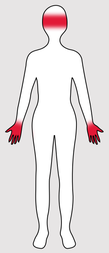
Automated Shoe Push Test and Gap Detection to Reduce Associate Fatigue

The Push Test

New Balance associates perform a push test in 22 seconds to check for gaps between the sole and upper of each shoe.

This test is performed by hand 8,400 times a day leading to strain in the hands and eyes of associates.



Current push test associates complete by hand

7-Point Push Test Locations

Our Innovation

Integrating camera vision into push test.

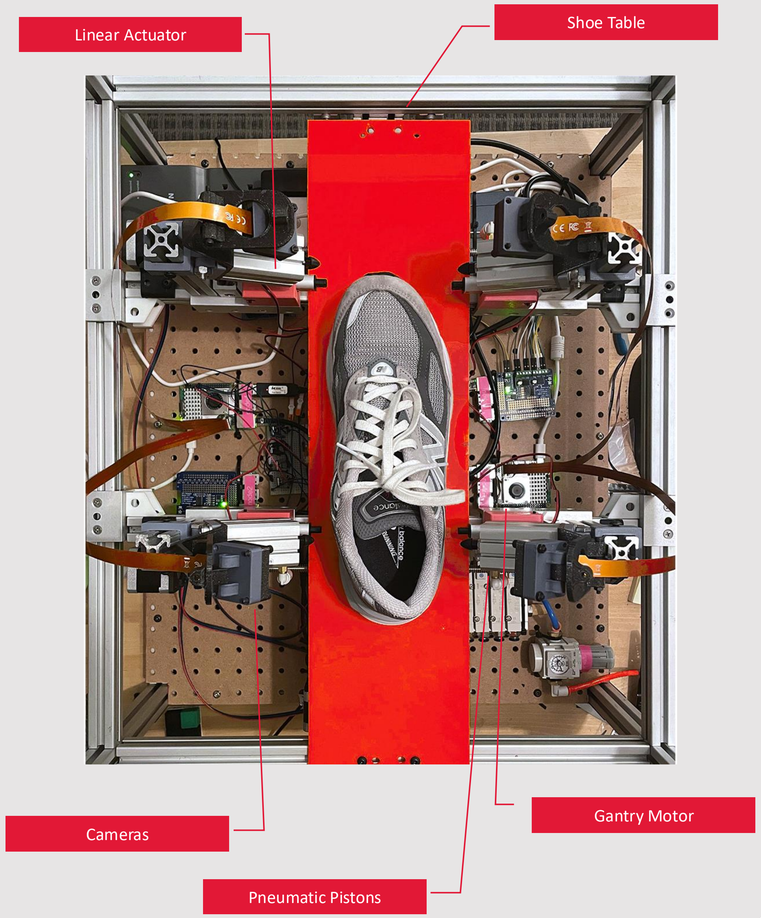
- Alleviates overlooked strain on eyes by magnifying image.
- Allows for horizontal table position and automated gap detection

Unopened gap in shoe

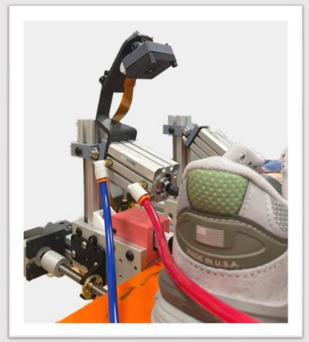
Opened gap in shoe

Goal:
Develop a gap checking system that performs the 7-point-push-test in 30 seconds to reduce associate fatigue while smoothly integrating into the production line.

The Horizontal System



Camera Capture



Cameras capture image of areas between sole and upper prone to gapping using adjustable camera mounts

Raspberry Pi stores images for future reference during quality control

AI gap detection through LLM inference

Single Foot Press

Solenoids control double-acting cylinder pistons

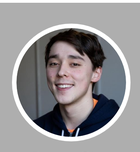
Consecutively timed push and camera capture operation programmed through mosfet and Raspberry Pi

Looking Forward

Additional features to add:

- Integrate lighting for clearer camera captures
- Program modularity for various shoe sizes
  - Shoe size presets servos can adjust to
- Automate activation through shoe sensing
- Improve safety measures
  - E-stop, sensors


Patrick McLeary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