



AI Used To Improve Training Stress Score (TSS) Measurements

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The Meat Motor website has performed an AI experiment to generate alternatives to the procedures athletes currently use to measure their Training Stress Score (TSS). The platform strives to break down complicated data into information that athletes can readily apply to their own training regimens, and this experiment helped the platform shed light on interesting opportunities that may be explored in the future.

As the article notes, "Endurance training benefits an endurance athlete because it places a progressive load on the athlete's physiological systems that allow them to improve via adaptation over time (physiological adaptation). Measuring the load of a given session is important, as is the cumulative load over time." The article shares that a range of AI models were utilized to run the experiment, including Dragonfly, Claude and Chat GPT 4.

Each of these models proved to have unique strengths and weaknesses, but Meat Motor sought to push them as far as possible in this simple experiment. While the experiment's results should not be considered the AI world's final say on the matter, the platform believes that there is strong reason to keep investigating the potential improvements AI can bring to athletes in various sports.

Many in the relevant fields will be aware that many fitness- and endurance- testing solutions exist already. While it can be taken for granted that there is always room for improvement, Meat Motor says it is important to identify a specific drawback that may benefit from AI. The platform began by examining which factors are most often taken into account in fatigue tests ? and they noted a striking connection between these factors.

Most tests rely on the following measurements: the distance covered, calories burned, pace or MPH maintained and so on. Some of these factors may be more variable than others, but they are typically external in nature. Many internal factors will contribute to an athlete?s score as well, such as their heart rate, Perceived Effort (RPE Scales) and even injury or illness to some extent.

?The challenge,? Meat Motor says, ?is that most training software like Training Peaks, Xert, WKO et al. create a fatigue or fitness score using ONLY external factor modeling. This can be detrimental to an athlete. Perhaps the most well-known external score is the Training Stress Score (TSS) which is modeled by Training Peaks when wattage is available.?

They add, ?This over-reliance on external stress measurements can be detrimental to recovery and optimal performance. Relying on external metrics and the expense of internal metrics is analogous to an F1 team seeing their car going around the track at 200mph and telling the driver, ?We?re okay, keep pushing,? while the wheels are falling off and the engine is on fire.?

Many will point out that certain internal metrics can indeed be gathered for an athlete, such as cardiovascular stress, metabolic stress and neuromuscular fatigue, but Meat Motor points out that these can be similarly misleading if examined outside context. If a solution exists, it would likely combine both internal and external factors, however, and this is where Meat Motor believed AI would be able to help.

Chat GPT 4, Dragonfly and Claude were tasked with creating a better-weighted test score for cyclists (using tailored prompts). Each came up with specific variables that a coach could measure, and these variables would then be plugged into an equation to measure the athlete?s response.

Chat GPT 4, for instance, suggested that coaches measure variables that could be plugged into a Single-Session Cycling Fatigue Index (SSCFI). Since the exact method produces a score between 0 and 100, results would quickly indicate where an athlete stands. A higher SSCFI, the article says, would indicate higher accumulated stress and fatigue for that specific training session. Further, a rolling average or a weighted average of individual session scores could be calculated over a longer period to produce an overview of the athlete?s performance during specific time frames.

Each AI model produced a unique solution that nonetheless relied on real-world measurements, such as

respiratory rate, hydration levels, metabolic rate, and even environmental conditions. Meat Motor comments that some suggestions were not as helpful, such as taking a muscle biopsy following each session, but the experiment does indicate researchers with more experience may be able to leverage AI with much greater success. For their part, Meat Motor looks forward to seeing the results of future experiments from the experts.

Those interested can read more here: [AI Models Alternative TSS Score](#). Meat Motor has many articles on other aspects of sports science as well.

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