

DIGITAL COMBINE BUILD PROPOSAL

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PROJECT OVERVIEW

The Company

We equip high school athletes with digital tools and professional resources to reach the next level. Its approach seeks to enable users to create their own destiny and gain scholarships with effective methods to improve and market their performance.

We currently have a web application which provides access to various training and nutrition tools as well as an athlete profile. Marketing tools are also housed within the web application.

THE INVENTION: DIGITAL COMBINE

In order to evaluate the speed, strength, agility and power of an athlete, many high school, college and professional sports teams put their athletes through a battery of skill assessments known as combine testing. To this point, all combine testing and results have been recorded by "In Person/Live" participation at these combine events. Unfortunately, due to the "in Person/Live" requirement of these combines, the ability to verify results of such events has been limited to a small number of participants.

We seek to build a DIGITAL COMBINE; a cellphone driven remote capture, experience within a mobile application which will provide a tool that can reliably utilize technology to digitally validate, verify, and record any athlete's performance in the combine skills assessment testing. The results of digital testing can then be provided to high school, college, and professional sports teams, who may rely upon their accuracy, to make decisions regarding the viability of any particular athlete's prospects for their program.

This COMBINE will provide athletes and coaches the ability to perform a small battery of objective measurements, record video, and post the results of these skill assessments.

The combine assessments will initially consist of four tests that measure variables such as: Time, Distance, Height and efficiency vs. "rules".

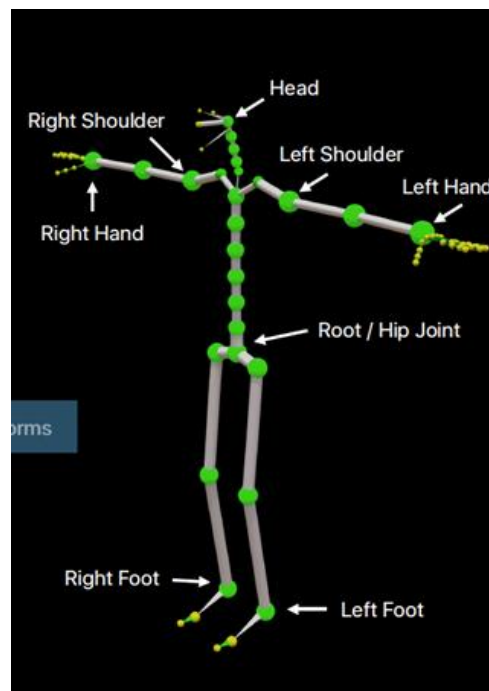
1. Speed Index (Measuring time in Sprinting, i.e. 40-yd dash, 60-yd dash, and 100 M Dash)
2. Broad Jump (Measuring height)
3. High Jump (Measuring distance)
4. 5/10/5 Shuttle (Measuring time to complete)

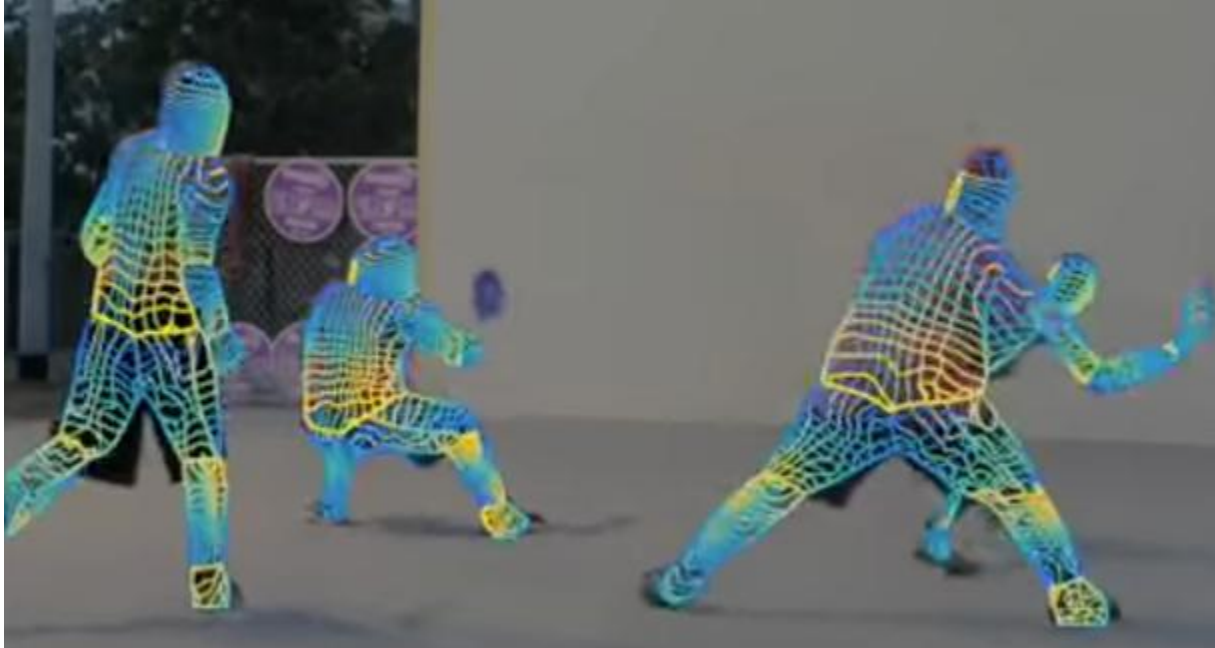
In addition, the app will contain features to allow an athlete to register, a coach to register and features to enable self-execution or coach-execution of the test. The results will have an opt-in display, so that athletes are in charge of when their scores are public and show up in search results. In addition, many of the basic features of the web application will carry forward into the mobile app.

Technical Background

In order to capture these measurements accurately with a mobile camera, a technical approach known as pose estimation will be used. This, in addition to potential depth cameras, can accurately measure where a human is in three-dimensional space and where their joints are over time as they do the movement.

These calculations rely on the mobile phone's camera as well as a machine-learning model which interprets the pixels to determine where a human form is, and what "pose" it is currently taking in each frame. This is typically done by finding major joint areas and translating what we know about the human body to compose a "pose estimation":





This core technology can be built with a combination of a model and then specific changes based upon need. For example, to build speed index - you use a **model** and then build on top of that your **rules**.

Build Options

The core components to build are:

1. Mobile application
2. Model to use for COMBINE tests (model)
3. Specific implementation of speed index, broad jump, 5-10-5 shuttle, and high jump (w/rules)

Due to the proprietary nature of the digital combine tests, there is no “direct buy” option. The software to do this does not exist, as we seek to build a unique offering.

Full Build of Model

We intends to hire developers to fully build the digital combine tests and mobile app. In this scenario, open source or platform software will be used to speed up development. This means that the build will be fully owned by us at the end of the product, and the limitations - good or bad - will be fully within us control.

iOS (Apple) has a pre-built model that can easily be used as a rapid starting point, building for both iOS and Android could potentially double development costs.

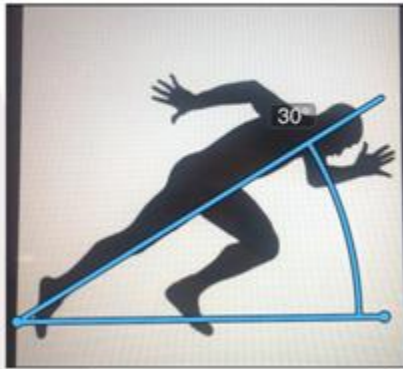
More information on Apple’s existing solution:

- ARKit and CoreML are platform upgrades built into the iOS (Apple) application developer’s kit. These technologies make use of pre-built learned models developed by Apple.
- Apple’s camera ecosystem has improved greatly after their purchase and technical integration of PrimeSense. Any phone with the A12 chip or higher has built-in body-tracking capabilities and a number of machine learning tools. In addition, their newest iPad Pro has a LIDAR camera on-board, which allows 3D body-tracking – a known game-changer in this problem space.
- As machine learning for pose estimation continues to innovate at a rapid pace, the size of on-device models has dropped significantly. In addition, these models have matured greatly. This project will evaluate the best, evaluating usage licenses, clinical accuracy, and robustness.
- The current trend is to also provide a single camera view with low-level supporting software that computes depth of known objects (like human shapes). This approach is currently shipping within the iPhone SE.

EXAMPLE OF “RULES” FOR SPRINTING

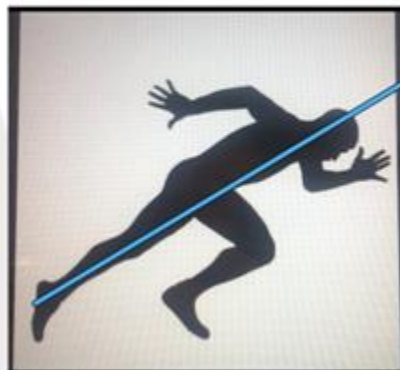
(Variances that fall outside these “rules” will lower the “Efficiency” rating of the skill)

Fundamentals of Speed
AccelerationThe Launch



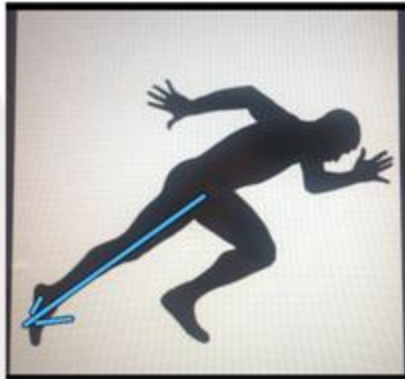
BODY ANGLE is determined by the amount of force an athlete can deliver to the ground; not the other way around.

Fundamentals of Speed
AccelerationThe Launch



POSTURE! POSTURE! POSTURE!
Key: Maintain
A Neutral Posture
(No flexion at the hip)

Fundamentals of Speed
AccelerationThe Launch



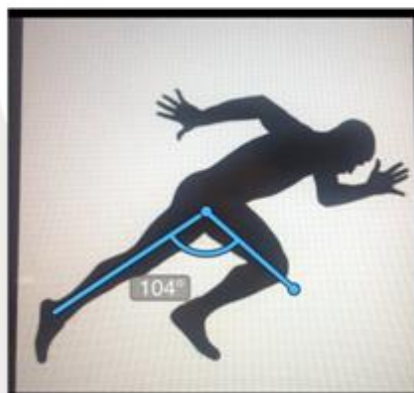
LEG ACTION
Key: Must be Piston-like
(Push the ground)

Fundamentals of Speed
AccelerationThe Launch



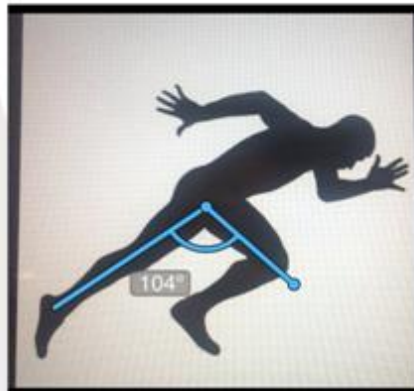
GROUND CONTACT
Key: Lower leg stiffness

Fundamentals of Speed
AccelerationThe Launch



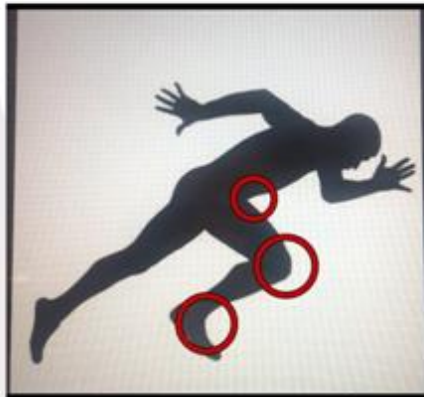
FRONT-SIDE RECOVERY
Must be powerful;
key: Greater than 90 deg.
split between thighs

Fundamentals of Speed
AccelerationThe Launch



FRONT-SIDE RECOVERY
Must be powerful;
key: Greater than 90 deg.
split between thighs

Fundamentals of Speed
AccelerationThe Launch



Key: TRIPLE FLEXION