

Dancing with Horses: Automatic Quality Assessment for Dressage Riders

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Feedback and Practice

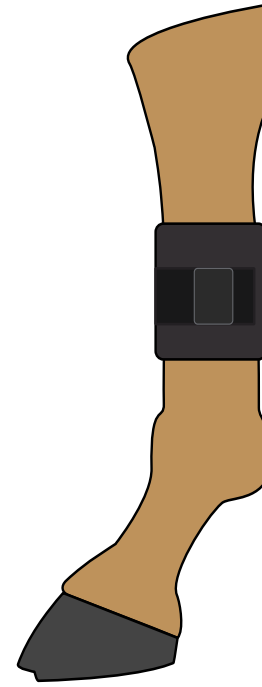
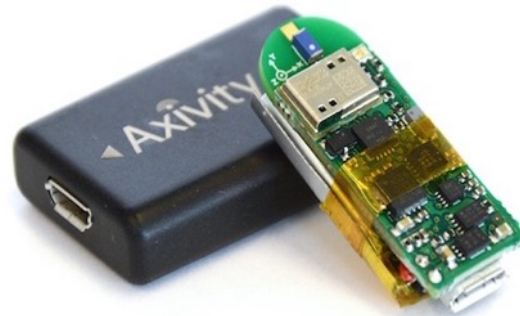
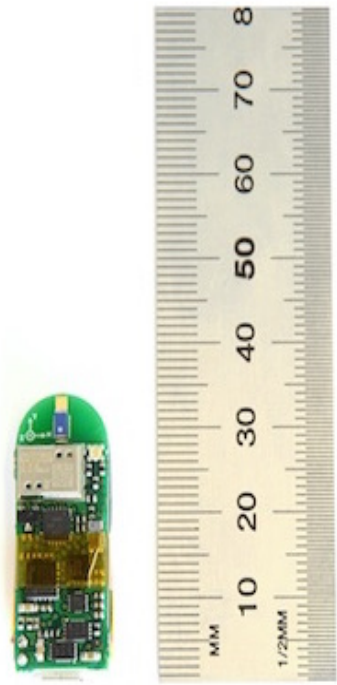


Aim

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

Data Collection

Data collected using Inertial Measurement Units (IMUs)



Study Size

Levels of Dressage

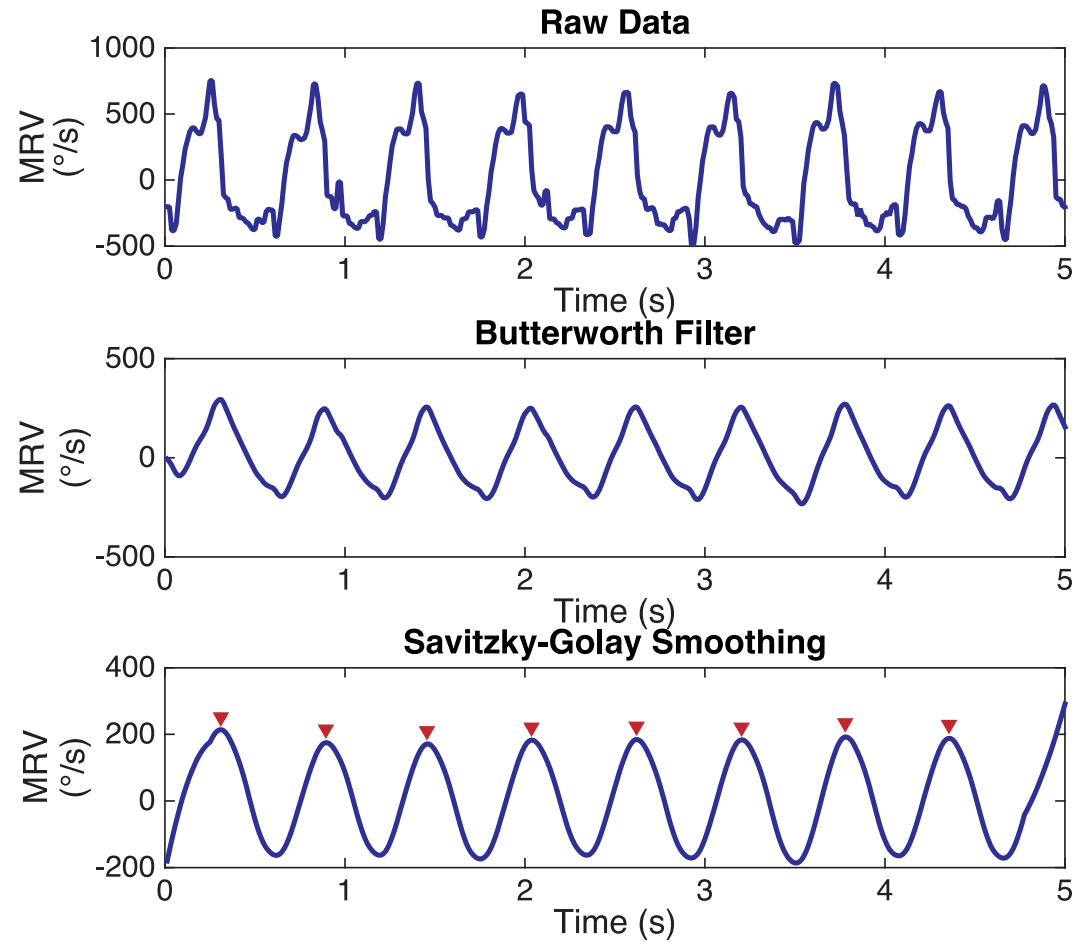
- Difficulty ↓
1. Introductory
 2. Preliminary
 3. Novice
 4. Elementary
 5. Medium
 6. Advanced Medium
 7. Advanced
 8. Prix St. George
 9. Intermediate I
 10. Intermediate II
 11. Grand Prix
- Covered by Deployment
-

Data Set Details

TESTS RIDDEN	29
UNIQUE HORSES	23
UNIQUE RIDERS	21

Stride Segmentation

MRV = Mediolateral
Rotational Velocity



Gait Classification



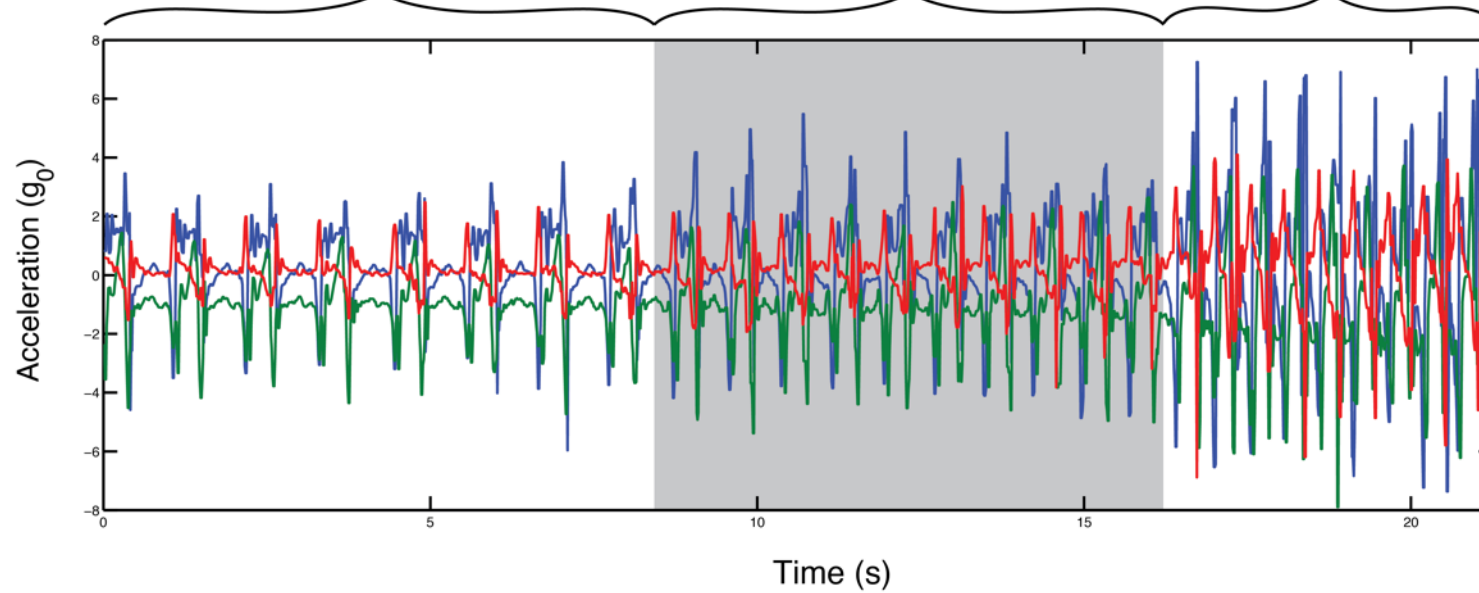
Walk



Trot

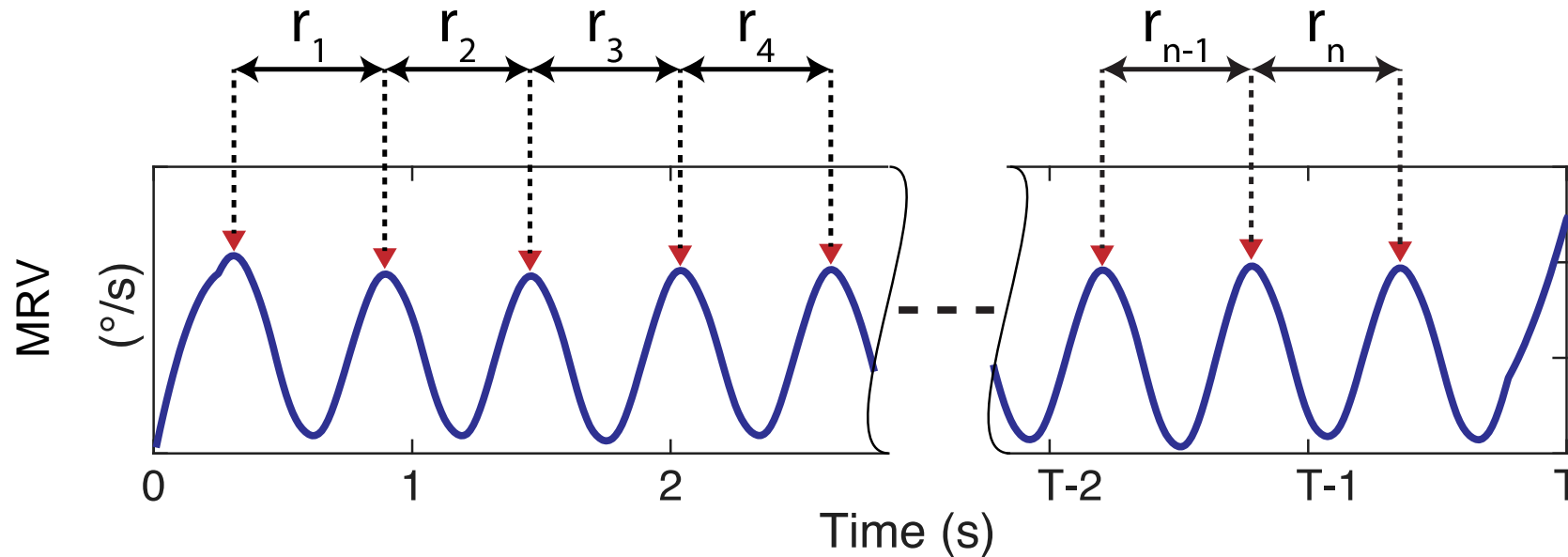


Canter



Rhythm

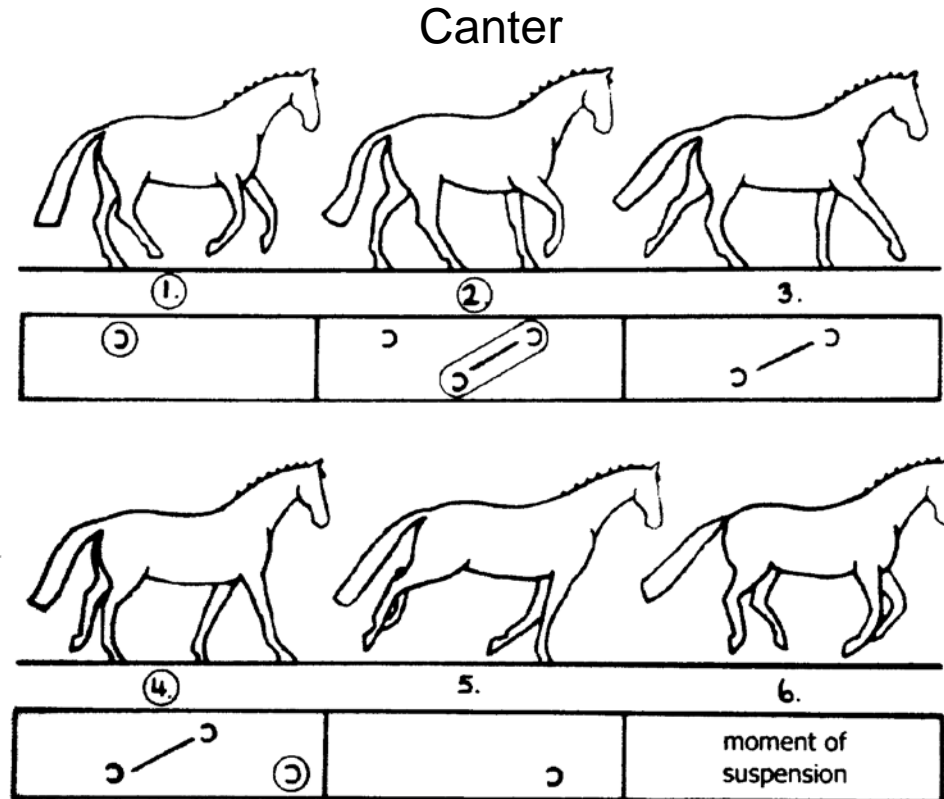
The rate at which each of the horse's feet contact the ground should be maintained through all turns, transitions, corners and straight lines



$$\text{Rhythm} = \sigma r$$

Regularity

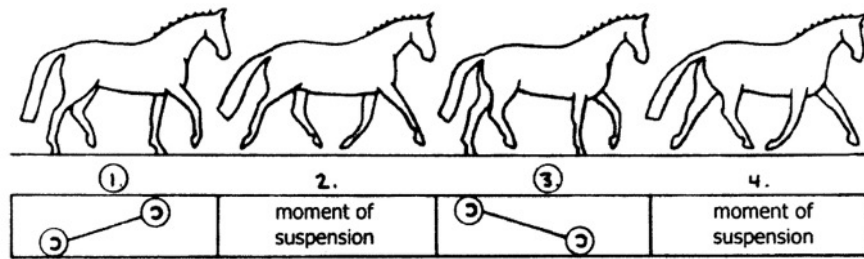
Conformation to the correct sequence of footfalls is critical if a horse is to perform at any level.



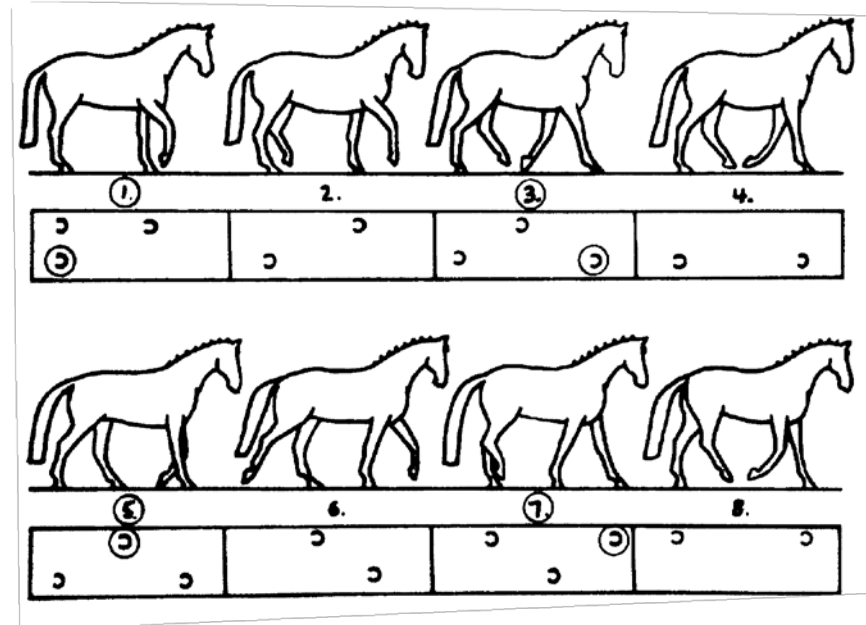
Regularity

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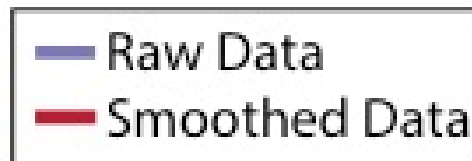
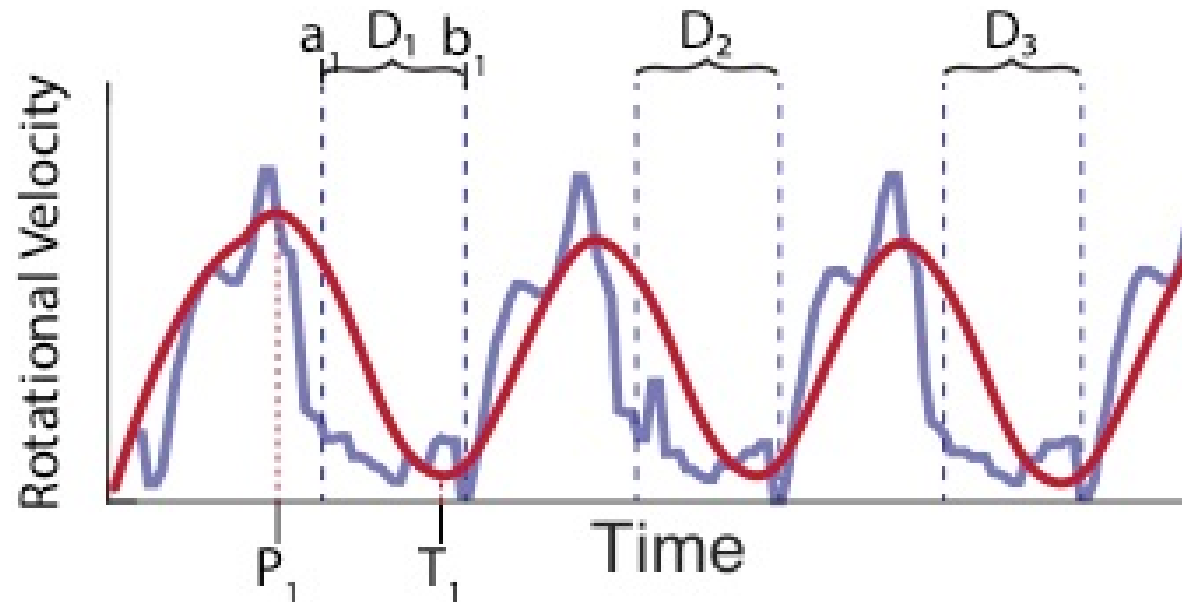
Trot



Walk



Consistency of Duty Factor



a = hoof down

b = hoof up

D_n = Stance phase

$$C = \tilde{A}D$$

Suspension

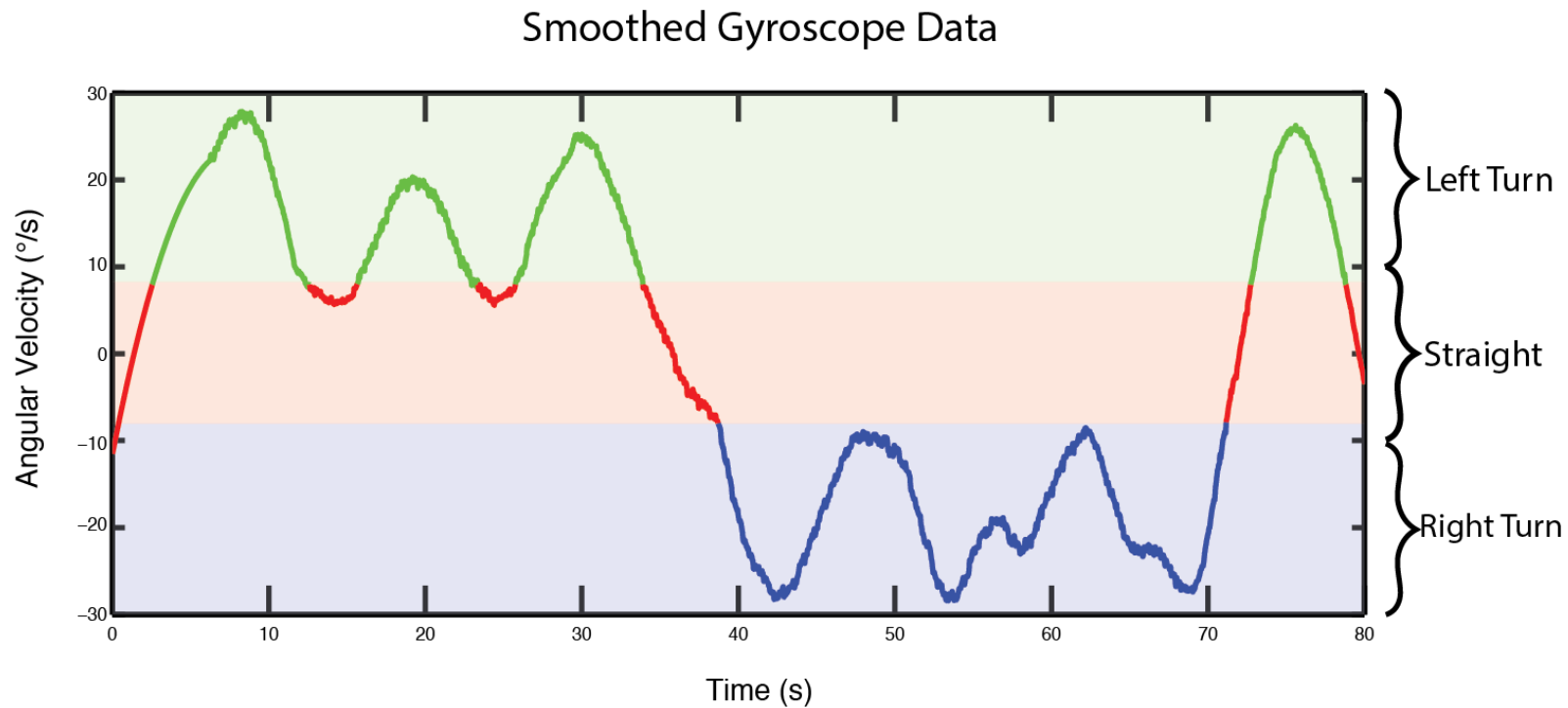
“The most important criteria of impulsion is the time the horse spends in the air rather than on the ground”

[FEI judges handbook]

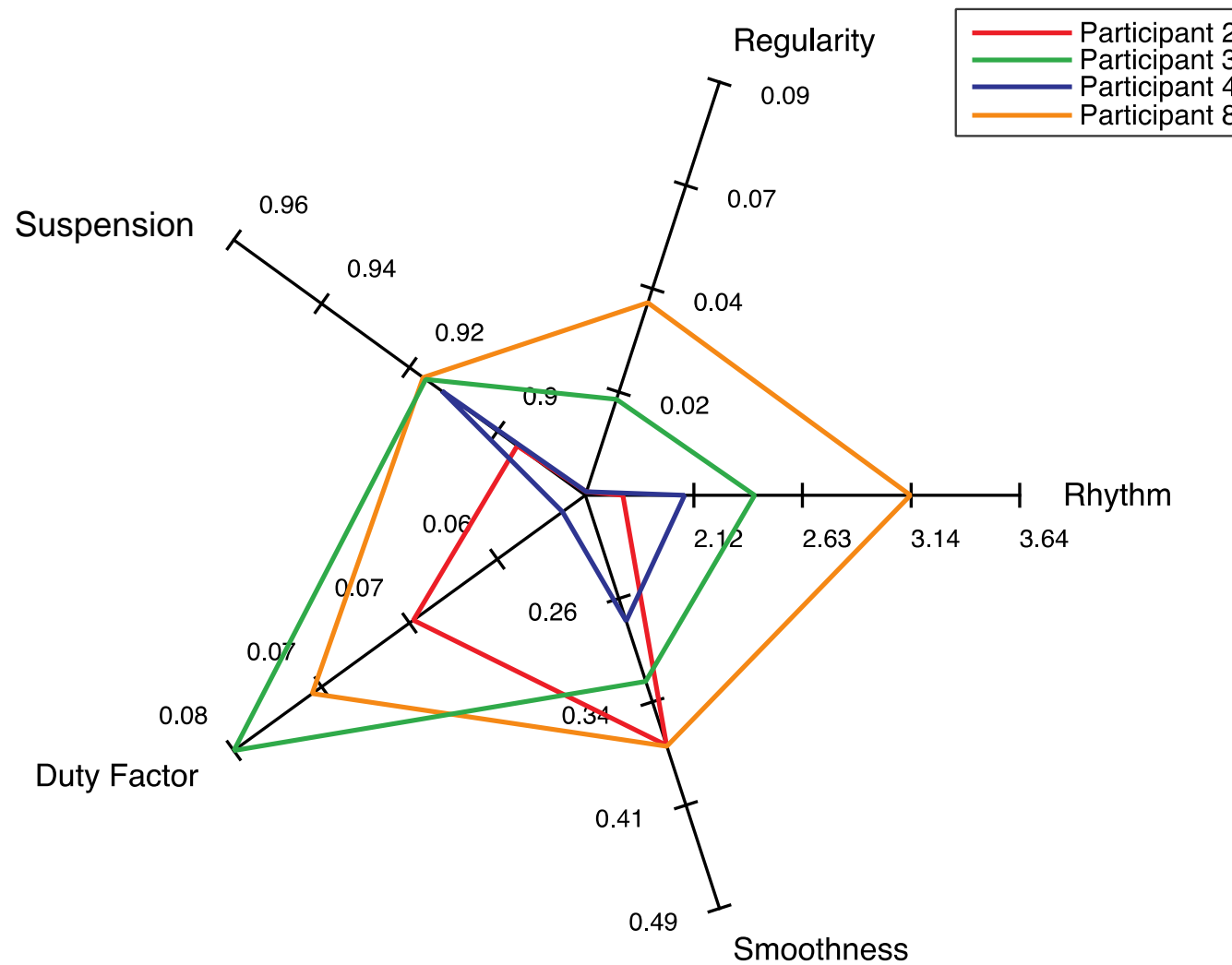


Smoothness of turn and straight

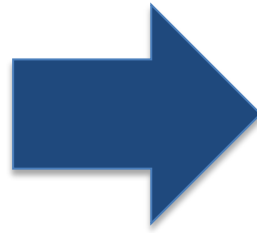
A horse should execute a turn smoothly and with a uniform amount of rotation for the duration of the turn.



Feedback



Summary



Thank you