# Stage 2 Interview – Sports Biomechanics Data Scientist Task

Congratulations on progressing to the final stage of the interview process for the Sports Biomechanics Data Scientist role at Movetru!

For this stage, we'd like you to prepare a **10-minute presentation and coding demo**.

# Task

**'Design and develop an approach for analysing real-time running and sprinting mechanics at different speeds for performance optimisation and injury mitigation.'**

 You should:

- Decide what data would be most useful for performance optimisation and injury mitigation.

- Write code to detect stride events and extract meaningful metrics.

- Show how your approach could work in real time and be validated in both lab and field settings.

# Challenge

- **Data Selection**

    - What type of data would you use to capture running and sprinting mechanics at different speeds?

    - Which signals or variables are most important for detecting stride events and performance changes?

- **Event Detection**

    - Write code to detect key stride events (e.g., foot strike, toe-off) from your chosen data.

- ○ Demonstrate how your algorithm adapts to both steady-state running and high-speed sprinting.

- **Metric Calculation**

  - ○ From the detected events, calculate metrics that could highlight both performance and injury risk.

  - ○ Justify why you chose these metrics.

- **Real-Time Algorithm Design**

  - ○ Outline and code a simplified workflow that could provide real-time feedback to athletes and coaches during a running session.

- **Validation**

  - ○ Describe how you would test and validate your algorithm in both controlled conditions (lab) and applied environments (track or field).

# Presentation & Submission Requirements

- **10 minutes max** for presentation.

- Slides (PowerPoint, Google Slides, or Canva) plus working code (Python or MATLAB).

- Code can be shown live or shared as a script/Jupyter Notebook.

- Include diagrams, pseudocode, or workflow illustrations as needed.

# What We're Looking For

- Practical and justified use of data to capture running mechanics.

- Clean, functional code for event detection and metric calculation.

- Logical approach to algorithm design for different running speeds.

- Clear rationale for chosen performance and injury-related metrics.

- Awareness of real-time application and validation challenges.

- Ability to communicate technical ideas clearly and concisely.


Please email submission of presentation and code to [dylan@movetru.io](mailto:dylan@movetru.io) by Tuesday 7th October ahead of your scheduled interview.