What is XR?

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* XR = inclusive term for augmented to virtual reality spectrum
  + Virtual Reality = “box on face”, primarily virtual experience
    - HTC Vive (room-scale), **Oculus Go** (standalone headsets), Google Cardboard (phone-based VR)
  + Augmented Reality = virtual objects on top of real world
    - Epson Moverio, software like ARKit or Snapchat
  + Mixed Reality = Mix virtual component with real objects and people, live mapping
    - Microsoft Hololens
* As fast as 3D printing revolutionized rapid prototyping, VR will be faster for iteration process.
* Empathy machine
  + Maybe doctors walkthrough a sensitivity training, reduce malpractice
  + Pain management- playing games distract patients (like burn victims) and reduce opiate use
* Rehabilitation game (punching like whack-a-mole); combined with motion trackers
* Phantom-limb syndrome
* Oculus Go combine with another sensor like EEG, can control virtual reality with mind
* Marker based stuff- real world object is augmented, think a logo on paper animated in AR, can be eye-catching for like a poster presentation
* Biometrics- tie in sensor measurements into game, like heart rate to a horror game
  + EEG- measure brain waves to control game. Like campfire roars with greater brain activity, quiets when more meditative
  + Eye tracking- tell autism, drunk, concussion, sexual preferences. Select things with eyes faster.
* Healthcare examples
  + Psychology- relaxation (meditation), facing trauma (PTSD, fear of heights, flying, snakes, tec.), anxiety (public speaking, revealing HIV status), smoking cessation, eating disorders, autism (social cognition)
  + Inpatient use - patient management, overcoming loneliness and depression, motivating movement, patient education
    - Envidia : show how medication goes into blood stream, more consistent medication use
    - Motivate cystic fibrosis kid to move around boring hospital (use quest game)
  + Education- going impossible places (blood stream, molecular bonding, anatomy, etc.), empathy, telestration
  + Physical training - athletics, fitness, physical rehabilitation
  + Professional training - surgical planning and practice, practicing CPR and Heimlich maneuver, radiology
  + Rehabilitation - stroke, vision disorders, attention, balance, memory
* 3 degrees of freedom (tracking head rotation only) vs 6 degrees of freedom (tracking position in space)