and contextual integrity, which aligns with the projects compliance to GDPR principles, like excluding private accounts from analysis.

## 3.4 Existing Solutions

### 3.4.1 Large Language Models

Large language models like Chatgpt(OpenAI)and Gemini (Google) are LLMs can be used for social media analysis via prompts. LLMs allow users to do things like analyse a specific post and generate content but, going deeper with analysing could be hard as multiple prompts would have to be made and even then, it may be possible that the information it gives may not be true. A big issue with a lot of these is that they restrict more powerful versions through a paywall. Using LLMs will create a good foundation for analysis but the project will have to expand on it by creating deeper analysis like the follower interactions as discussed.

### 3.4.2 Mandala AI

Mandala AI is an existing social media analytics tool that focuses more on the marketing and growth aspects of social media. Its core functionalities include identifying influence hierarchies and analysing engagement patterns to maximise reach and monetisation. It offers metrics like follower growth rates, post performance benchmarking and competitor analysis. However the fact that Mandala AI has a business centric design limits its utility for non commercial and personalised analysis. It lacks the ability to analyse individual behaviour like identifying user personalities and does not explore shared interests.

# References

Torgeir Dingsøyr, T. Dybå, N. B. Moe (2010) Agile Software Development - Current Research and Future Directions

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