Booking.com

Booking Home : Quality Engineering

Automatic test verification

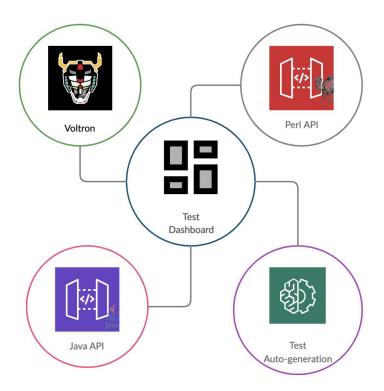
Yang Liu (flint.liu@booking.com) | 20 Nov 2019

Go Automation.

Agenda

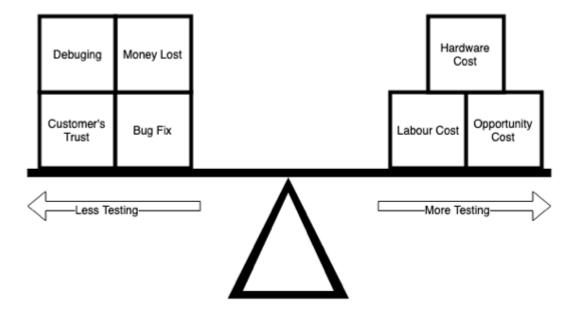
- **1.** Automation in Booking Home
- 2. Testing and Quality Engineering
- 3. Metamorphic Testing
- 4. Case Study: Log Based Autoverification
- 5. Case Study: Test Al Image Recognition

Test Automation in Booking Home.

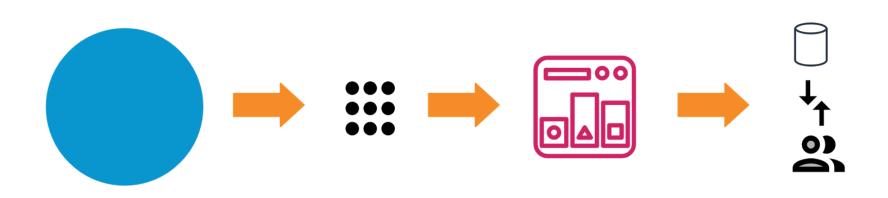


Testing and Quality Engineering

Before everything else.



What is Testing?



How can we test those?

Settings Tools

Google movies J Q Q All Videos & Maps I Images I News More

Page 2 of about 12.270.000.000 results (1,22 seconds)

Movie Ticketing - Facebook

https://www.facebook.com > movies +

See showtimes for movies near you and buy your tickets through Facebook with no fees at select theaters. The discount will be automatically applied at checkout ...

Movies - Google Play

https://play.google.com > movies + No information is available for this page. Learn why

Movies | FANDOM

https://www.fandom.com > topics > movies Your daily source for all things TV, movies, and games, including Star Wars, ... 'Batman: The Movie' Honest Trailer Shows the Dark Knight's Lighthearted Origins.

Not possible

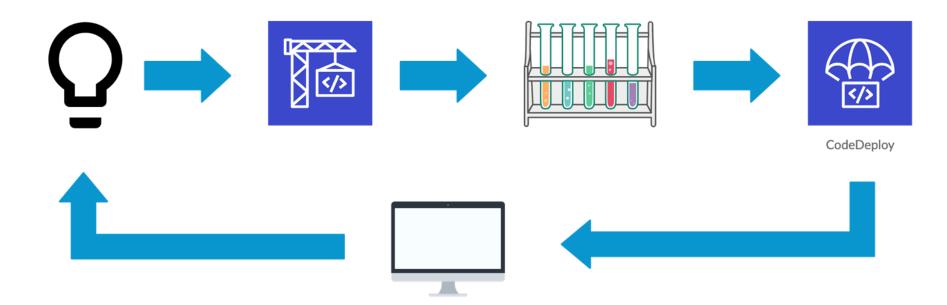
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Automation in Quality Engineering.



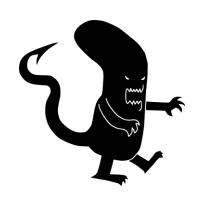
Oracle Problem.

Determining the correct output for a given input is known as the oracle problem or test oracle problem, which is a much harder problem than it seems, and involves working with problems related to controllability and observability.

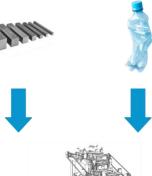
-- wikipedia.org

Metamorphic Testing

Test a powerful machine.

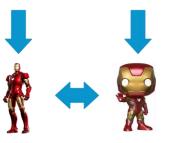














A real problem.

Google

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Movie Ticketing - Facebook

https://www.facebook.com + movies +

See showtimes for movies near you and buy your lickets through Facebook with no fees at select theaters. The discount will be automatically applied at checkout ...

Movies - Google Play

https://play.google.com i movies +

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Movies | FANDOM

https://www.fandom.com > topics > movies

Your daily source for all things TV, movies, and games, including Star Wars, ... 'Batman: The Movie' Honest Trailer Shows the Dark Knight's Lighthearted Origins.

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MT is property based testing and also a compromised solution.

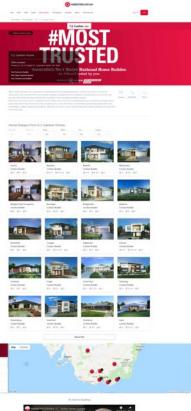




Case Study: Log Based Auto-verification

A single page web application.

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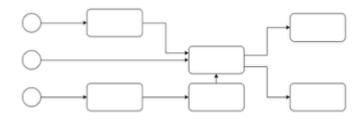




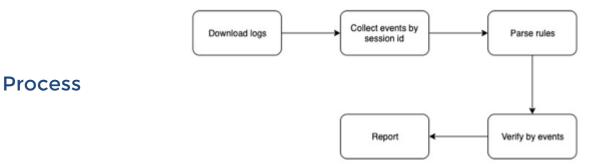
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- Two user actions should not fired within 1 sec
- Sending email should be fired after enquire click
- Share action should be fired after more click
- Zoom in event should be fired when user clicks a display
- Zoom out event should be fired when user clicks all displays

Auto-detection from Splunk log.



Path Coverage may be unlimit





Case Study: AI Image Prediction

Test candidates.



V0



Resnet50: Minivan: 71.34

DenseNet: Minivan: 49.27

Inception: Minivan: 99.93

V1 - compressed



Resnet50: Minivan: 71.22

DenseNet: Minivan: 52.71

Inception: Minivan: 99.94

V2 - mirrored



Resnet50: Minivan: 66.11

DenseNet: Minivan: 43.09

Inception: Minivan: 53.01

V3 - cropped



Resnet50: Minivan: 65.81

DenseNet: Minivan: 29.00

Inception: cab: 83.52

V4 - white background



Resnet50: Minivan: 59.80

DenseNet: garbage_truck: 13.57

Inception: beach_wagon: 64.82

V5 - black background



Resnet50: Minivan: 71.28

DenseNet: television: 7.17

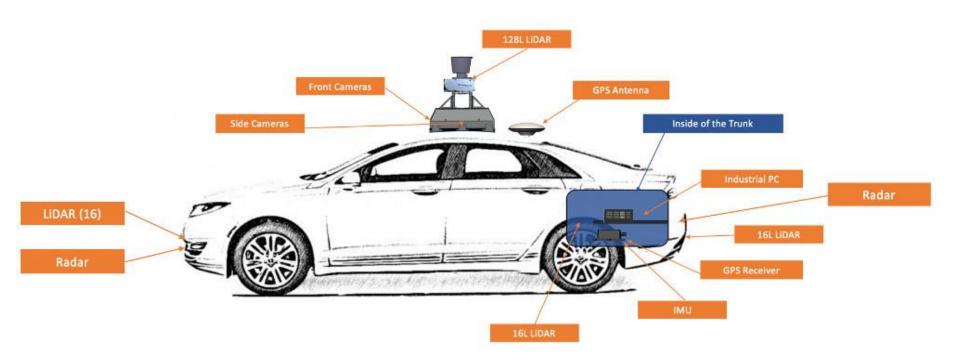
Inception: dishwasher: 7.37

Is that important?

"The system design did not include a consideration for jaywalking pedestrians," the watchdog stated [PDF] in its write-up. "Instead, the system had initially classified her as an '**other**' object which are not assigned goals."

https://www.theregister.co.uk/2019/11/06/uber_self_driving_car_death/

Driverless car system.



We Are Hiring!!!

alina.cojanu@booking.com



