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Boston
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June 18–June 21

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Title:

Automated Detection of Traumatic Hand Fractures on Plain Radiographs Using a Deep Learning Model

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Disclosures:
none reported



Background

- Despite their common nature, some acute hand injuries (esp. occult fractures of the carpals and phalanges) can be difficult to visualize on plain films
- Some go undiagnosed as result
- Deep learning machine vision algorithms are capable of detecting occult fractures on plain film
- Models can reasonably be created to mitigate missed fracture diagnoses



Objectives

- Investigate this use of artificial intelligence models for acute hand trauma.
- Train and evaluate a deep learning algorithm capable of detecting and localizing hand fractures on plain films.



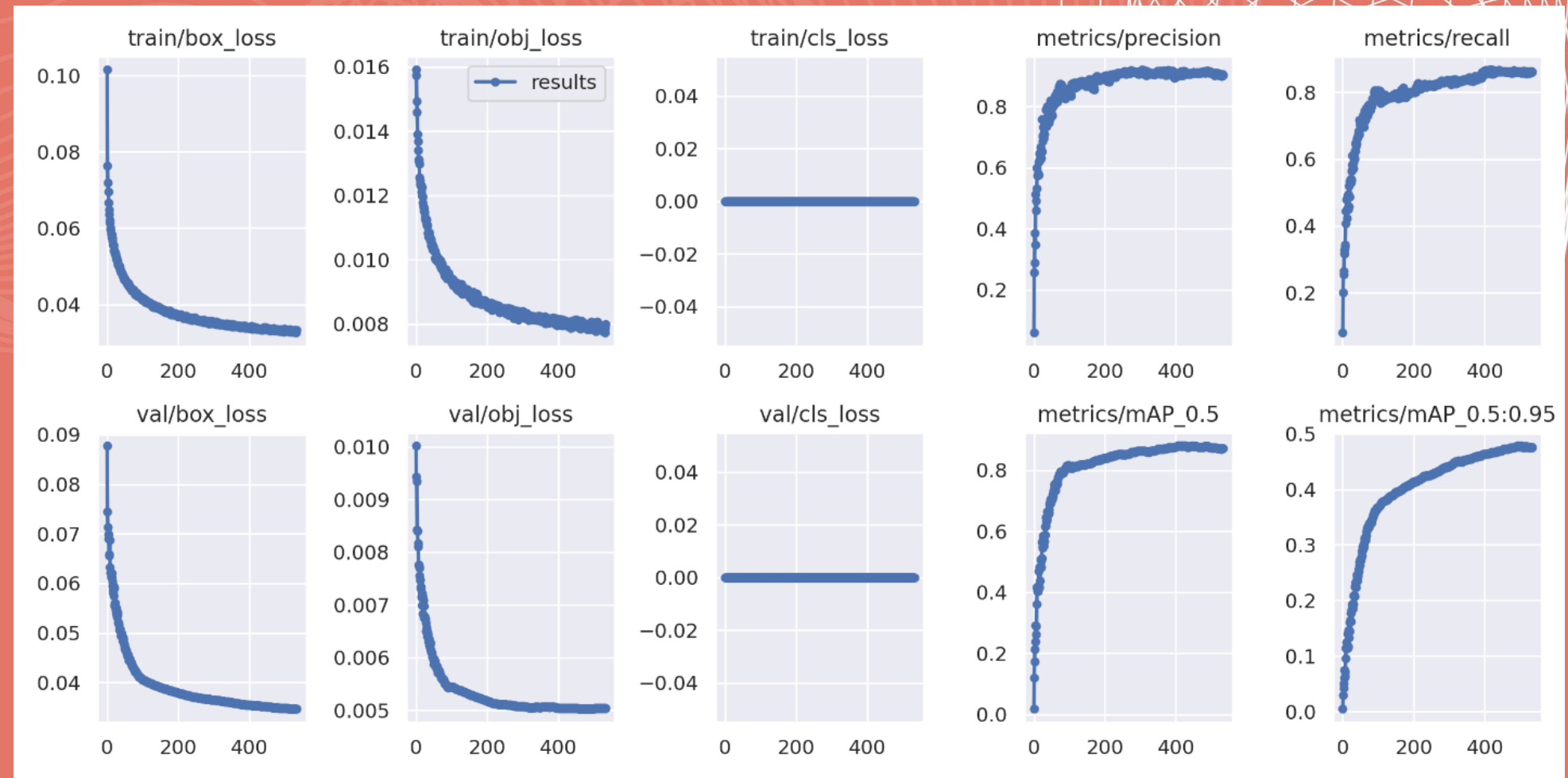
Methods

- 1548 hand trauma radiographs
- Fractures marked by bounding boxes
- Preprocessed, augmented to 3.2k training samples, 314 validation samples, and 154 test samples
- Object detection model trained for 550 epochs



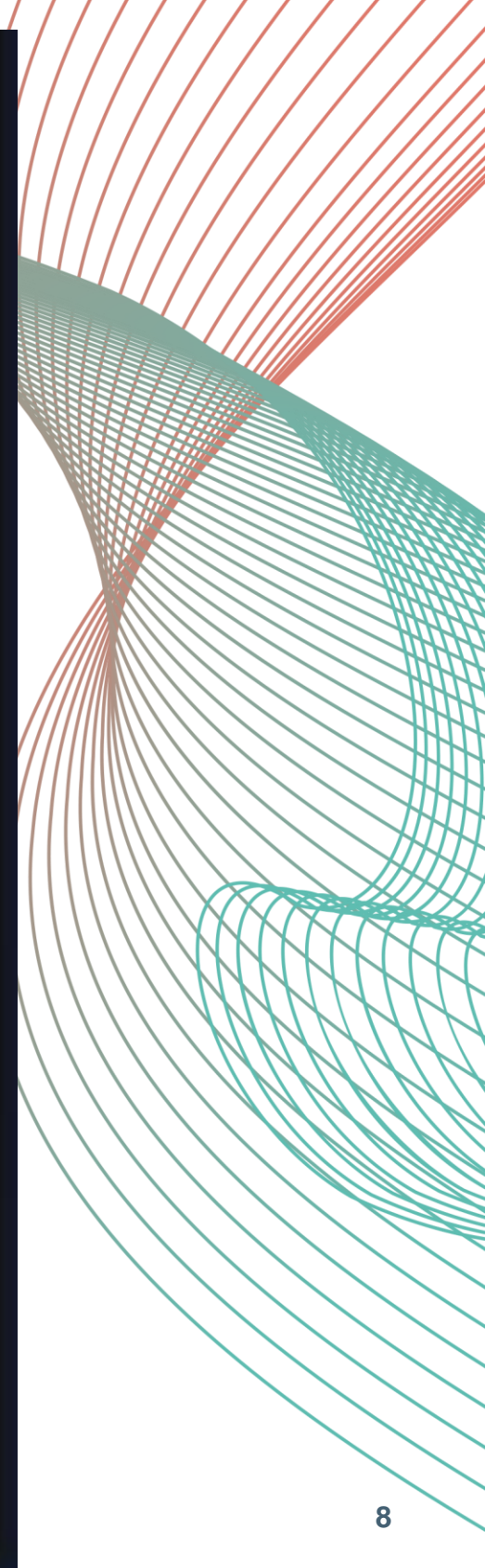
Results

- mAP of 88.0%
- precision of 91.0%
- recall of 86.1%



Conclusions

- Preliminary study
- Promising candidate for diagnostic adjunct in trauma films
- May be used as triage tool in future high-acuity/trauma settings (e.g., emergency dept)



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