

Google's DeepMind health & Moorfields Eye Hospital - Using AI to predict retinal disease progression

1. Background

Google's DeepMind AI group launched DeepMind Health and have since worked in partnership and collaborated with Moorfields eye hospital NHS foundation trust to research and predict the progression of retinal disease, specifically wet age-related macular degeneration (wet-AMD) (Deepmind.com, 2020).



2. What is AMD?



AMD is a leading cause of blindness affecting around 25% of individuals aged 60+ in Europe (Li et al, 2019), with 15% of those with dry-AMD developing wet-AMD, which can cause permanent vision loss. Detecting the onset of wet-AMD during the transition period from dry-AMD could provide a crucial opportunity for novel therapeutic strategies and potentially prevent vision loss.

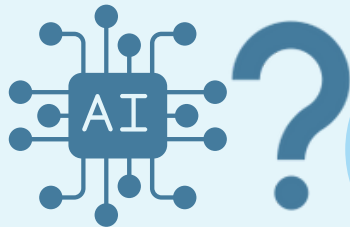
3. Why is the AI needed?

Ophthalmologist's routinely diagnose wet-AMD using OCT scan analysis but is time consuming and leads to preventable vision loss (Ahuja and Halperin, 2019). Therefore, Google and Moorfield Eye Hospital trained an AI system on a large dataset of anonymised OCT scans allowing for better reliable predictions of wet-AMD onset in the next six months than experts.



(Moorfields.nhs.uk,2022)

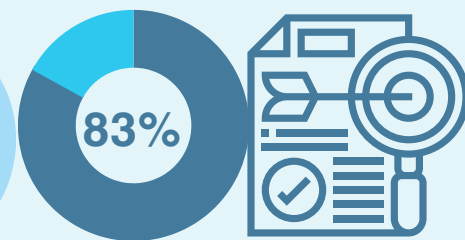
4. How does the AI work?



The AI's software is based on deep learning principles and use algorithms to find patterns in data, the OCT scans (Vincent ,2018). After being deployed, the AI is given new OCT scans to examine for potential wet-AMD indicators using the knowledge gained during training. A risk score for each patient, reflecting the likelihood of illness development over time, can also be given to clinicians by the AI.

5. Limitations of the AI

- Although the AI was more accurate than 83% of the experts, there are concerns regarding the accuracy and reliability of the AI due to potential biases that could impact the AI's performance in the training data.
- The 'black box' problem – use of AI raises clinician concerns in their trust of the AI's decision making as it is too complex and they are unable to understand how the AI came to its conclusion (Ahuja and Halperin, 2019).



6. Implications of use



- The AI has potential to benefit AMD patients and care teams, but its accessibility may widen the socioeconomic gap in healthcare outcomes.
- DeepMind's data protection is subject to strict regulations such as EU's GDPR, but there have been accusations of not properly notifying patients about data usage in the past.

References

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