

Swim Standard: Data-Driven Swimming Performance Dashboard

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Project Overview

Introducing Swim Standard, an interactive dashboard solution for coaches that revolutionizes the benchmarking, analysis, and optimization of swimming performance. I developed Swim Standard while working as a Sports Data Analyst/Statistician for Abhishek V., a former national swimmer and freelance coach/mentor. Swim Standard utilizes clean datasets, predictive models, and interactive visualizations, thereby facilitating the rapid application of sophisticated insights on the pool deck.

Three fundamental issues of coaching were meticulously addressed in order to achieve this:

- Benchmarking confusion arises as a result of the difficulty that instructors and swimmers encounter when comparing student performance to national records.
- Exercise overload – With the abundance of potential exercises, it is both error-prone and inefficient to have to recall the appropriate instructions for a specific stroke or performance.
- Due to the fact that athletes typically do not practice all distances and there are voids in the evaluation and prioritization of training, incomplete event testing occurs.

Swim Standard is distinguished by its unique perspective: as an individual who has competed in swimming since the fourth grade and has earned numerous gold medals in the freestyle, breaststroke, and individual medley events, I have successfully integrated data science and athlete insights to guarantee that the tool is not only technically sound but also relevant and practical in real-world coaching scenarios.

By addressing these obstacles, Swim Standard empowers coaches to deliver evidence-based, focused commentary, thereby maximizing the effectiveness of each training session and minimizing wasted time and resources.

How Problems Were Solved

- **Problem:** Manual computation and lookup is required to compare student time with Indian national records, which is an exhausting task.

Solution: Implemented a one-click benchmarking feature: Input a student's time and immediately view the record, variation from the record, and percentage gap.

- **Problem:** Coaches do not recall and coordinate the proper drills for every stroke/event.

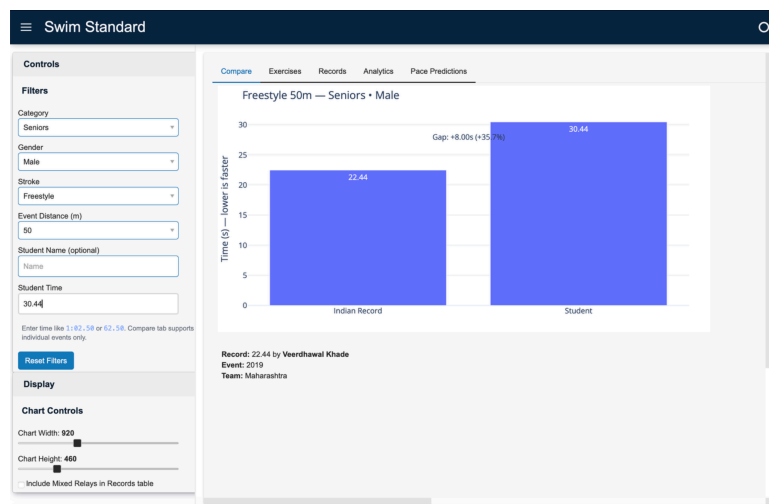
Solution: Created an Exercises Tab, that utilizes a reusable CSV file that stores exercises in relation to strokes + sprint/middle/distance categories, to display workout prescriptions in the format of a table. Coaches can now access filtered exercises almost immediately, without the need to rely on memory.

- **Problem:** It was time/energy consuming to make students test every distance, making it tedious to assess their overall stroke performance.

Solution: Trained and deployed a supervised ML power-law regression model ($t=a \cdot d^b$) to predict times across distances, quantify gap-to-record, and automatically flag underperforming events for targeted coaching.

Dashboard Walkthrough

Compare Tab



Enter a student time → instantly see comparison with the Indian record, complete with automated gap annotation (+8.00s, +35.7%).

Exercises Tab

Swim Standard

Controls

Filters

Category
Seniors

Gender
Male

Stroke
Freestyle

Event Distance (m)
50

Student Name (optional)
Name

Student Time
30.44

Enter time like 1:42.58 or 62:58. Compare tab supports individual events only.

Reset Filters

Display

Chart Controls

Chart Width: 920

Chart Height: 460

Include Mixed Relays in Records table

Compare Exercises Records Analytics Pace Predictions

stroke	event_m	event_bucket	exercise_name	exercise_type	equipment	primary_muscles	sets
Freestyle	50	Sprint	Underwater dolphin to 12.5m	pool	fins (optional)	core:glutes,hip flexors	4-6
Freestyle	50	Sprint	Breakout 25s (12.5m fast to surface)	pool	none	lats:shoulders,triceps	4-6
Freestyle	50	Sprint	Catch-up with snorkel	pool	snorkel	lats:shoulders,core	4-6
Freestyle	50	Sprint	6-3-6 drill	pool	none	core:shoulders	4-6
Freestyle	50	Sprint	Paddles + pull buoy (hypoxic 5:7)	pool	paddles,pull buoy	lats,triceps,core	4-6
Freestyle	50	Sprint	Parachute sprint 25s	pool	drag chute	glutes,quads,hamstrings	4-6
Freestyle	50	Sprint	Tempo Trainer 80/100 pace	pool	tempo trainer	cardiorespiratory,core	4-6
Freestyle	50	Sprint	Vertical kick (dolphin-flutter)	pool	dumbbell or med ball	hip flexors,glutes,core	4-6
Freestyle	50	Sprint	Pull-ups (strict)	dryland	pull-up bar	lats,triceps,scapular stabilizers	4
Freestyle	50	Sprint	Last pull-down	dryland	cable machine	lats,triceps	3-4
Freestyle	50	Sprint	Dumbbell row (snatch-arm)	dryland	dumbbell	lats,rear delt,core	3-4

Hundreds of drills condensed into a dynamic, searchable workout library, filtered by stroke and distance bucket. This replaces guesswork with targeted training guidance.

Records Tab

Swim Standard

Controls

Filters

Category
Seniors

Gender
Male

Stroke
Freestyle

Event Distance (m)
50

Student Name (optional)
Name

Student Time
30.44

Enter time like 1:42.58 or 62:58. Compare tab supports individual events only.

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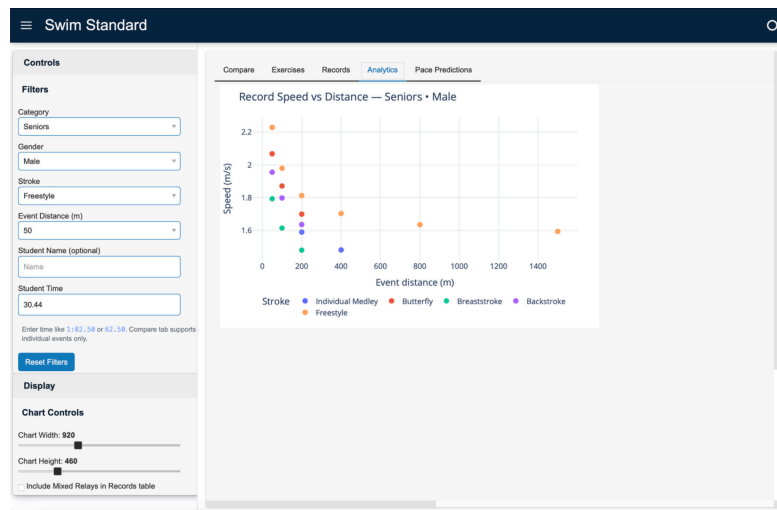
Include Mixed Relays in Records table

Compare Exercises Records Analytics Pace Predictions

category	gender	stroke	event	record_holder	time_str	team	date_event
Seniors	Male	Medley Relay	4 x 100m	Karnataka	3:48.83	NaN	2019
Seniors	Male	Freestyle Relay	4 x 200m	R.S.P.B.	7:45.24	NaN	2016
Seniors	Male	Freestyle Relay	4 x 100m	R.S.P.B.	3:29.32	NaN	15-Nov-14
Seniors	Male	Medley	400 m	Rehan Poncha	4:30.13	Karnataka	02-Nov-09
Seniors	Male	Medley	200 m	Sajan Prakash	2:05.83	Kerala	Senior Nationals 2018
Seniors	Male	Butterfly	200 m	Sajan Prakash	01:57.73	Kerala	2018 Senior Nationals
Seniors	Male	Butterfly	100 m	Sajan Prakash	00:53.46	Kerala	2018 Senior Nationals
Seniors	Male	Butterfly	50 m	Veerdhawal Khade	0:24.19	Maharashtra	2019 Senior Nationals
Seniors	Male	Breaststroke	200 m	Sandeep Sejwal	2:15.22	R.S.P.B.	01-Nov-13
Seniors	Male	Breaststroke	100 m	Sandeep Sejwal	1:01.97	R.S.P.B.	01-Nov-11
Seniors	Male	Breaststroke	50 m	Sandeep Sejwal	0:27.89	Delhi	2018 Senior Nationals Heats
Seniors	Male	Backstroke	200 m	Srihari Nataraj	02:02.29	Karnataka	2019
Seniors	Male	Backstroke	100 m	Srihari Nataraj	00:55.63	Karnataka	2019

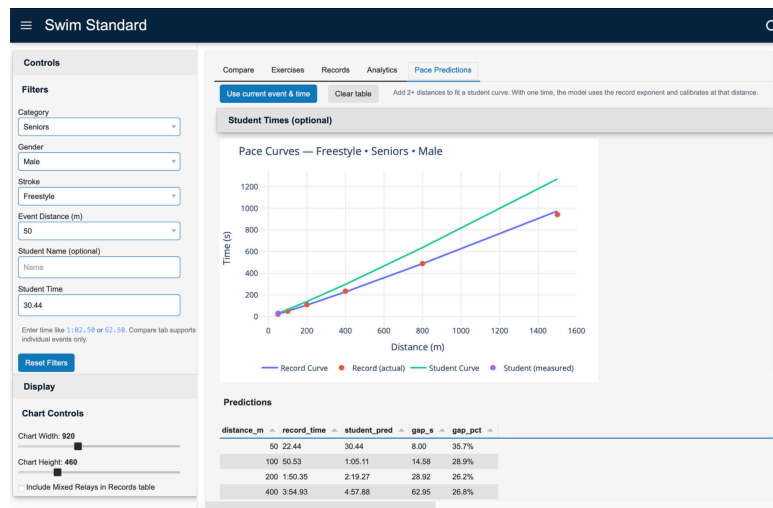
Searchable record tables filtered by Category, Gender, Stroke, Distance. Provides quick context on India's swimming standards.

Analytics Tab



Shows record speed vs distance across strokes—highlighting how performance drops off as distances increase.

Pace Predictions Tab



Student times are fit against a pace curve vs record curve. The model predicts untested distances and automatically flags largest performance gaps for coaching focus.

Impact

By meeting the everyday needs of coaches, Swim Standard has become a training partner instead of just a tool:

- Simplifies complexity – Coaches no longer juggle drills or manually calculate gaps.
- Provides performance prediction capability – Since Machine Learning fills missing event data, progress can now be monitored holistically without extensive testing.

- Combining experience with science – A lifetime of competitive experience plus analytics-based insight produced an instrument that's relied upon on the deck and insightful in practice.

This project proves the capability of sports analytics “done right” to facilitate coaches and players in India by conjoining expert domain know-how, scholarly research, and machine learning into a pragmatic, coherent, and impactful solution.