Improving Access to High Quality Mental Healthcare with VR

Sam Gage

This talk

- What has been developed so far?
- Which areas can benefit?
- How are VR healthcare applications developed?
- What opportunities are there in the future?

How did I get here?

Motion control and AR console games

R&D for PlayStation VR

VR tech in the film industry

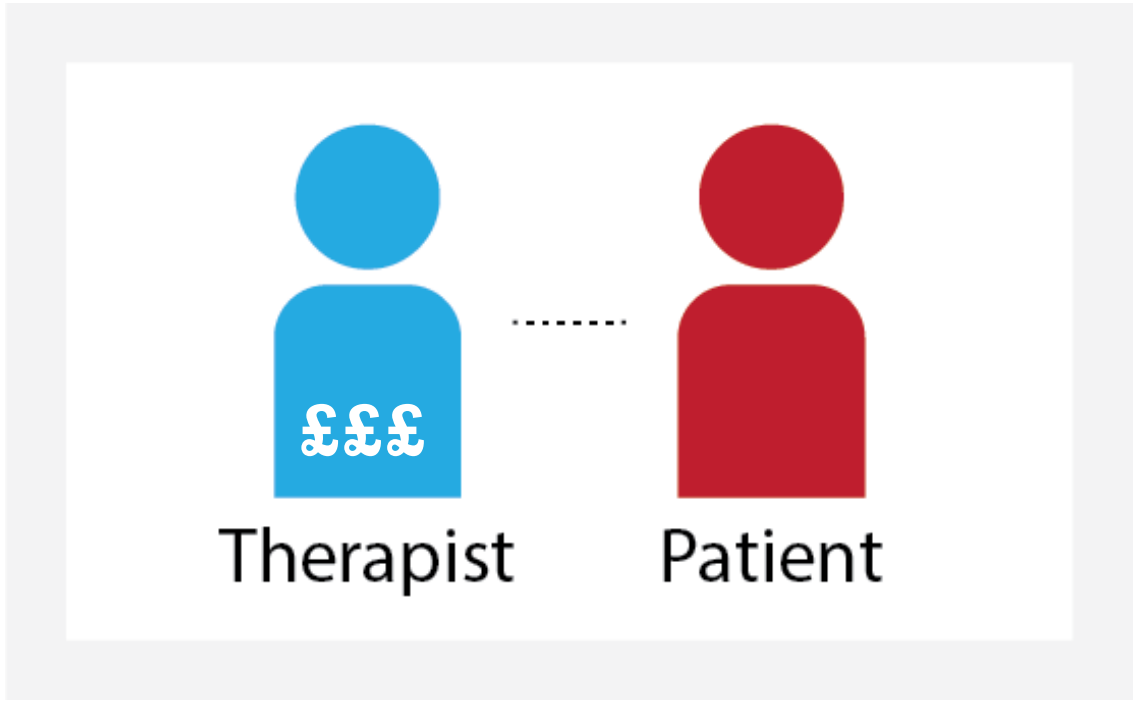
Built a studio and team creating healthcare applications

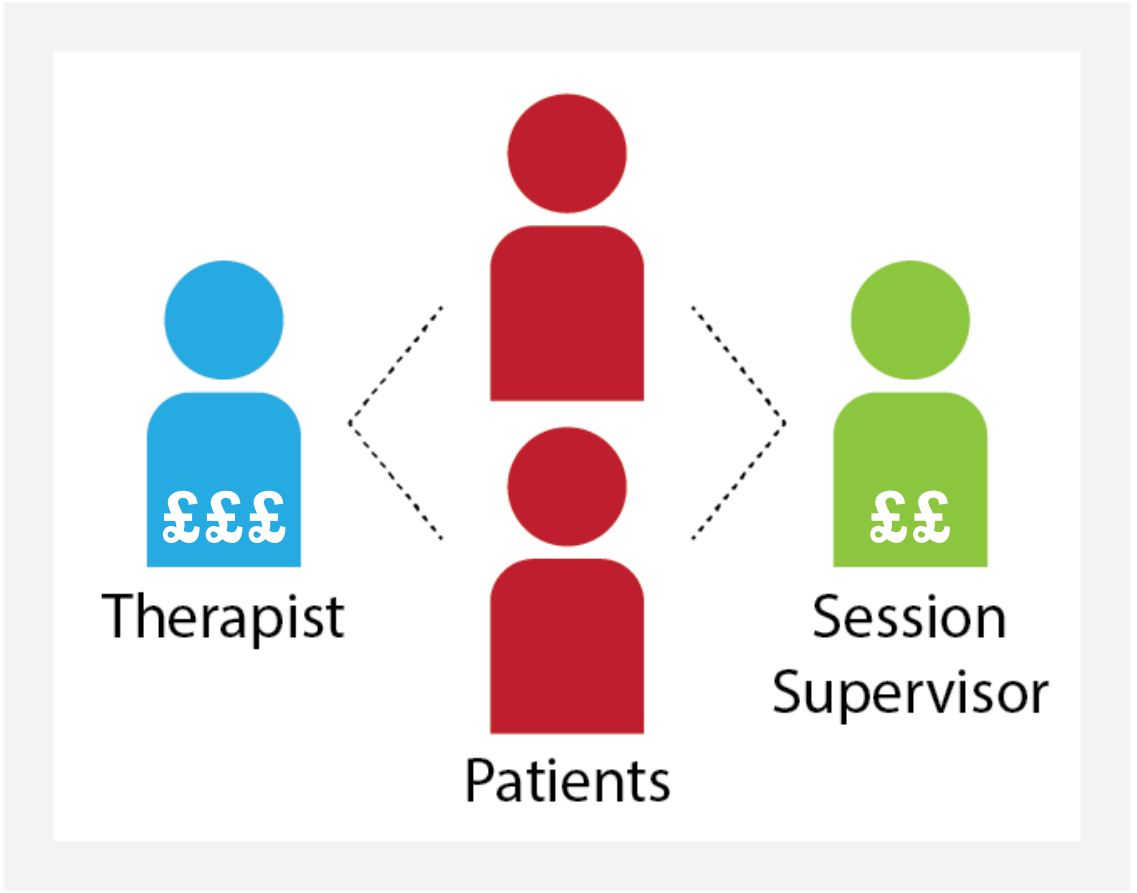
Why now?

- VR hardware has become affordable
  - High quality setups are in the hundreds of pounds
- Realtime rendering is really good
- Game engines have made development more accessible

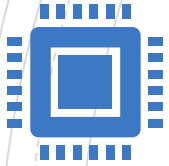
Why VR?

- Can put patients into controlled situations
  - Safe
  - Practice real world interactions
  - Allows repetition
- Can automate parts of therapy
  - Less need for qualified supervision

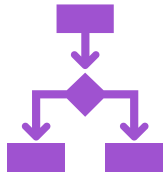

£££
Therapist
Patient


£££
Therapist
Patients
££
Session
Supervisor

Healthcare app development is (almost) just like game development



Same hardware



Same realtime technology

Same technical skills

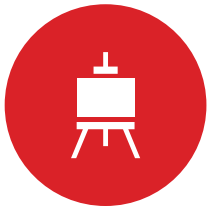
Similar design skills (in addition to clinical)

Team

CLINICAL DESIGNER

UX DESIGNER

PROGRAMMERS



3D ARTISTS (ENVIRONMENT / CHARACTER)

ANIMATION (HAND / MOTION CAPTURE)

QA

IT / DEV OPS

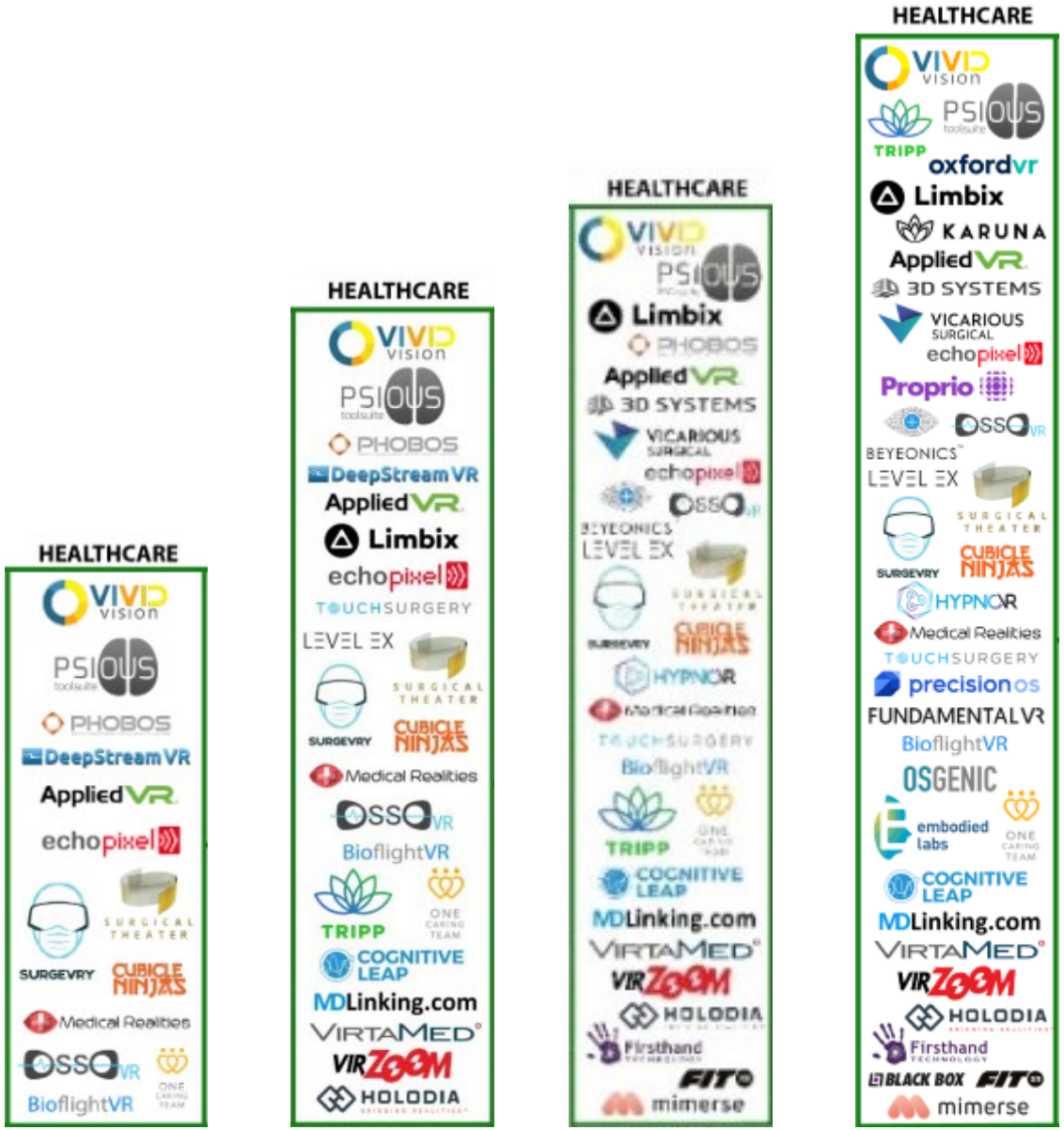
Core Technology

- **User embodiment**
  - Avatar
  - Input mapping
- **Therapy flow**
  - State machine
  - Interpretation of user actions
- **World interaction**
  - Object behaviour
  - Affordances
- **Character behaviours**
  - State machine
  - Chatbots

Differences

- **Regulations**
  - Seem scary, not actually that scary
  - Cover things like quality assurance and patient data
- **Users**
  - Will likely be inexperienced with the technology
    - Keep the inputs very simple
  - Practitioners may want to tailor the experience for patients
- **Market**
  - Direct to consumer – High volume, low unit cost
  - Healthcare providers - Low volume, high unit cost

Industry landscape



Source: The Venture Reality Fund

Mental healthcare

- **Psious**
  - Exposure
    - Social Anxiety
    - Exam Anxiety
    - Fear of Flying
  - Relaxation
- **Limbix**
  - Exposure
    - Job interviews
    - Agoraphobia
  - Relaxation
  - Education
- **VR Calm**
  - Palliative
    - Nature experiences
    - Virtual companionship

Psious

https://www.youtube.com/watch?v=VtmNIsOJe5U

Limbix

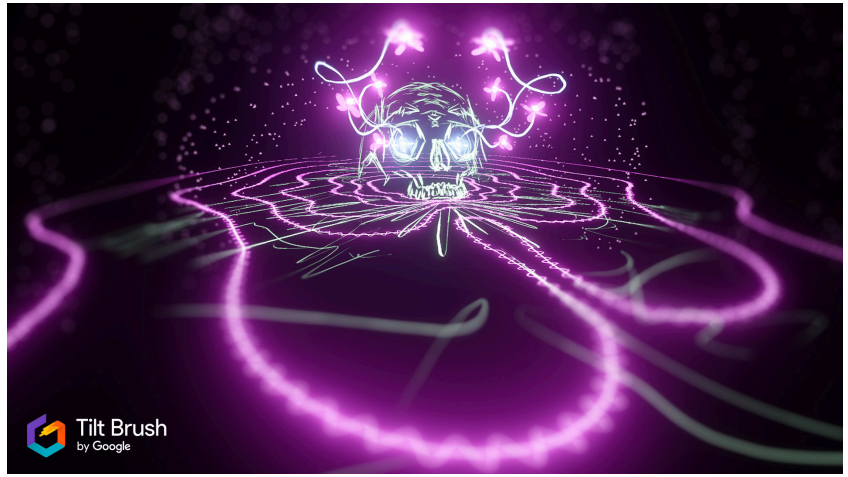
https://www.youtube.com/watch?v=F7ANFSZCLxM

Other healthcare

- **Vivid Vision**
  - Corrective exercises
    - Lazy eye
    - Cross/wall eye
- **Touch Surgery**
  - Surgical training
    - Viewing procedures
    - Practicing procedures

Creative apps

- **Tilt Brush**
  - 3D painting



- **SculptVR**
  - 3D sculpting

Happy accidents

- **Pokémon Go**
  - Requires users to walk around outside
  - Low level exercise
  - Great for social engagement
- **Beat Sabre**
  - High energy workout
  - Cardiovascular health

https://vimeo.com/304412747

Who is the customer?

- Direct to consumer
- Heathcare services
- Private healthcare providers

Platforms

- Tethered
  - More power for high fidelity experiences
  - Cumbersome
  - Fixed
  - £1000+ / installation
- Standalone
  - Lower power, lower fidelity
  - Simple to use
  - Portable
  - £400 / installation

Build a solid team

- Clinical expertise
- Technical expertise
- No cutting corners
- Communication and trust are very important
  - Clinical and technical teams will take time to understand each other's needs and limitations

Regulations – The 'Hard' Way

- **ISO 13485**
- Not actually that hard (just very verbose)
- Build them into your processes
  - Secure development environment
  - Version control
  - Quality control (department leads check and push changes to main branch)
  - Clinical sign-off
- You will probably need to run clinical trials

Regulations – The 'Easy' Way

- Need to comply with GDPR regarding user data
- Restricted as to how the product is marketed
- Still a good idea to run a clean production processes

What to watch out for

- Just because you want it to work, doesn't mean it will
  - Create rigorous measures for success in advance
  - Test early and often
  - Fail fast
  - Niche conditions will have a higher cost per patient
- People might be sceptical
  - VR and immersive tech has had a lot of hype
  - It's tricky for people to separate fact from fantasy
  - You need to be clear and open

Future

- Cost reduction
- Widescale adoption
- Improved character behaviours
- High fidelity embodiment
  - Particularly in shared realities, for example to help a therapist read emotions

Summing up

- A wide range of healthcare applications can be built
- There are many paths to market
- It can be a tricky market, but there are a lot of opportunities
- Every development in VR technology enables new treatments

Thank you!

Sam Gage

@Scampleton