**COMP60532 Digital Biology**

**GROUP WEEKLY REPORT**

| **Team Number** | **13** | **Date** | **09/02/2024** |
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| **Team member contributions** |
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| Piotr: carried out research about AI applications to disease prediction  Hafsa: researched → disease recurrence prediction using AI  Ziyu: researched on the AI application on the post-operative care  Muying: researched on the AI application on the precision medicine  Shenhujing: researched about AI application on the drug discovery  Hamwen: researched the survival prediction based on Deep Learning  Yufan: researched some specific examples of AI used for disease prediction |

| **Summary of findings** |
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| Disease prediction: promising and well-researched topic which has some well-known challenges that need to be faced. AI is effective at predicting disease, for example, can enhance early detection and improve accuracy especially in some areas lacking resources.  Disease recurrence: limited information on the topic, in regard to genomics specifically. Most literature focused on imaging/clinical/cell data not on gene data.  Precision medicine: considering Individual variability, combined with information from patient symptoms, clinical history, and lifestyles to facilitate personalised diagnosis and prognostication.  Survival prediction: A promising subject and one on which more progress has been made. Thanks to the advancement of computing devices. Multimodal deep learning models have been widely used for survival in recent years, integrating different types of high-dimensional data and trying to maintain the dimensionality of the data as well as dealing with missing data. So far, a single model can be applied to different kinds of cancer types with good performance.  Drug discovery: Although it shows great potential, the maturity of deep learning in drug discovery applications may vary depending on specific use cases.  Post-operative care: The integration of AI into surgical phase recognition presents a promising avenue for enhancing surgical training and operational efficiency. AI can support surgeons in decision-making and post-operative analysis, contributing to improved patient outcomes and surgical practices. |
| **Plan for Next Week** |
| Team: we have specified a framework to use to support our research. The framework consists of five aspects that we need to consider for each of the four topics that we are going to explore moving forward. By the end of next week, we plan to write up the structure of our report.  Topics of interest: Disease Prediction, Drug Discovery, Disease Classification, Precision/Personal Medicine.  Framework for research:   * How does the task work/what's the process? * What are the existing DL models used for this task? * Accuracy - how good is the model at the task? * What are the limitations of the models? * How explainable are the models? * What are the practicalities of the models/what is the use-case and how easy to use?   Piotr: continue research on disease prediction using the above framework for research  Yufan: research AI applications for disease prediction based on genomic data using the above framework  Hafsa: research on disease classification using the above framework for research  Ziyu: research on the disease classification within the mentioned framework  Shenhujing: Research on drug discovery and development using the above research framework  Muying: continue deeper research on precision medicine using the above framework for research  Hanwen: research on precision medicine using the above framework for research |