Dancing with Horses: Automatic Quality Assessment for Dressage Riders

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Feedback and Practice
Aim

To develop an unobtrusive platform to provide feedback to amateur dressage riders
Data Collection

Data collected using Inertial Measurement Units (IMUs)
MRV = Mediolateral rotational velocity
Gait Classification

Walk

Trot

Canter

Acceleration (g0)

Time (s)
Rhythm

The rate at which each of the horse’s feet contact the ground should be maintained through all turns, transitions, corners and straight lines.

\[ \text{Rhythm} = \sigma r \]
Regularity

Conformation to the correct sequence of footfalls is critical if a horse is to perform at any level.
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Consistency of Duty Factor

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\[ D_n = \text{Stance phase} \]

\[ C = \tilde{A}D \]

- \( a \) = hoof down
- \( b \) = hoof up

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Suspension

“The most important criteria of impulsion is the time the horse spends in the air rather than on the ground”

[FEI judges handbook]
Smoothness of turn and straight

A horse should execute a turn smoothly and with a uniform amount of rotation for the duration of the turn.

Smoothed Gyroscope Data

- Angular Velocity (°/s)
- Time (s)

- Left Turn
- Straight
- Right Turn
Feedback

Suspension

Regularity

Rhythm

Duty Factor

Smoothness

Participant 2
Participant 3
Participant 4
Participant 8
Summary
Thank you