



Rethinking Physical Therapy

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100 million

adult Americans live with a
musculoskeletal injury

([Bone & Joint Initiative, 2015](#))

65%

physical therapy patients **don't**
follow up after their injury

([National Center for Biotechnology Information, 1993](#))

What is **the gap** in physical therapy?

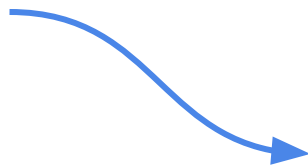
Lengthy commute times in:

Suburban, rural, & under-served areas

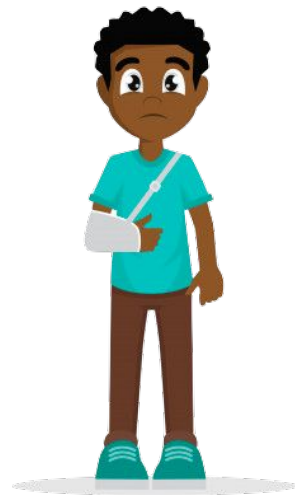
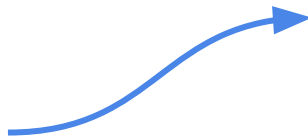


Existing solutions are risky

Don't go to the
doctor



Try to follow PT videos
or articles



What is the gap in telemedicine?



Use cases **limited to simple conditions** like the flu

Communication over video call can be unclear

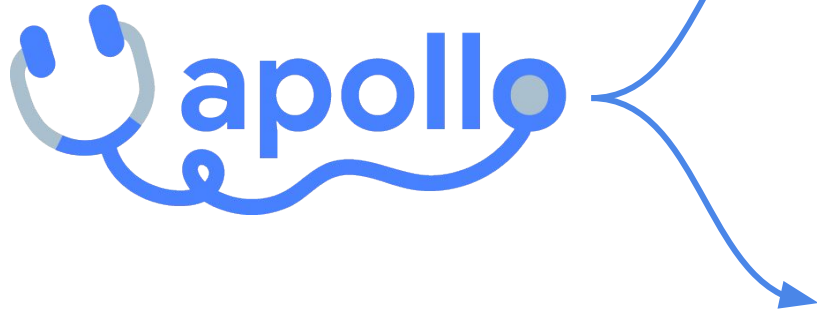
What does PT need?



Physical therapists need to actively monitor patients

PT telemedicine must enable this communication

Apollo is the solution



Guidance through
exercises

Appointments from
home

Meet Chris - Needs PT



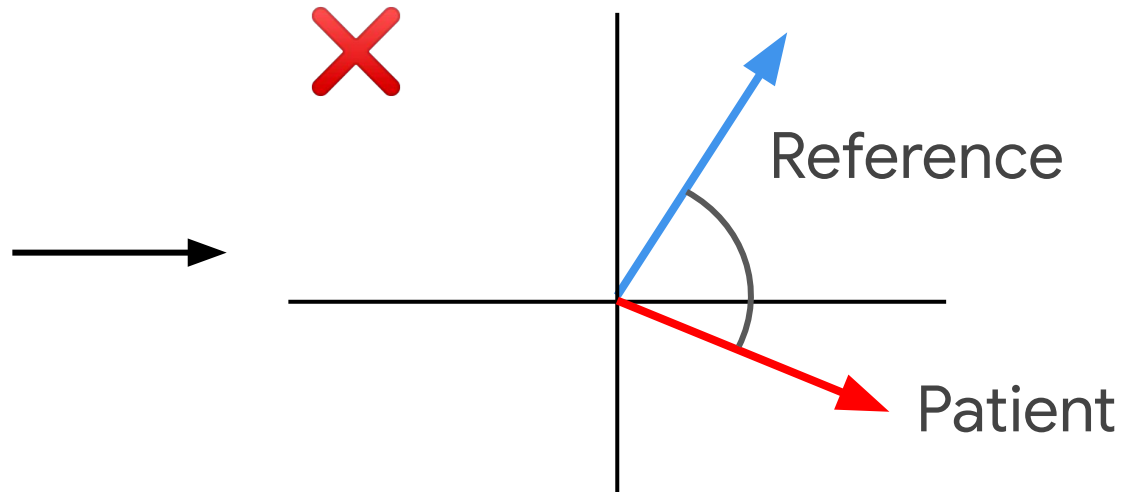
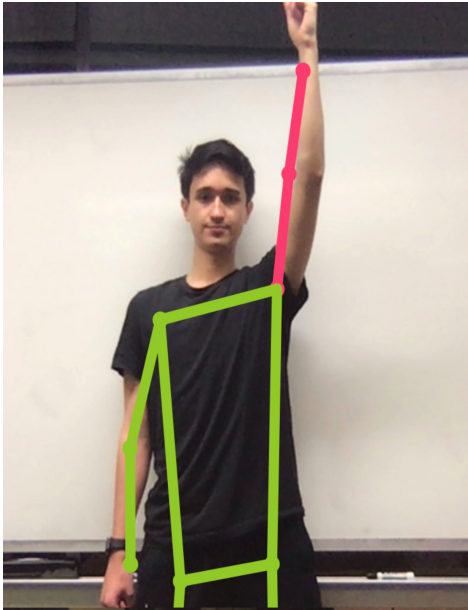
Injured rotator cuff

Struggles to commute
because of 9-5 job

How do we know when a pose is “correct”?

~~Hard code matching based on body angles~~

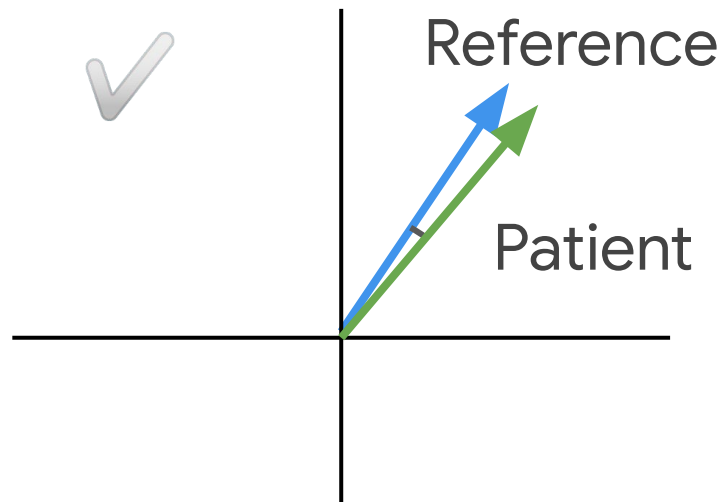
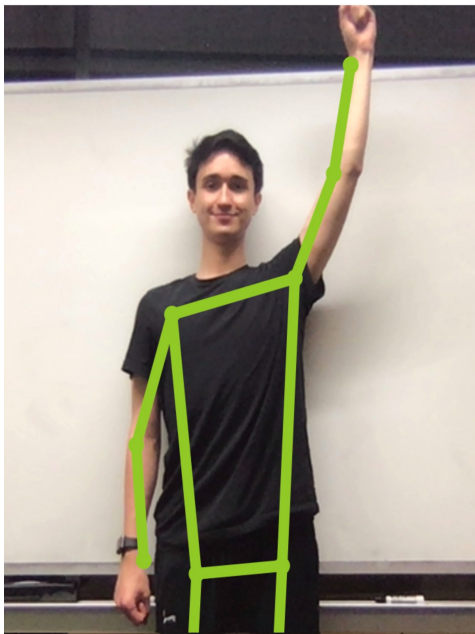
Compare patient’s vector with reference vector



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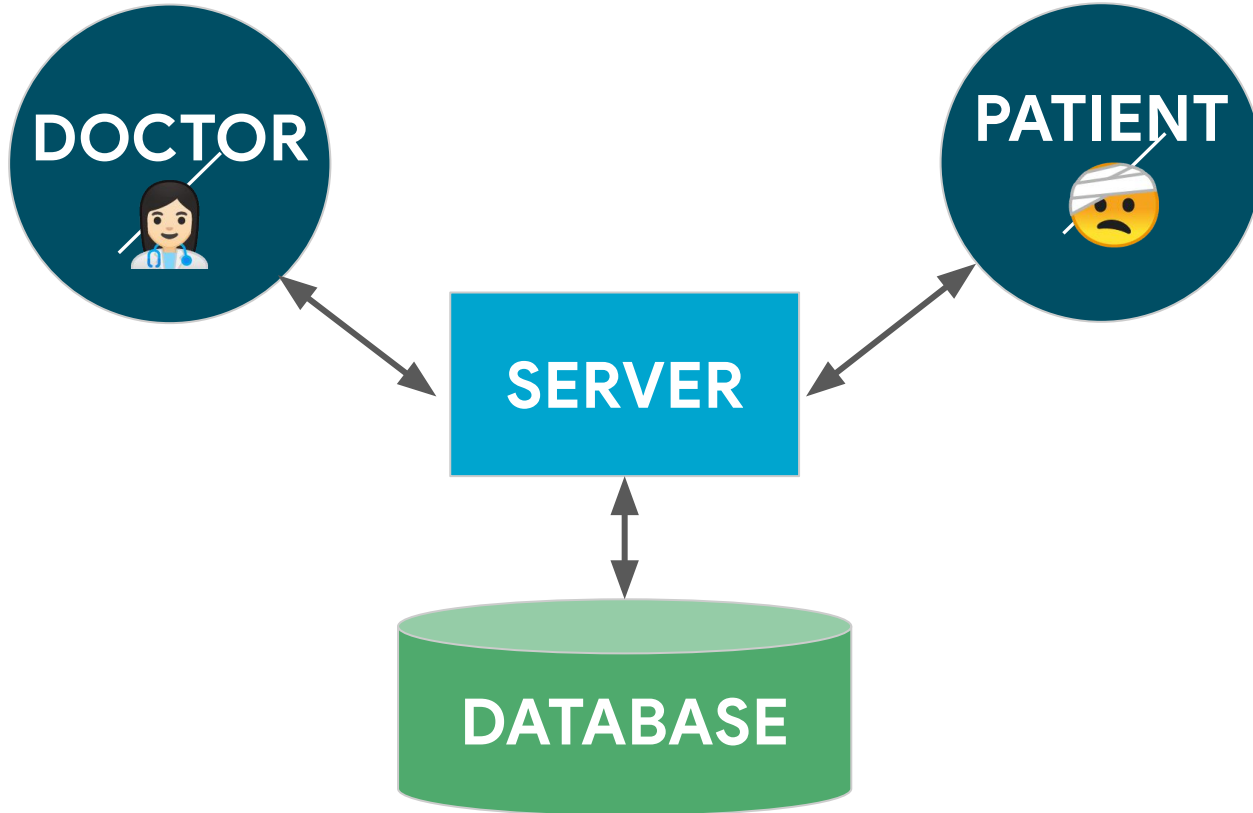
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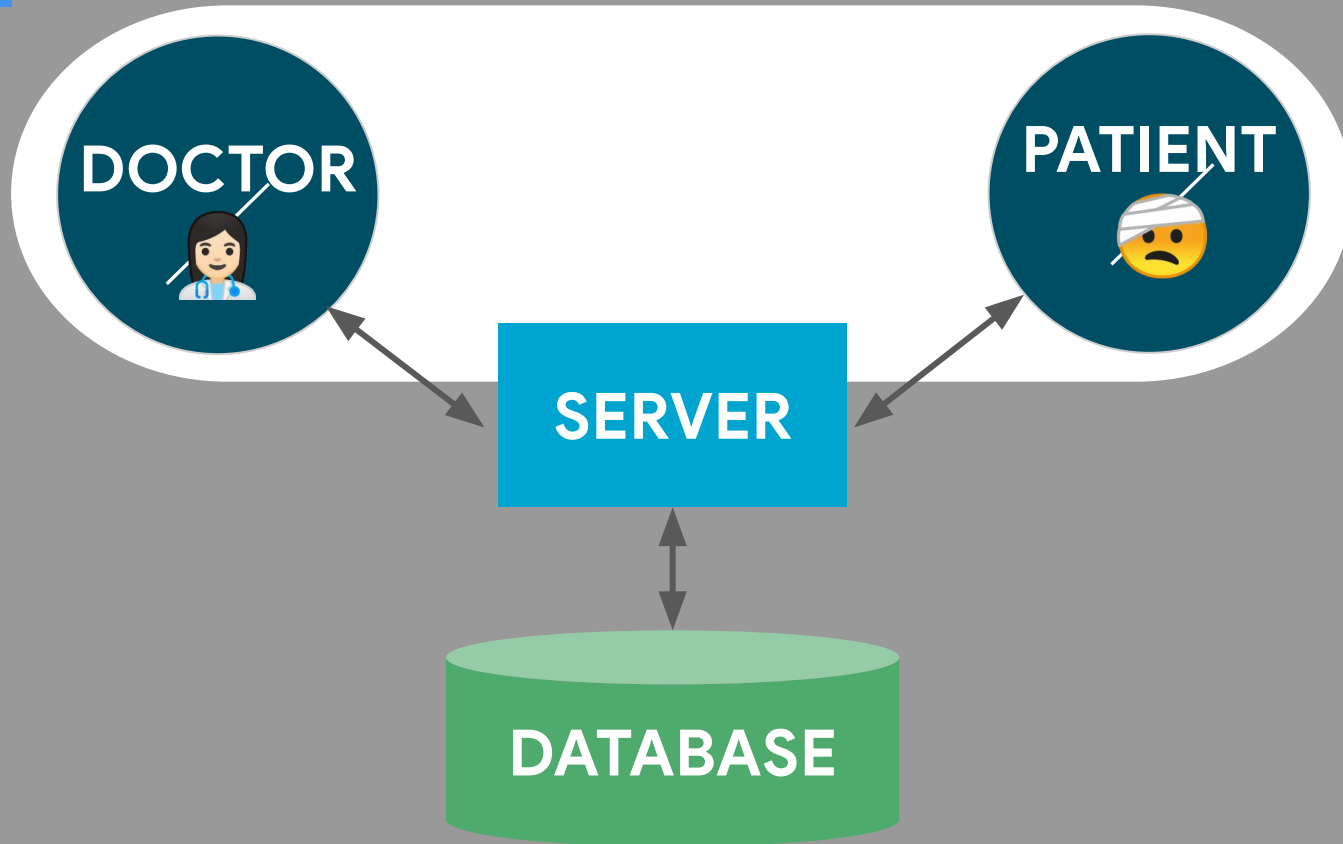


Easily **scalable** to
different exercises

Architecture Backbone



Architecture Backbone

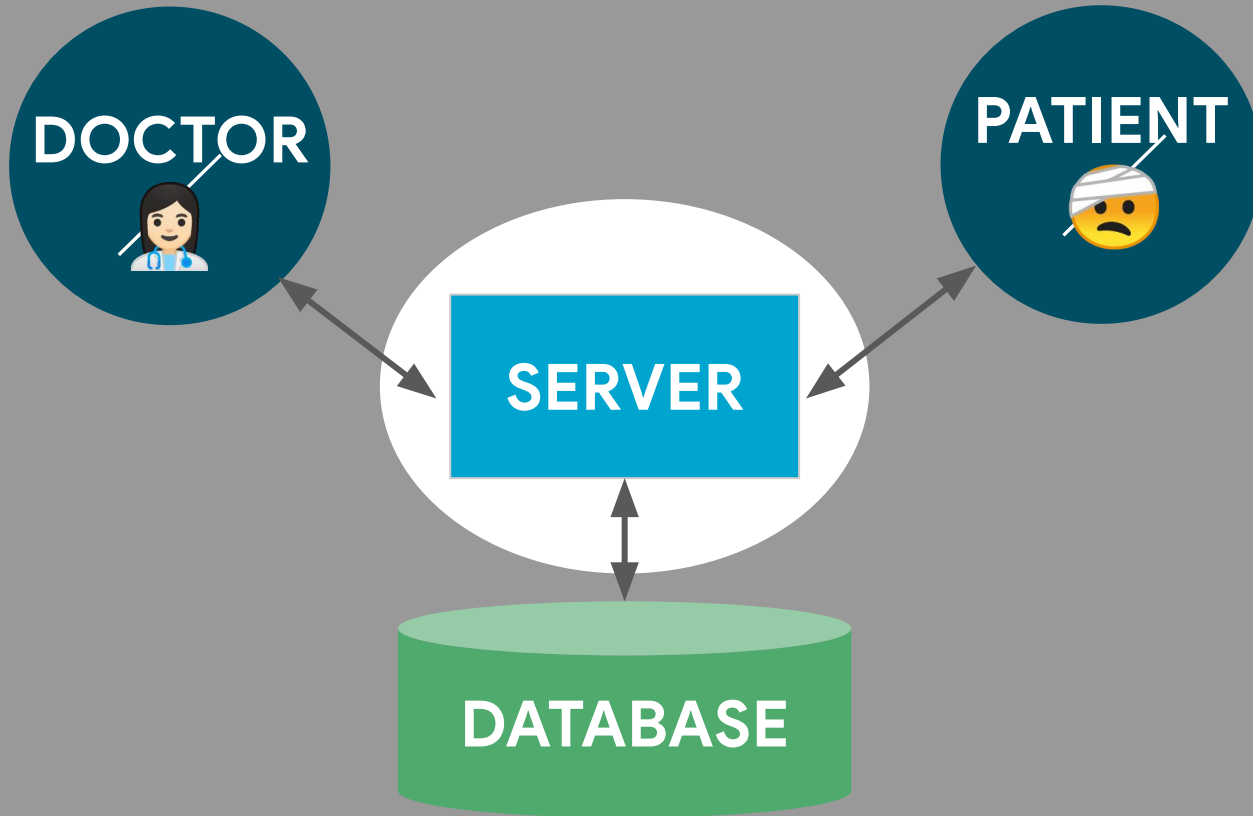


Client handles video call & pose tracking

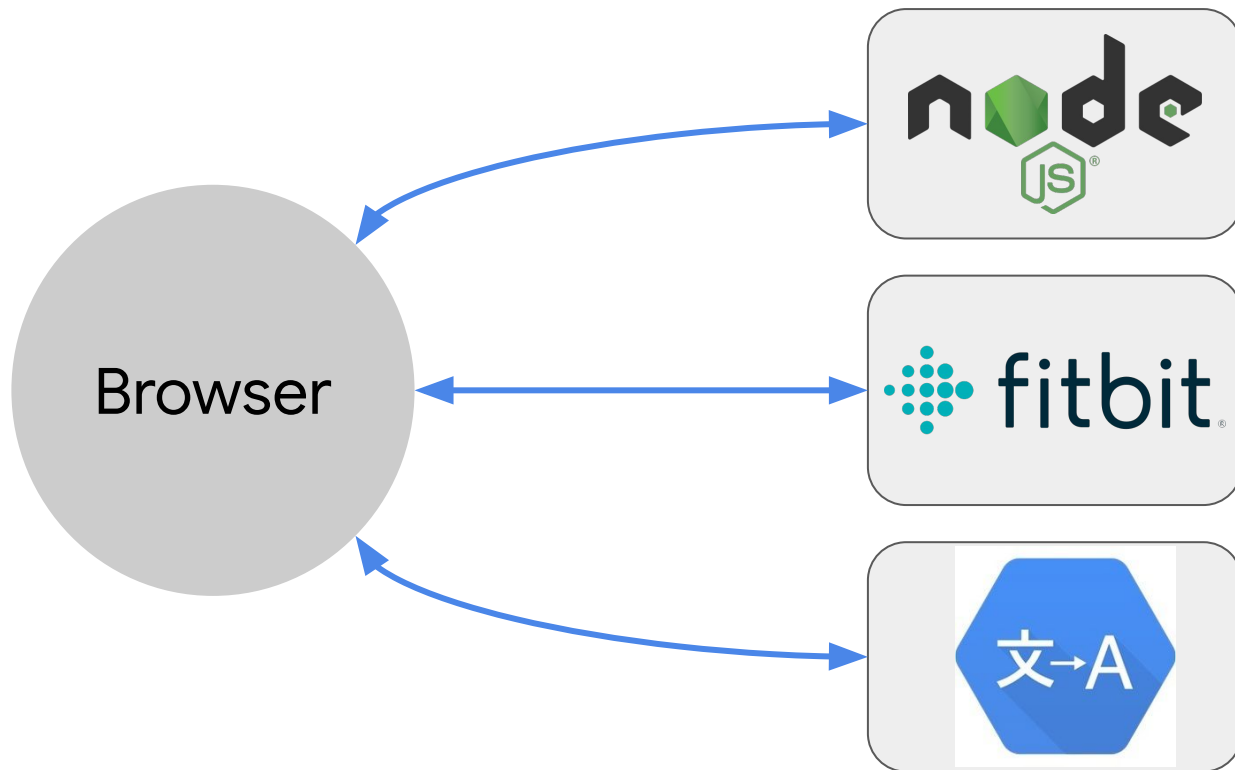


PoseNet Model

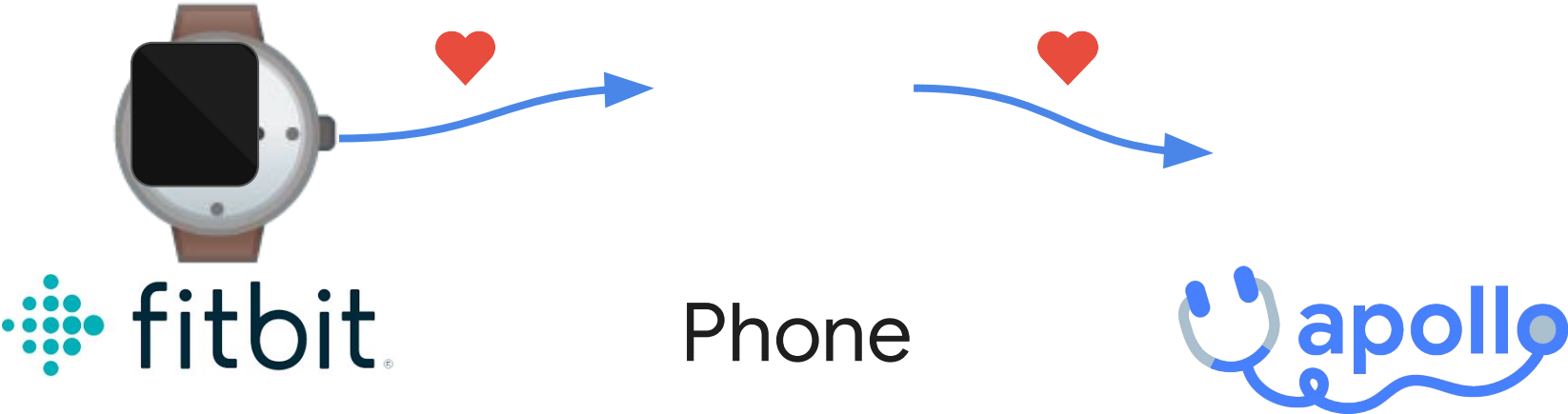
Architecture Backbone



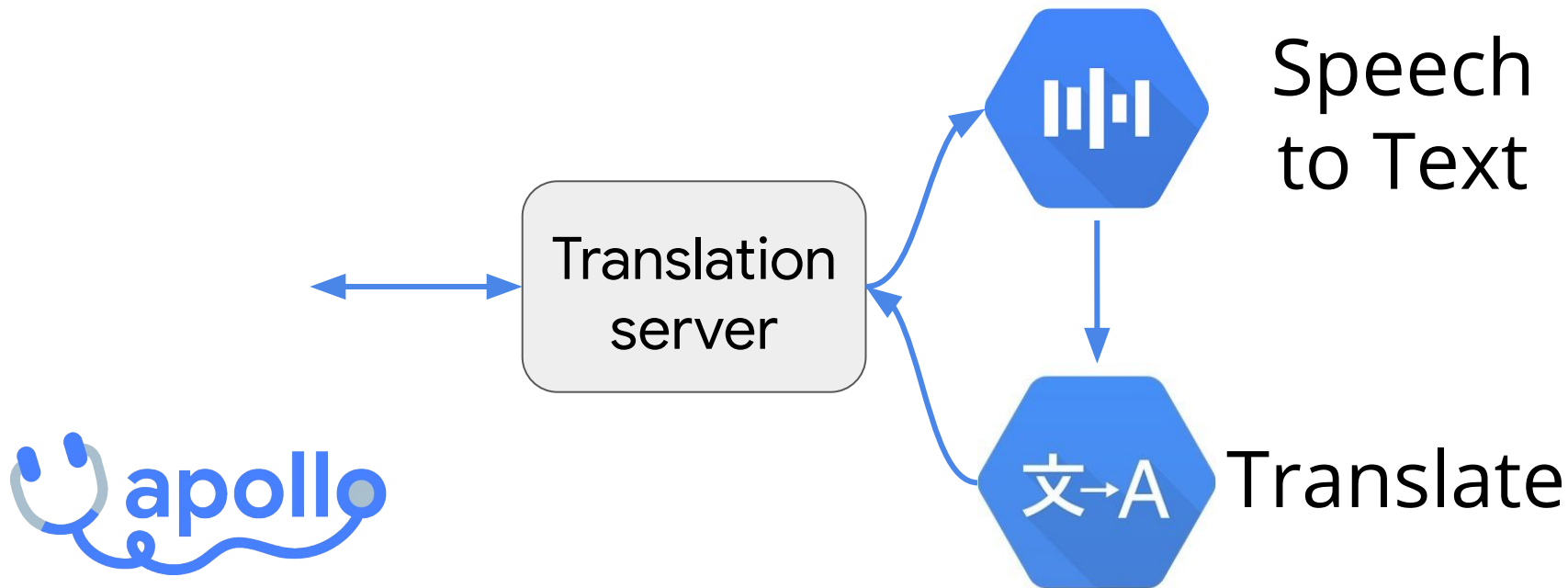
Server side split into microservices



Live data reduces miscommunication



Translation makes apollo accessible to all

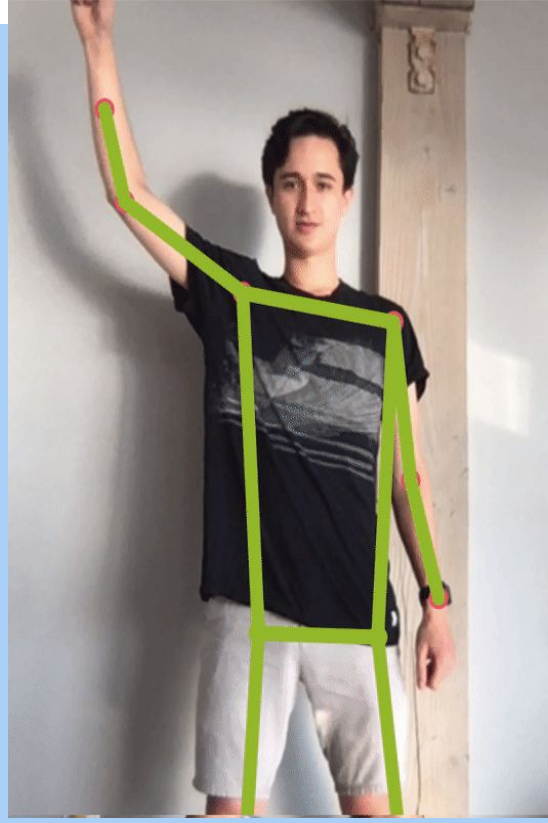


Making medicine accessible



Appointments easily
accessible from home

Making medicine intelligent



Real-time guidance improves communication and enables physical therapy

Making medicine inclusive



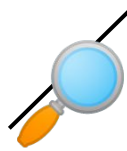
Quality care is made universal through translation

Rethinking physical therapy



Questions?

Appendix - Research



- Study from Aarhus University Hospital in Denmark that suggests **correlation** between **pain** and **heart rate**
- Most common musculoskeletal injuries are from **trauma**, **back pain**, and **arthritis**
- Our tensorflow model uses a **residual neural network** architecture with **52 layers** ([more on residual neural networks](#))
- Why Tensorflow.js? Tensorflow.js makes it easy to build and deploy ML models from the browser