Knowledge and masking to address AI bias and performance

Presagen

A.I. Enhanced Healthcare

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AI bias and performance are significant issues for AI

Impacts scalability (generalizability), reliability and utility of AI when used in clinical practice

Can’t just throw data at AI algorithms and expect a good result

AI (machine learning) does not understand the problem or the data

AI simply looks for patterns and features in the data to help you identify or classify something of interest, e.g. cancer in an image

Greater detail in data is not always helpful

Overwhelming details in data cause difficulty for AI (machine learning)

AI can find patterns in irrelevant details that are not important to solving the problem

Example: identifying polar bears in images

Most polar bear images contain snow

Rather than learn to identify polar bears, the AI may learn images containing snow are polar bears

AI does not always find what it is looking for on its own

Knowledge of the problem and data helps to design and target the AI

Masking helps eliminate irrelevant details that may confuse AI, and focus on what's important

How does it help with bias?

Example: Potatoes and Carrots

Easy to distinguish with
different shape and color

How does it help with bias?

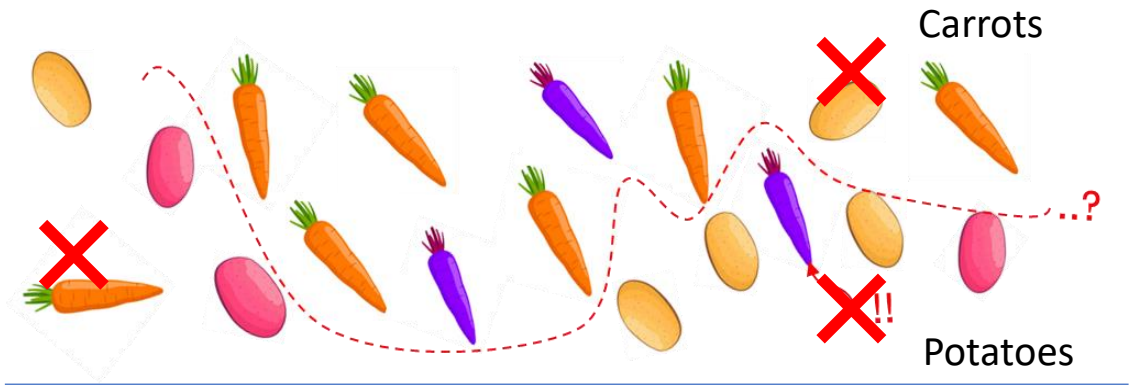
Example: Potatoes and Carrots

Easy to distinguish with different shape and ***color?***

AI focusing on color can produce unexpected results

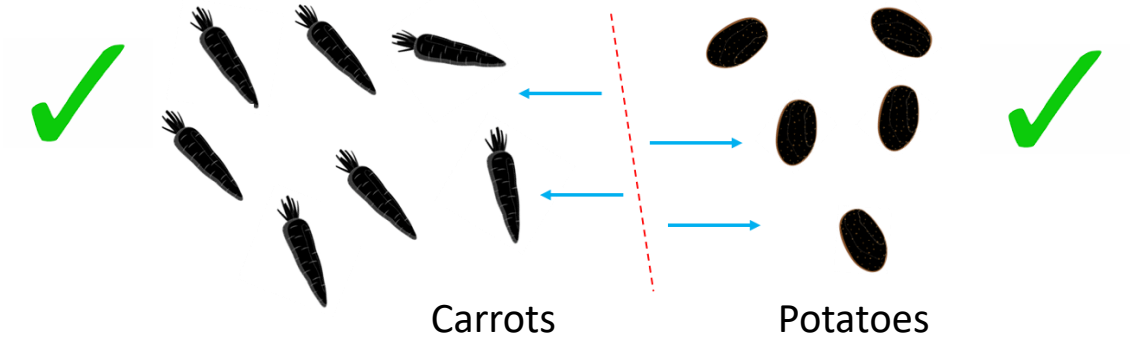
Masking can help eliminate impact of color influencing identification of potatoes and carrots

No Masking



Color confuses the AI

Masking



Eliminate color as a factor
= better performing AI

Real world medical example: images of embryos in IVF

Use AI to assess embryo:

Viability
Likelihood that the embryo will lead to a pregnancy for the IVF patient

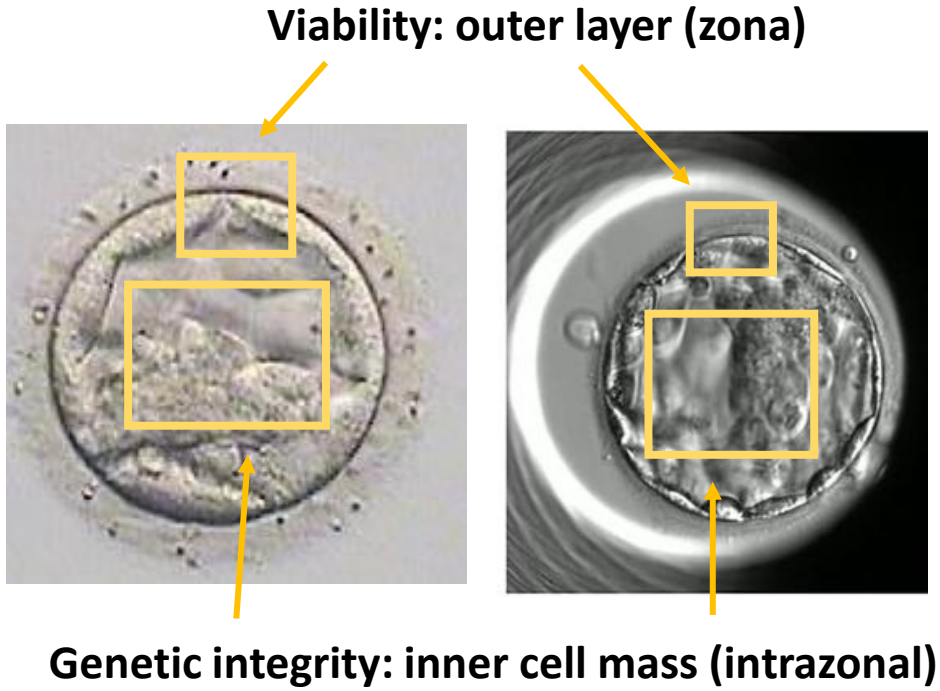
Genetic Integrity
Likelihood that the embryo is genetically normal

Images of embryos

Real world medical example: images of embryos in IVF

AI Performance

Different parts of the embryo are important for assessing their viability (likelihood of pregnancy for IVF patient) and genetic integrity



Real world medical example: images of embryos in IVF

AI Performance

Different parts of the embryo are important for assessing their viability (likelihood of pregnancy for IVF patient) and genetic integrity

AI Bias

Images from different camera systems look different, with potential for hardware bias

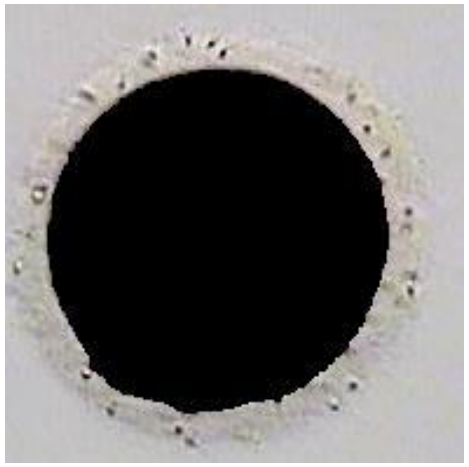
Standard Microscope Camera

Time-Lapse Incubator

Masking helps target AI on what is important to improve embryo AI performance and reduce bias

Whole embryo

Zona Segmentation



IntraZonal Segmentation

Augmentation also helps eliminate potential bias from embryo orientation or color

Different colors synthetically imposed on the same image

Different flips and rotations imposed on the same image

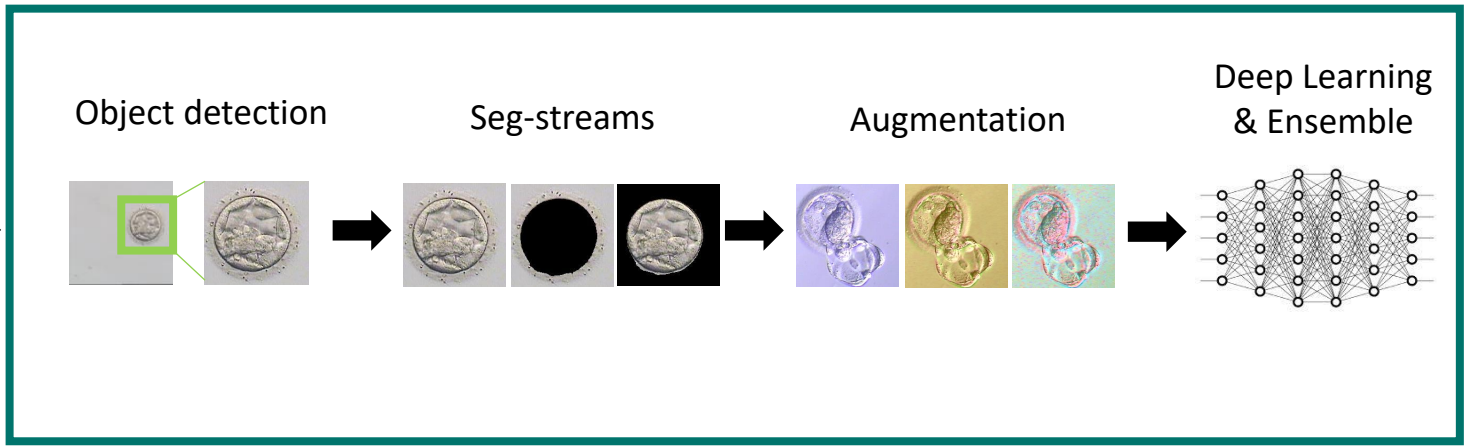
Creating an AI for embryo assessment

Training Dataset
(Non-time lapse images only)

\+

Pregnancy or Genetic Outcomes

Model Training Pipeline

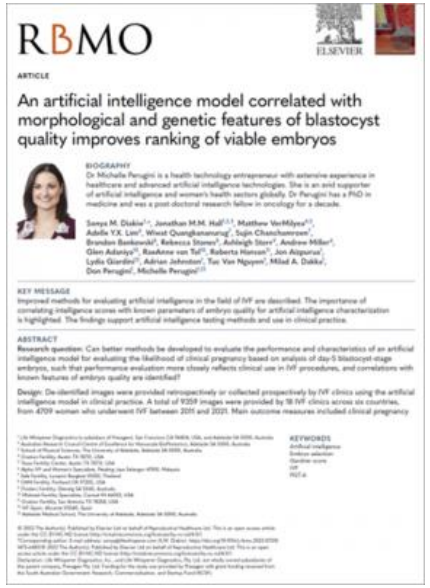


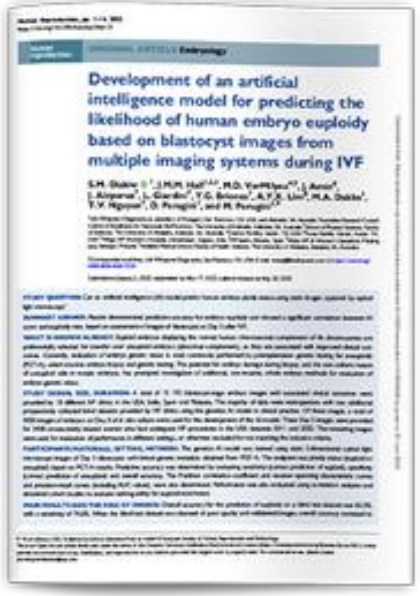
Testing on Different Imaging Types

Standard Time-Lapse

Unbiased AI clinically validated on camera systems it was not trained on

Presented at ESHRE 2020



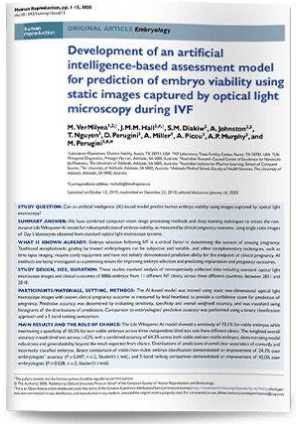


- Life Whisperer AI is only available for sale to healthcare professionals -

AI performance for embryo assessment based on international clinical studies

25%

Increased accuracy for pregnancy prediction


Development of an artificial intelligence-based assessment model for prediction of embryo viability using static images captured by optical light microscopy during IVF

12%

Reduction in cycles needed to achieve pregnancy*


RBMO

An artificial intelligence model correlated with morphological and genetic features of blastocyst quality improves ranking of viable embryos

Using simulated cohort ranking analyses.

82%

Probability of selecting a genetically normal embryo*


Development of an artificial intelligence model for predicting the likelihood of human embryo euploidy based on blastocyst images from multiple imaging systems during IVF

Using simulated cohort ranking analyses. Genetic status was evaluated based on an embryo having the correct number of chromosomes.

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Knowledge and masking can help improve AI performance and reduce bias

For healthcare, it improves scalability (generalizability), reliability and utility of AI when used in clinical practice

Helps ensure AI is applicable to everyone

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