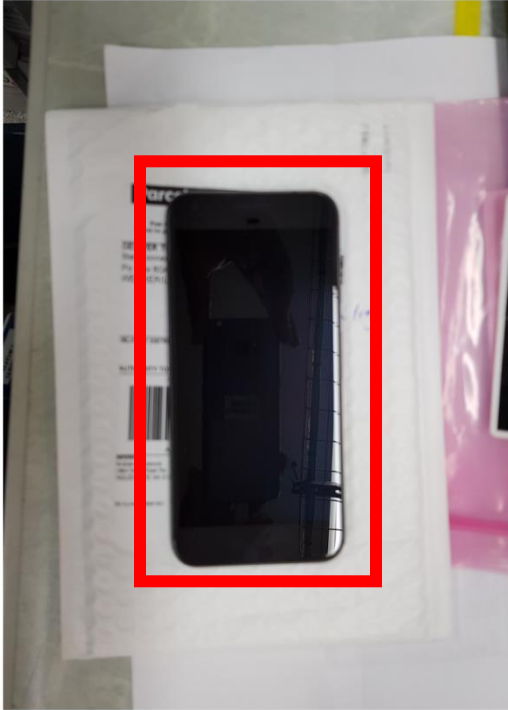


Concept:

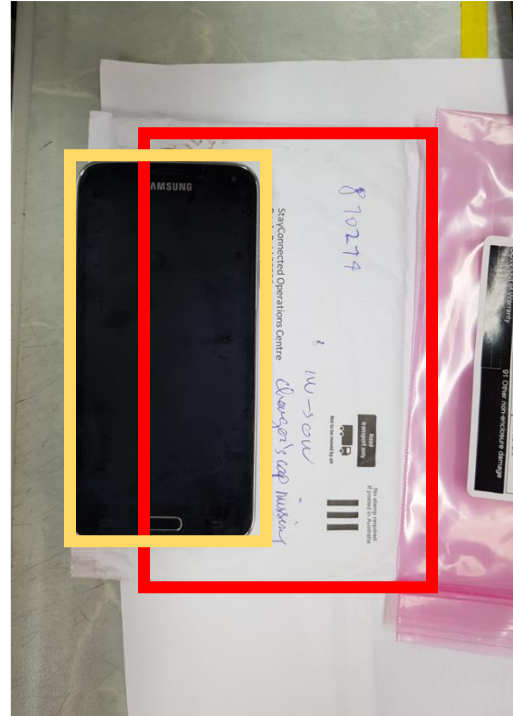
- User use a camera to read text -> phone and finger detection -> crack detection
1. OpenCV read frame from camera and show on screen. The fram will be visualized with center box (we named (OCR-BOX)).
 - a. User will move the camera to let the text (IMEI number) inside the box -> press "o" on keyboard to confirm -> run OCR -> show OCR on screen (for example in top-corner)
 - i. Ask press "f" (forward) to continue next phase or press "b" (backward) to stay at OCR phase (if the OCR wrong)



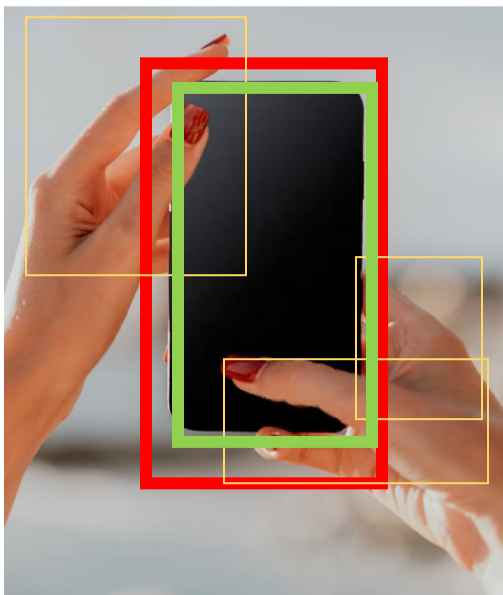
2. If press "f" (forward); we come to Phone/Finger detection phase. Show bigger box with ratio 16:9 (normally phone ratio) from center of screen
 - Run Phone/finger detection yolov5 model in real time; check finger position.
 - IF phone inside center box AND finger not on screen (phone box) -> continue phase 3
 - IF phone not inside center box -> show on the top that "please move phone in focus box". IF finger on screen -> "please move finger out of phone"



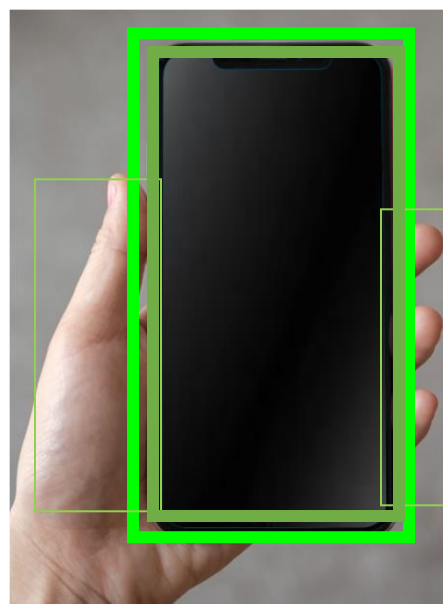
Phone inside center box



Phone not inside center box



Finger inside screen



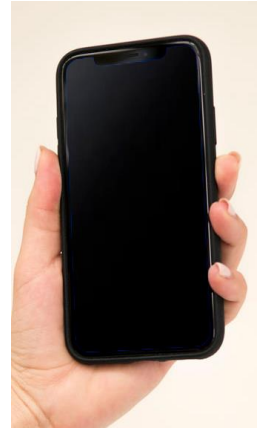
ACCEPTABLE (phone inside box and finger not on screen)

3. IF phone inside AND finger not on screen -> run crack detection and visualize the crack on frame.
- IF not, comeback step 2.

Note:

- The Finger checking will have option to enable/disable in arge parse. If disable -> no need check finger inside/outside screen (and no need visualize finger too).
- We already has crack detection model; need to train finger and phone detection using "yolov5"
- Some control hotkey on frame which using `cv2.waitKey()` to control:
 - o "o" -> run OCR inside the OCR-box
 - o "f" forward from OCR -> detection phase
 - o "b" retry OCR mode (mean not go to detection, stay at OCR checking step and wait to press "o" to verify OCR again)
 - o If in detection phase; press "b" to backward OCR phase.
- To visualize, we can set color for phone box and finger box to let user know the status. Example:
 - o Phone box will be green if fully inside center-box; if outside, change it to orange or yellow to warning.
 - o Finger box will be green if not inside phone, if inside phone -> change to orange/yellow to warn then user will know to move finger out.
 - o If all condition acceptable (phone inside box AND finger not on screen) -> change center box to green color so user know that crack-detection is running (can print some text on top corner to let user know the phase/status)
- IF just a small part of finger inside phone (normally the box not totally match finger shape), still acceptable.

- ACCEPTABLE



- NOT ACCEPTABLE (finger inside phone)

