



OWN YOUR ATHLETE-NESS

Creating an Algorithm for Personalized Fitness Programming

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The State of Fitness Programming

Automation & personalization are everywhere.

Ok, almost everywhere.

Most coaches are still writing workouts and long-term fitness plans by hand. The result?

- Most workout plans are not personalized
- True personalized plans are expensive
- Creating fitness plans - general or personalized - is time consuming for trainers and coaches



The Problem

How can we make personalized programming accessible to everyone?

- Use technology to automate the creation and delivery

What does a viable computer-realizable solution look like?

- Remove the reliance on intuition and instinct
- Retain the feeling that a coach wrote the workouts



MATLAB has helped us do all of the above!

The Deep Athletics Team

Founders

- Aaron Adams

- Former US record holder in Olympic Weightlifting
- 10+ years experience programming for both elite athletes and everyday worker-outers

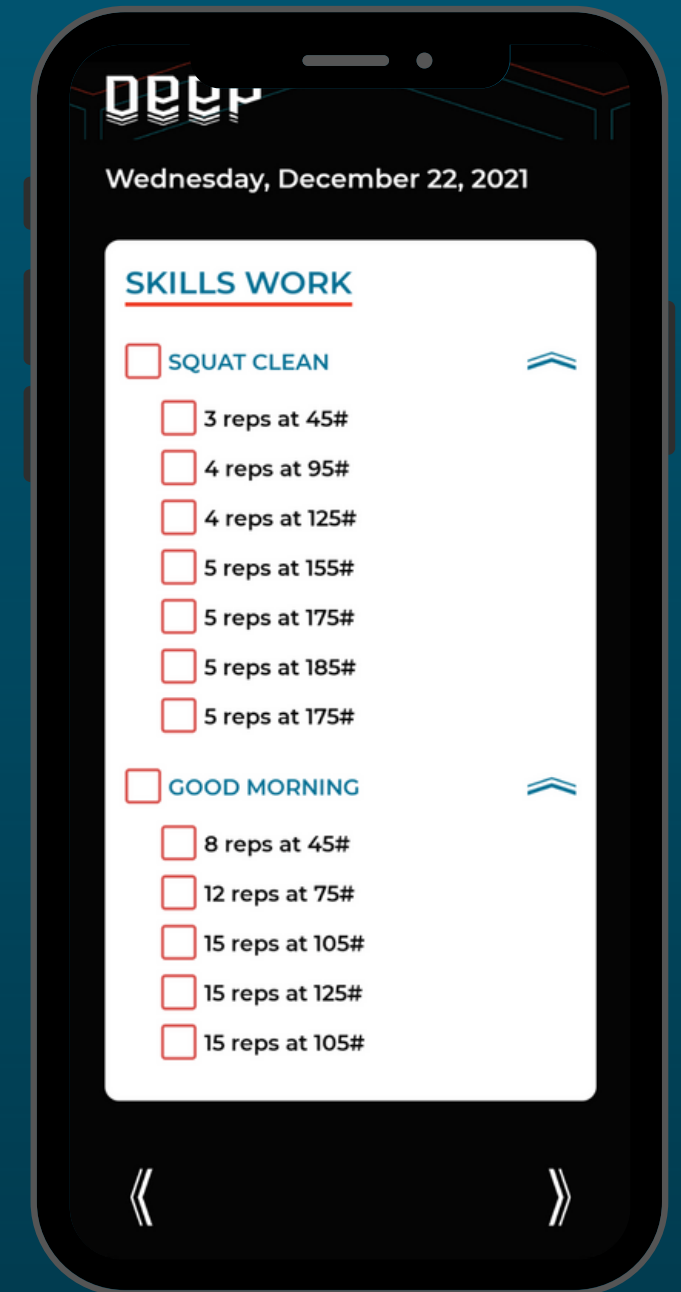
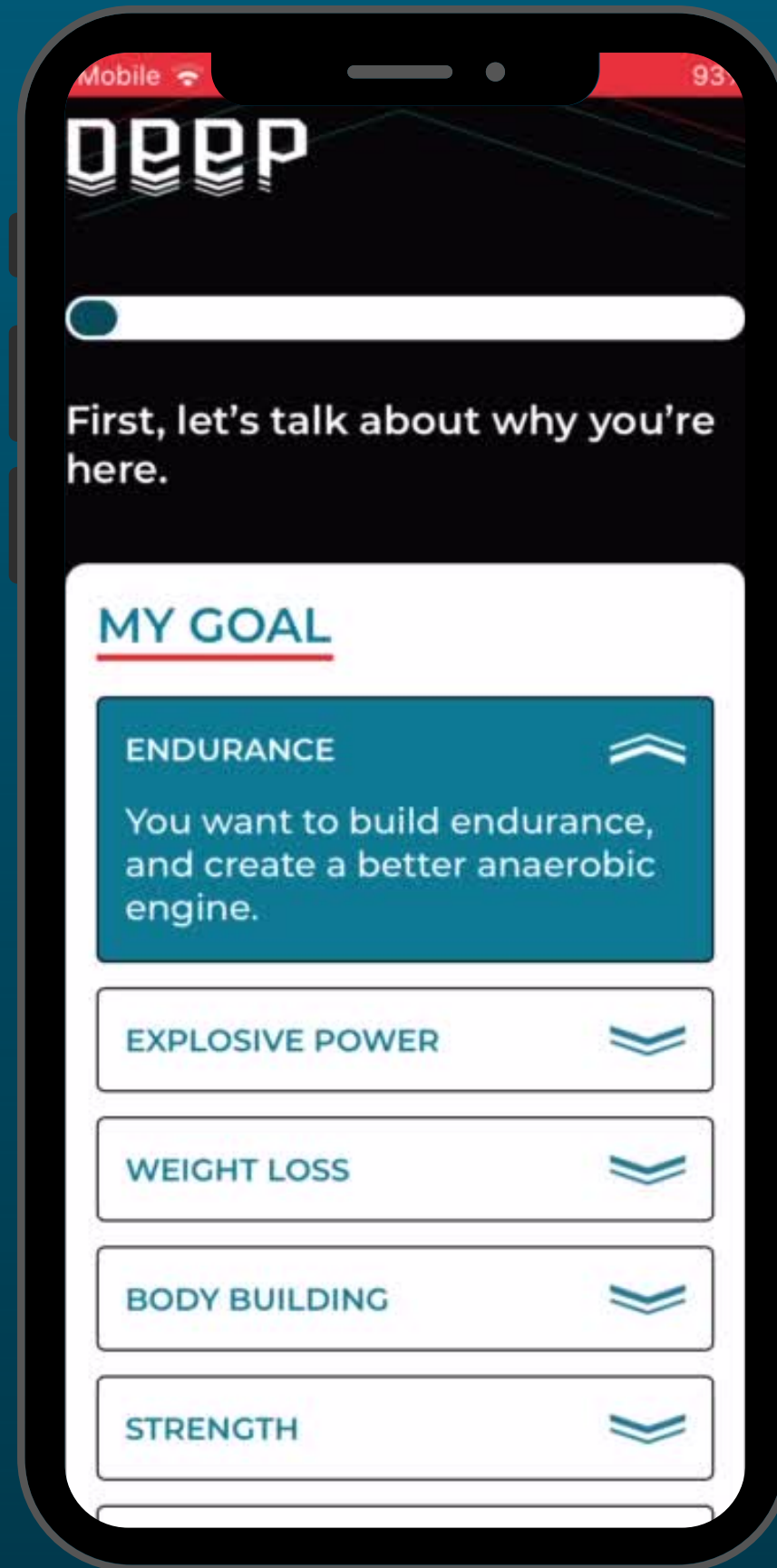
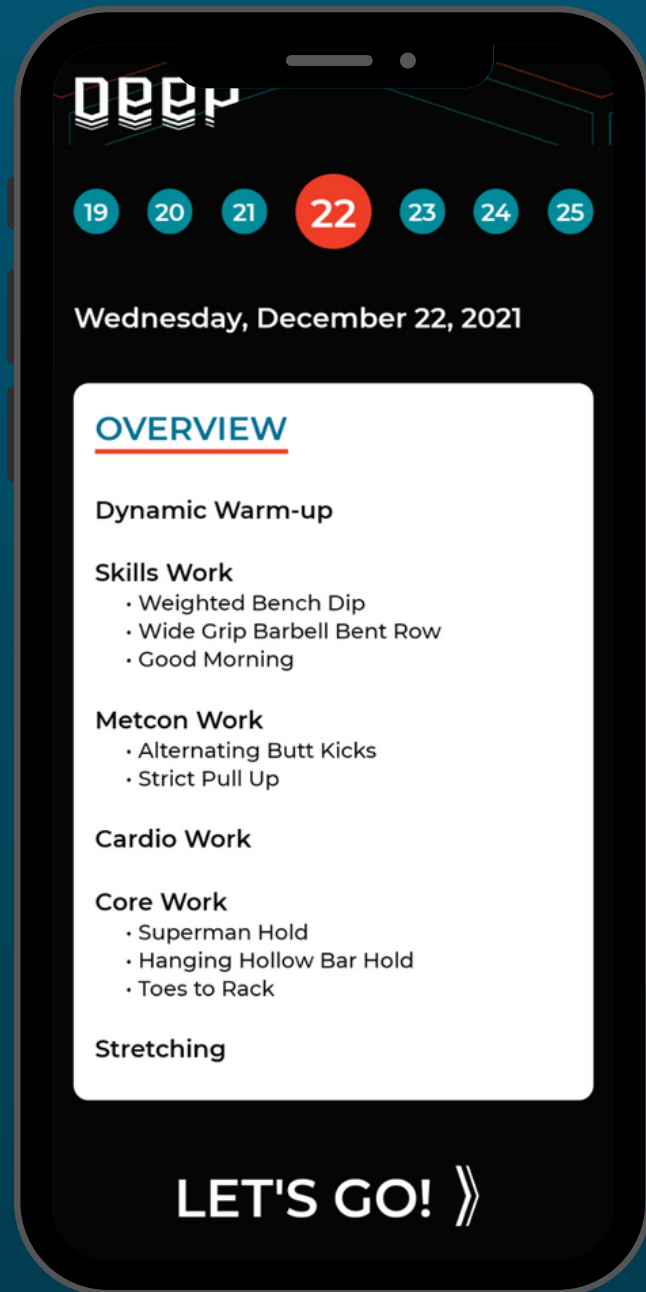


- Dave Erickson

- 20+ years experience in defense/aerospace industry
- Extensive expertise in modeling, simulation, and building complex algorithms
- Every-day worker-outer



The App



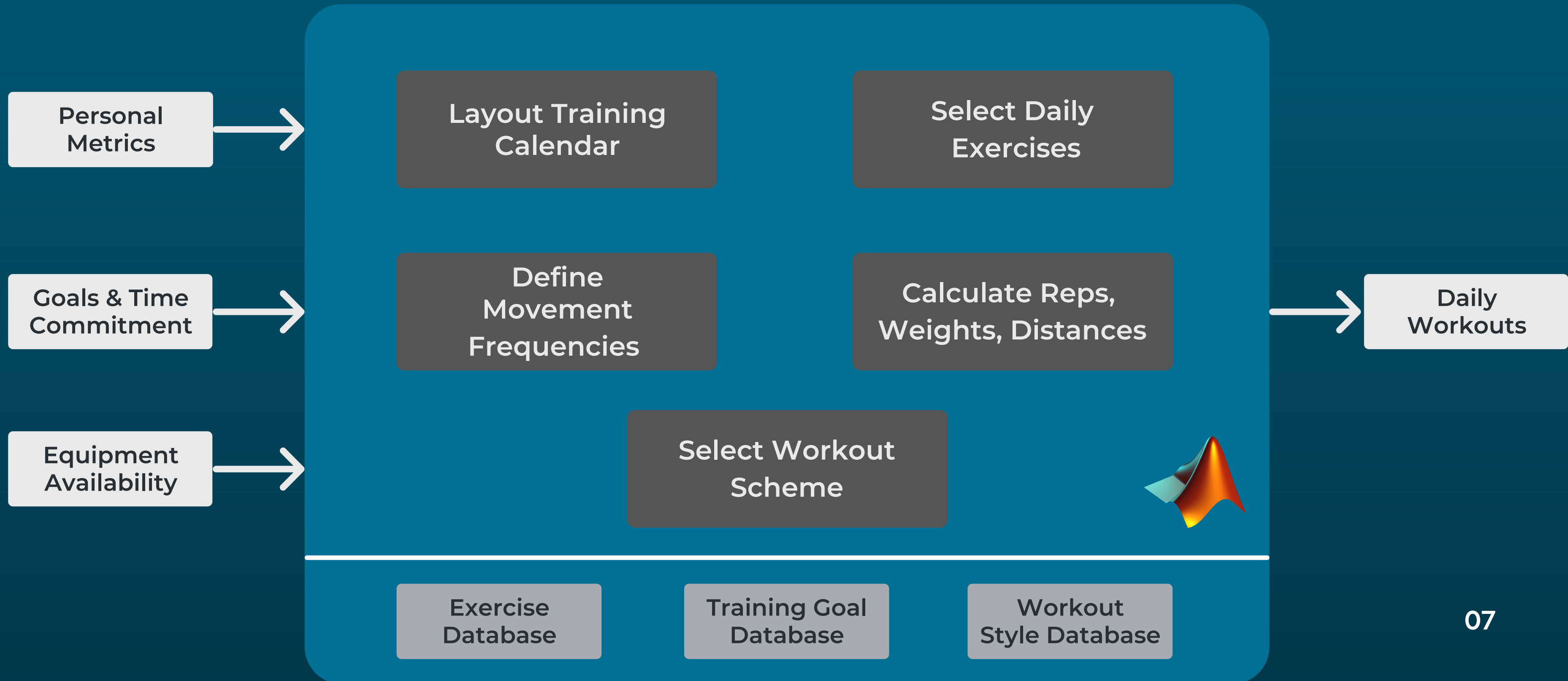
The Deep Athletics Algorithm

What does the Deep Athletics algorithm do?

- Unique daily workouts
- Maintains periodization and progressive overload
- Avoids human-error mistakes
- Accounts for skill level, equipment, injuries and time commitments
- Very specific daily workouts, including
 - Warmup & stretching
 - Skills, metcons, cardio, & core
 - Reps, weights, & times



Inside The Algorithm



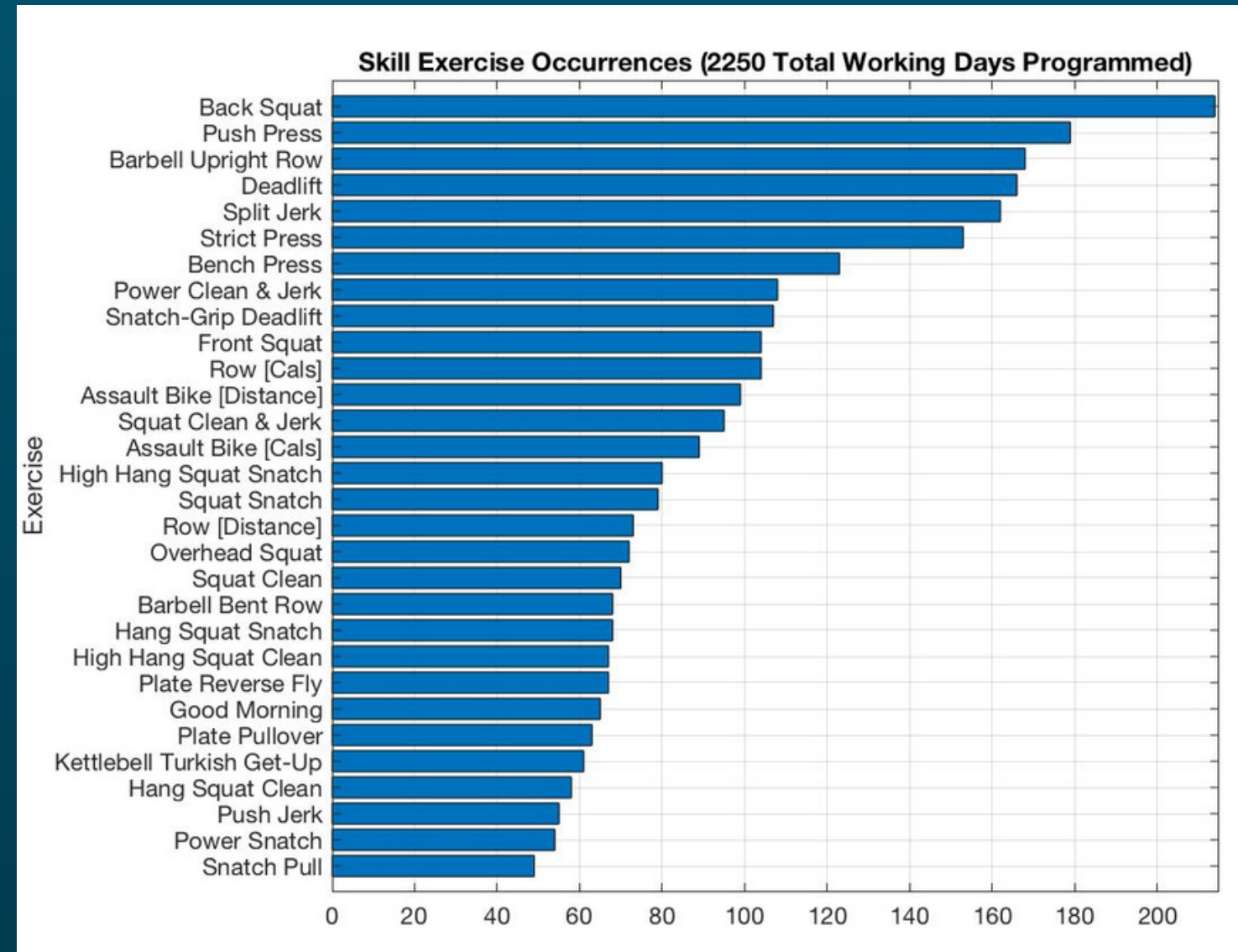
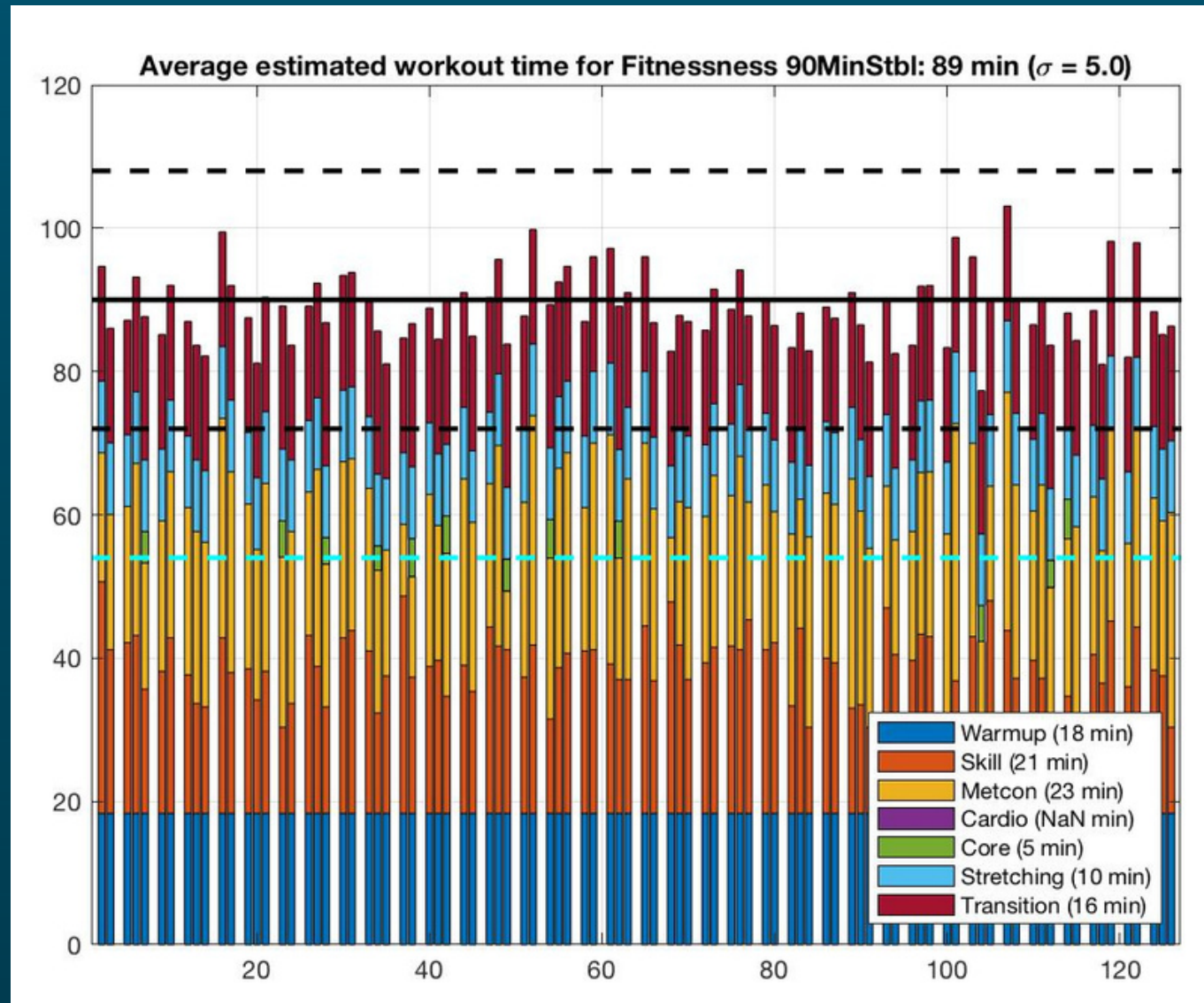
The Implementation Challenge

The inherently "human" nature of the problem presents unusual challenges that MATLAB is well-suited to handle

- Mixture of numerical and text-based variables throughout
- Large exercise database built in Excel spreadsheets
 - Easy for us to read and modify
 - Separate tool built to read and error check before saving as .MAT file for speed
- Significant randomness built into algorithm



Integrated Development, Testing & Analysis



MATLAB allows us to integrate testing & analysis into the algorithm

The Delivery Dilemma

Once we determined the algorithm was feasible, the next question became how to deliver workouts to individuals.

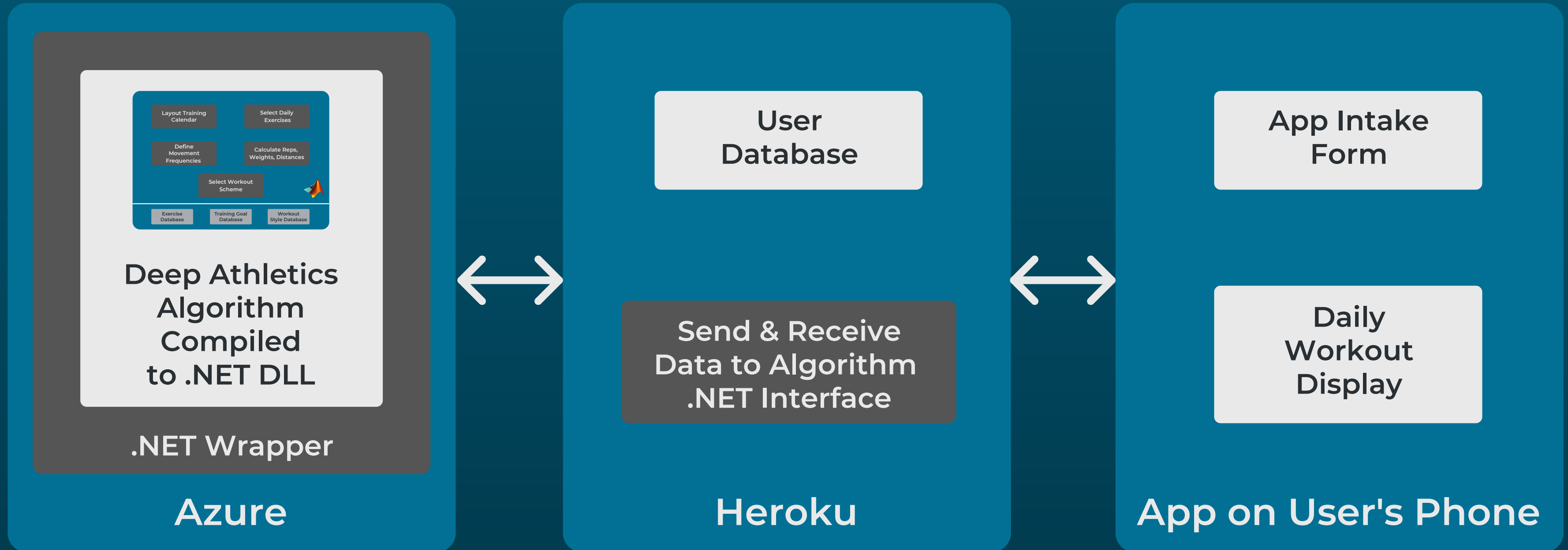
- Given today's world, a phone app is the obvious choice

How can the algorithm interface with an app?

- Port the algorithm to an app-centric language
- Use MATLAB Coder to port to C/C++
- Use MATLAB Compiler SDK to build DLL
- Use MATLAB Production Server to host the algorithm



Delivering The Algorithm

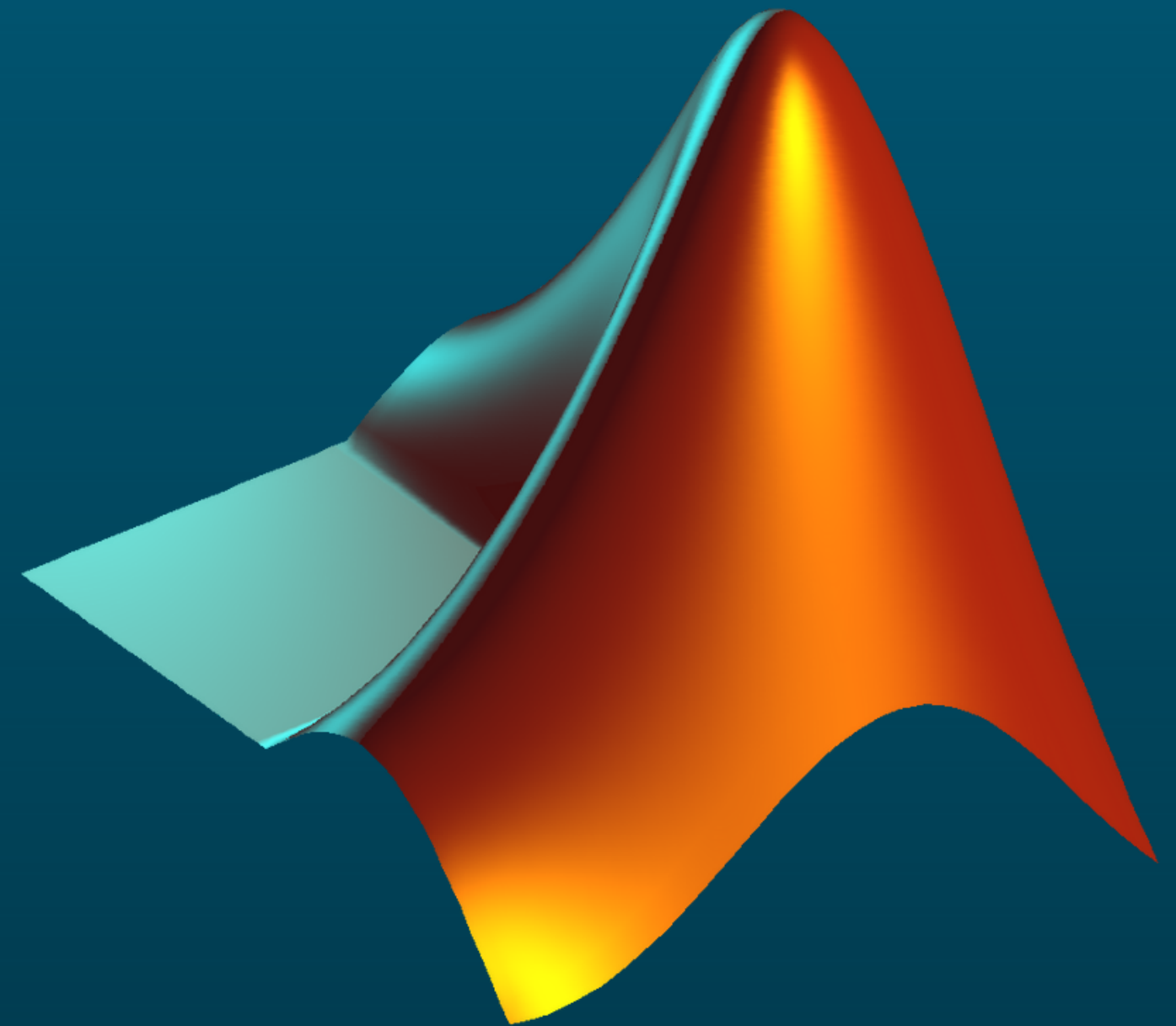


MATLAB Compiler SDK used to build .NET DLL

My Takeaway on MATLAB

The flexibility of the MATLAB "ecosystem" has significantly simplified our gestation

- Moved from concept development to deployment on the Apple and Android app stores without interruption
- Allows for integrated testing and analysis
- Saved significant money and time
- Remarkable customer support





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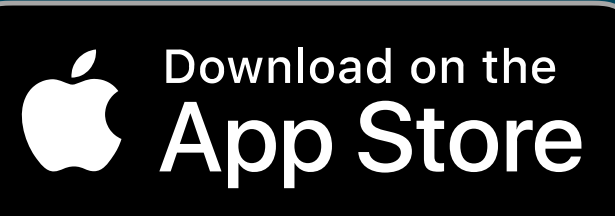
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Thank you for your
time & interest!



*Deep Athletics - Helping everyday worker-outers
realize their Athlete-ness*