Augmented Reality for Fun and Profit

By Sean T. McBeth

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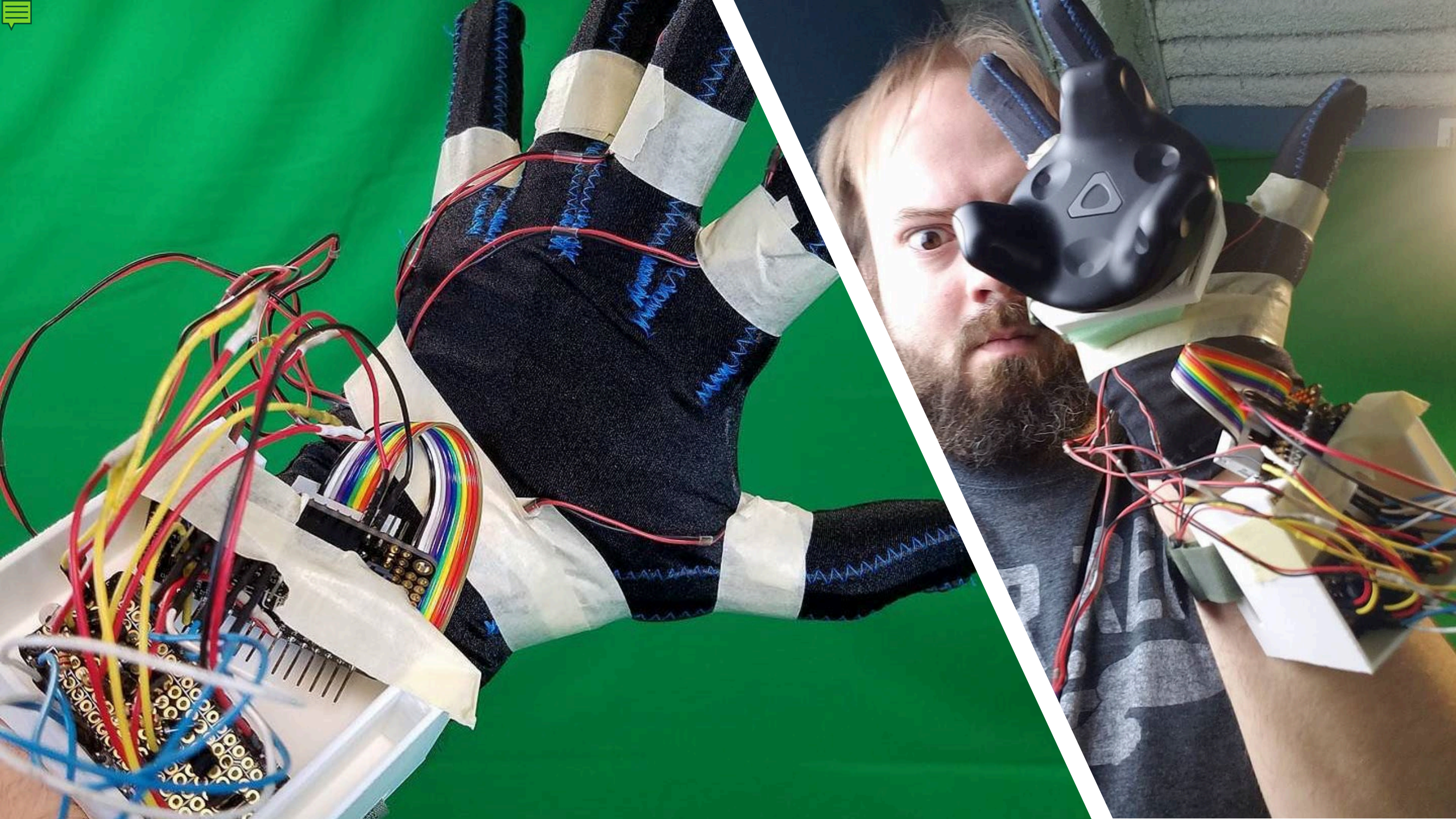
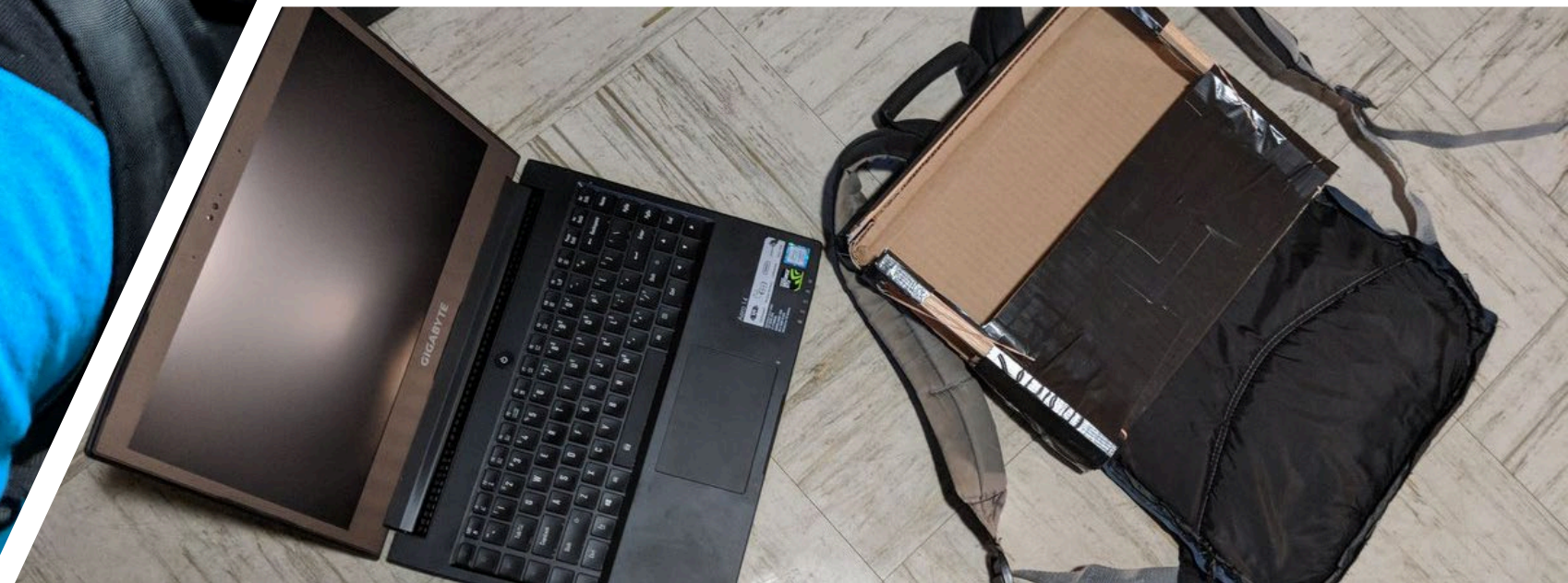
Sean T. McBeth

- 20 years of programming experience
  - (literal grey beard)
- Worked in lots of different industries
  - Geographic Information Systems
  - Internet of Things
  - Machine Vision
  - Augmented Reality
  - Virtual Reality
- Forgotten/forcefully suppressed knowing more languages than I can count
- Not necessarily a duck
- Pretty sure nobody is reading this far

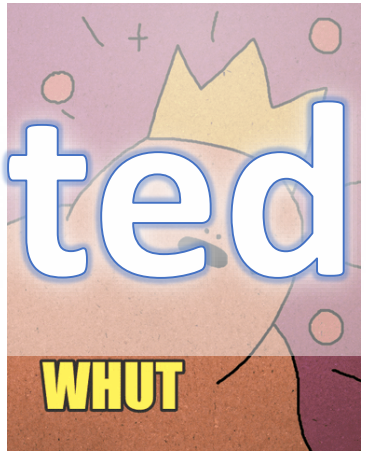



GIGABYTE


MICHELLE MCBETH
THE SPHERE
A JOURNEY IN TIME
MICHELLE MCBETH
THE CHILDREN OF DOCTOR LANCING
MICHELLE MCBETH
THE LUNAR CONSPIRACY


MICHELLE MCBETH
THE SPHERE
MICHELLE MCBETH
THE CHILDREN OF DOCTOR LANCING
MICHELLE MCBETH
THE LUNAR CONSPIRACY

What exactly is Augmented Reality?



Let’s get it out of the way…


Pokémon
GO
Pikachu
CP 62
AR

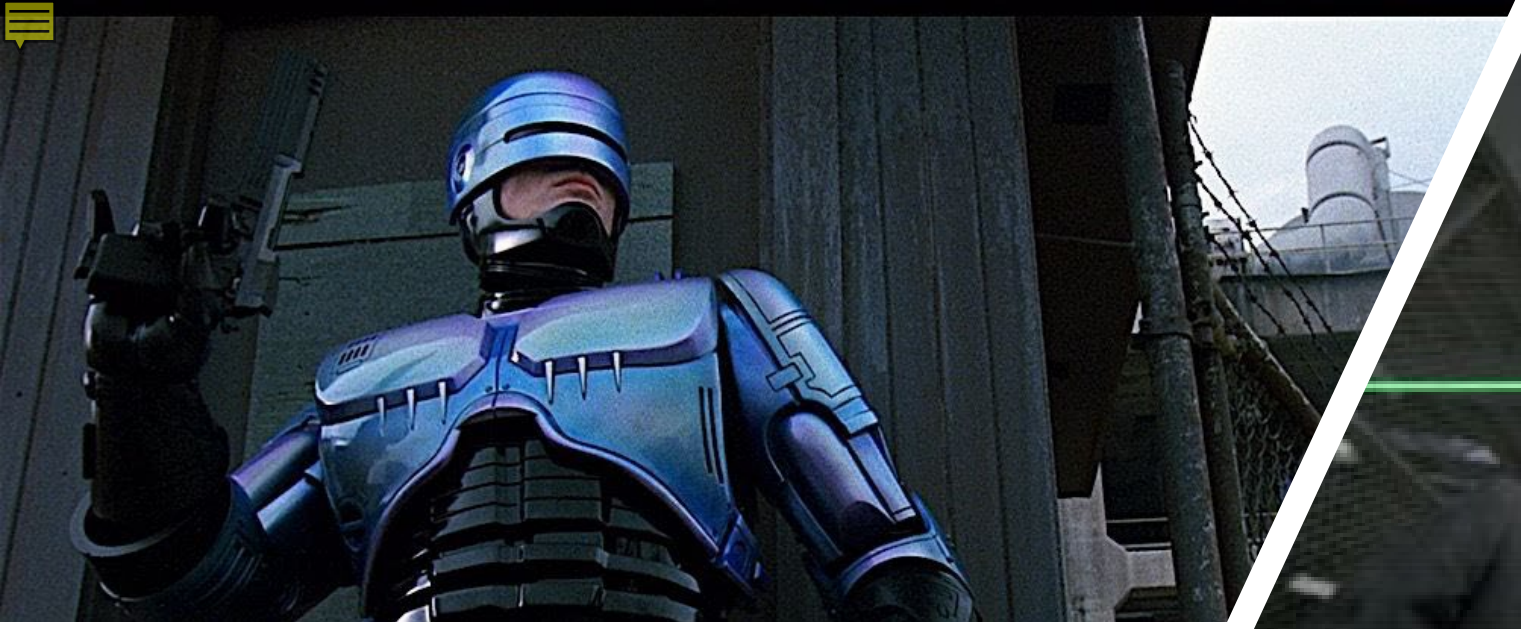
But...


3:50
AR
7


CODE:
23 4654
65 4334
24 5261
45 3665
38 2856
35 6878
66 4217
TARGET
ACQUIR
MATCH CRITERIA
NETFILE 342-589
MISSION PROFILE
CONNOR, JOHN
HGHT 234654
WGHT 654334
HAIR 245261
EYES 453665
GEND 38285
DIST 35687
FACI 6642
BILD 2543
POST 453
PERCENT
99.45036
IDENT POSITIVE

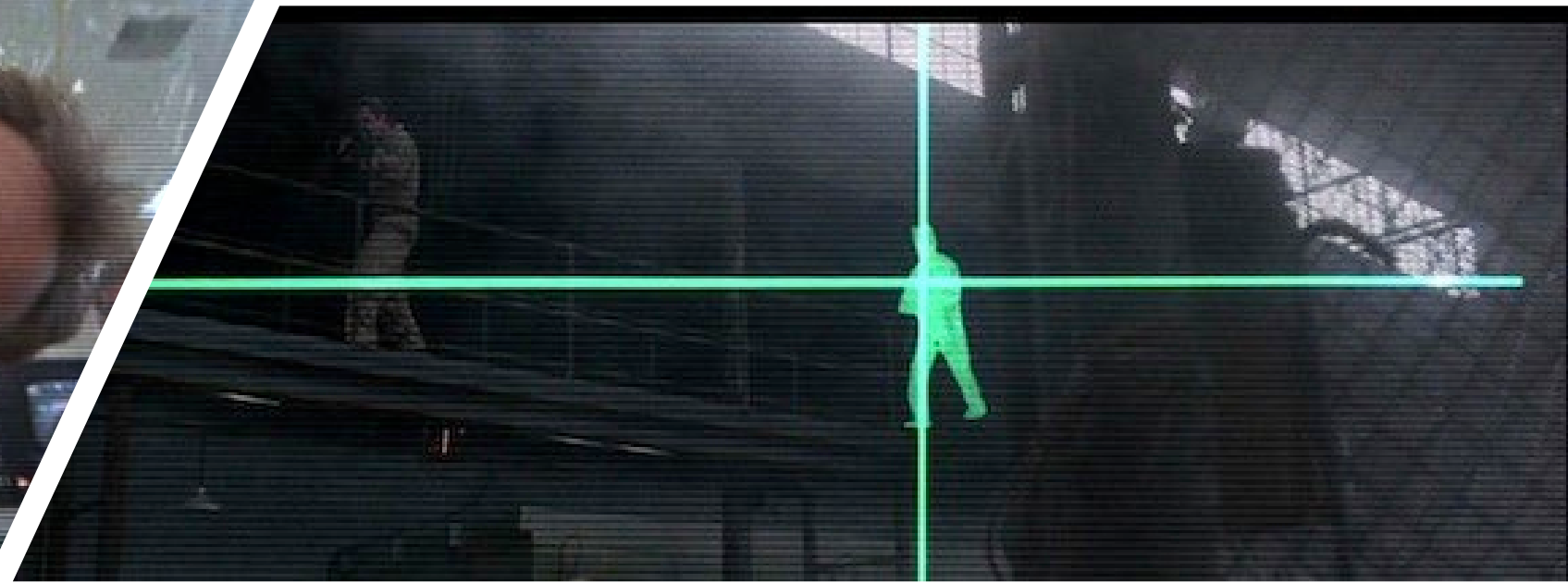

OLUTE
536904
ATION
234654
356878
ALL MI


SCAN MODE 43894
SIZE ASSESSMENT
ASSESSMENT COMPLETE
FIT PROBABILITY 0.00
RESET TO ACQUISITION
MODE SPEECH LEVEL 70



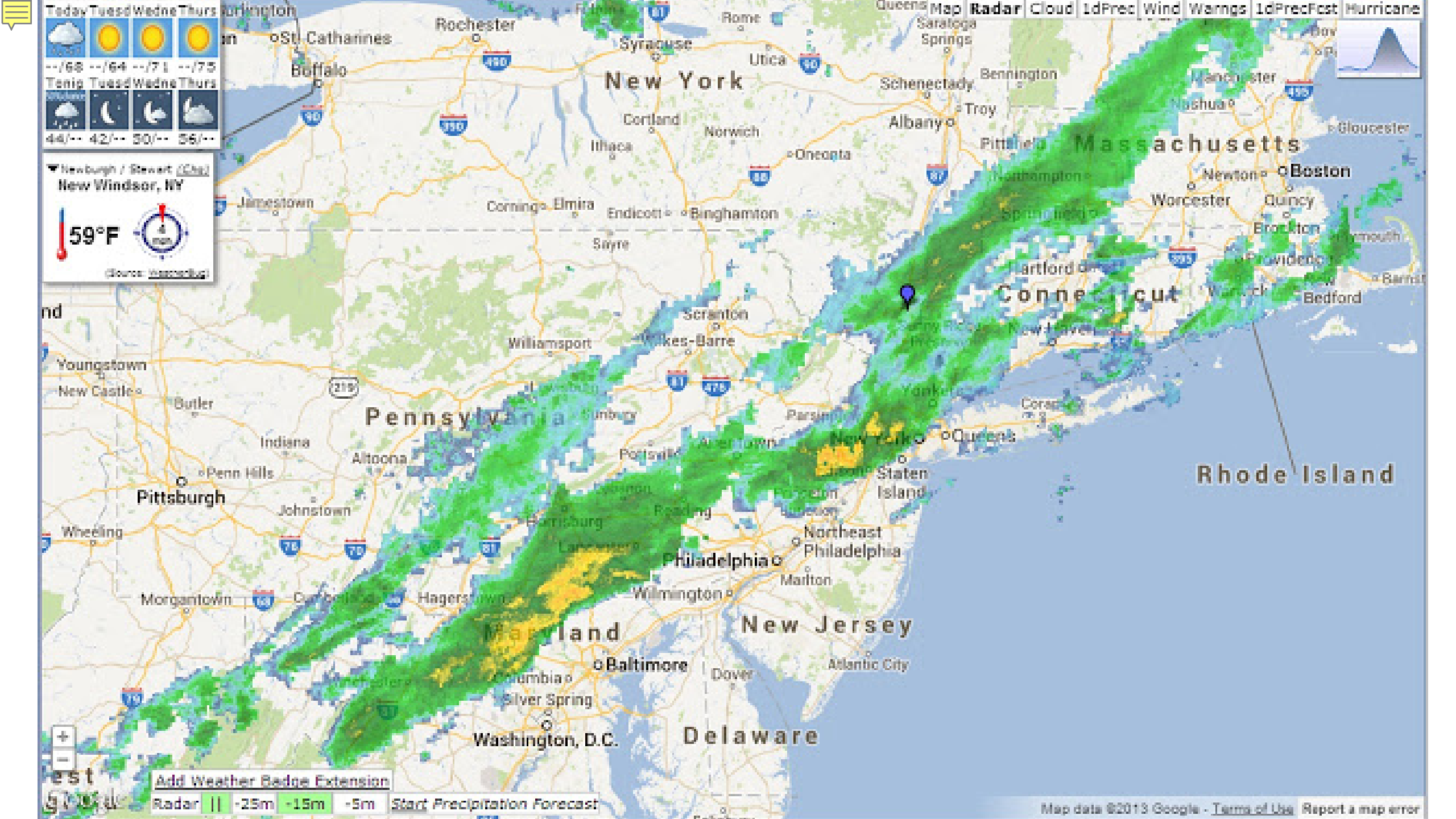

TARGETING_

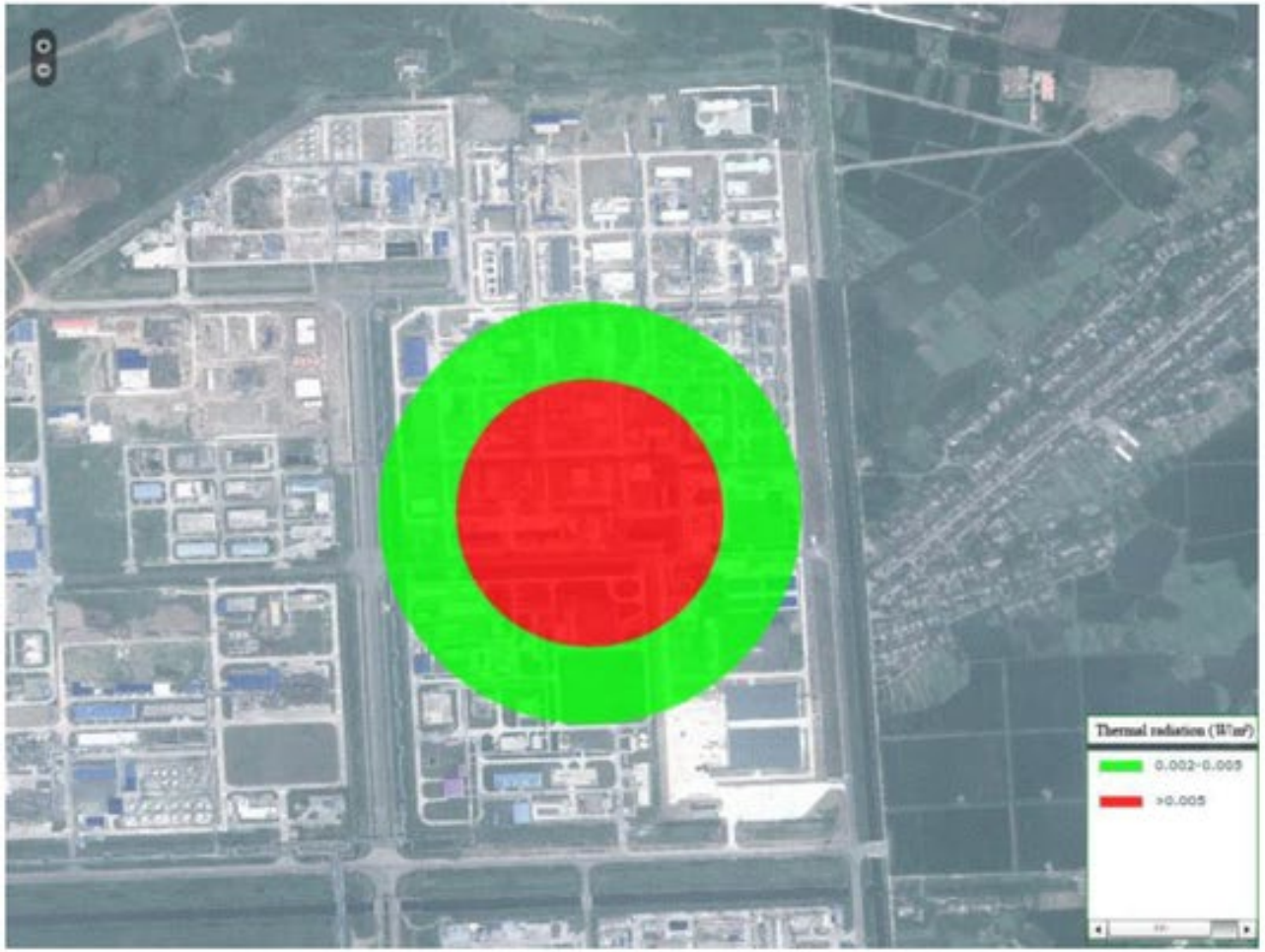

COMMAND.COM
LOAD BIOS
BIOS SYSTEM CHECK
RAM CHECK
CONFIG.SYS
BIO.COM INTERFACE
TO ROM I/O
CONTROLLER
COMSPEC.EXE
MEMORY.DAT
ROBO UTILS
SYSTEM BUFFER
PARAMETERS
PARITY SET
MEMORY SET
SYSTEM STATUS
OK_



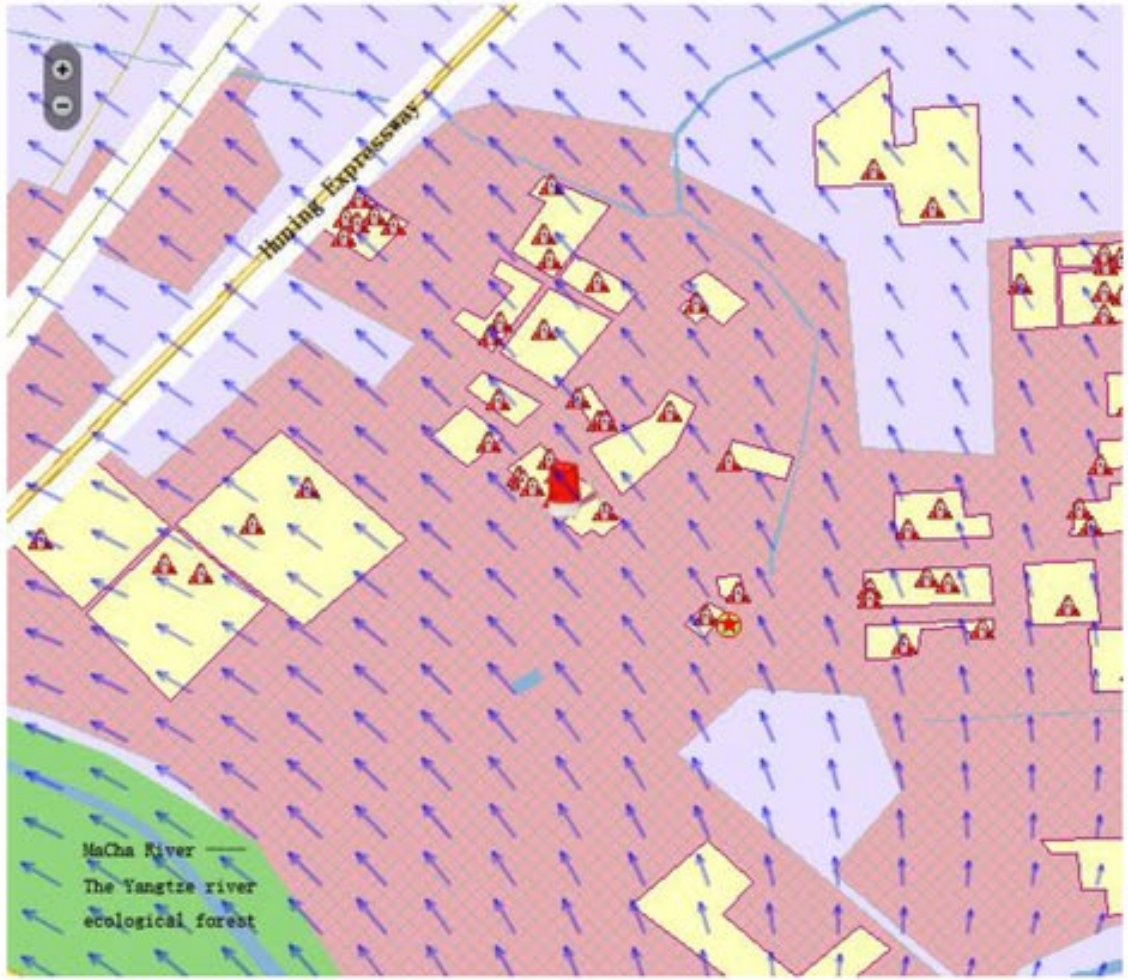
But...


GO HUB


Today Tuesd Wedne Thurs
--/68 --/64 --/71 --/75
Tonig Tuesd Wedne Thurs
44/-- 42/-- 50/-- 56/--
Newburgh / Stewart (Chs)
New Windsor, NY
59°F
Source: wunderground
Map Radar Cloud 1dPrec Wind Warngs 1dPrecFcst Hurricane
New York
Massachusetts
Connecticut
Rhode Island
Pennsylvania
New Jersey
Maryland
Delaware
Buffalo
Rochester
Syracuse
Utica
Albany
Schenectady
Troy
Boston
Worcester
Springfield
Hartford
Providence
Bedford
Scranton
Wilkes-Barre
Williamsport
Binghamton
Elmira
Ithaca
Cortland
Norwich
Oneonta
Jamestown
Youngstown
New Castle
Butler
Pittsburgh
Penn Hills
Indiana
Altoona
Johnstown
Wheeling
Morgantown
Harrisburg
Reading
Lancaster
Philadelphia
Northeast Philadelphia
Wilmington
Baltimore
Silver Spring
Washington, D.C.
Dover
Atlantic City
Staten Island
Queens
Add Weather Badge Extension
Radar || -25m -15m -5m Start Precipitation Forecast
Map data ©2013 Google - Terms of Use Report a map error


Thermal radiation (kW/m²)
0.002-0.005
>0.005

(a)


Huning Expressway
MaCha River
The Yangtze river
ecological forest

(b)

But also…


HANDS


www.shutterstock.com · 137288126


RACKED => EXTENDED_TRACKED
Pleas continue to
the next experience
vuforia

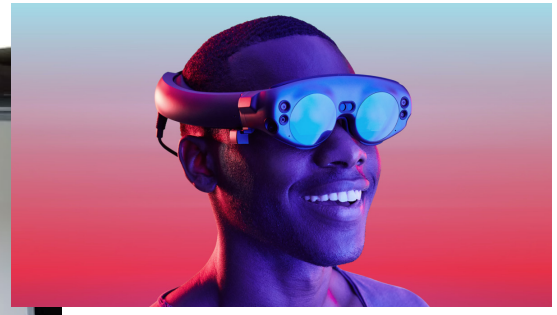

DXR
DIGITAL REALITY

Why?

- Availability
- Context
- Communication

Why?

- Availability
- Context
- Communication
- AKA why we have Smartphones



2013

2015

2019

2021?

Maybeeee???

How? Lot’s of ways

- Microsoft Windows Mixed Reality
- Magic Leap
- Vuforia
- Google ARCore
- Apple ARKit

Windows Mixed Reality - https://www.microsoft.com/en-us/hololens

Pros

- Support for both VR and AR
- Free to develop
- Excellent tracking with no external hardware
- Excellent documentation
- Wearable, keeping hands free for work
- Hand-tracking built-in
- Voice recognition built-in
- Solid surface detection
- Huge Windows API for lots of other advanced functionality
- Desktop metaphor for running standard 2D apps

Cons

- Expensive (US $3500)
- HoloLens 1 – short battery life
- HoloLens 2 – limited availability
- Hand gestures provide no haptic feedback

Magic Leap - https://www.magicleap.com/

Pros

- Free to develop
- Wearable, keeping hands free for work
- Hand-tracking built-in
- Controller with haptic feedback available
- Excellent battery life

Cons

- Expensive (US $2300)
- “Compute Pack” worn on hip
- No voice recognition (yet)
- Documentation is limited
- Updates are slow
- Company is in trouble

Vuforia - https://vuforia.com/

Pros

- Popular in mobile AR market
- Excellent Unity integration
- 3D model recognition
- 2D image target recognition
- Supports most smartphones (both Android and iOS)

Cons

- Somewhat expensive at scale
- Not at all open source
- Requires use of their services
- Smartphones and tablets need to be held

Google ARCore - https://developers.google.com/ar/

Pros

- Free to develop
- Excellent Unity integration
- Solid surface detection, no markers required
- 2D image detection
- Supports most ***modern*** smartphones
- Lots of new features released regularly

Cons

- Smartphones and tablets need to be held
- Doesn’t support older phones
- Documentation is limited

Apple ARKit - https://developer.apple.com/arkit/

Pros

- Very similar to ARCore
- Excellent Unity integration
- Solid surface detection, no markers required
- 2D image detection
- Supports most iPhones and iPads
- Lots of new features released regularly

Cons

- Costs $100/yr to develop
- Requires Apple computer to develop
- Apple devices only
- Apps must be deployed through App Store
- Smartphones and tablets need to be held

How to choose?

- Windows Mixed Reality
  - You need best-in-class tracking
  - You need advanced application features like voice recognition
  - You need the user's hands to be free
- Magic Leap
  - You can't quite afford a HoloLens
  - You need the user's hands to be free
  - You don't mind carrying a brick on your hip
- Vuforia
  - You don't need hands to be free
  - You need to support lots of devices that users already own
  - You want to augment images or complex 3D models
- Google ARCore
  - You don't need hands to be free
  - You want to support devices users already own
- Apple ARKit
  - You like ARCore's features and you don't mind being locked into Apple's ecosystem

Thanks!