

Using R to Construct a Graphical User Interface for an Interactive Fitness Log

Karsten Tait Maurer

Iowa State University

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Introduction

Fitness Logs

- ▶ A tool for improving personal fitness
- ▶ Used to record information about personal workouts
- ▶ Data generally recorded into a basic spreadsheet or notebook

Rec Milers

- ▶ ISU club to promote consistent exercise
- ▶ Members keep a fitness log
- ▶ All activities are converted using time into "Rec Miles"
- ▶ Every 250 Rec Miles (up to 1000 Rec Miles) the member earns prizes

GUI Goals

How can a GUI improve these fitness logs?

- ▶ Record data in a format compatible with statistics software
- ▶ Provide more continuous motivation for exercise retention
- ▶ Point and click environment for user to explore exercise data

Goals in Development of Fitness Log GUI

- ▶ User accessibility
- ▶ Ease of data entry
- ▶ Capturing important elements of the workouts
- ▶ Features to promote exercise retention
- ▶ Quality data exploration using informative graphics and summary statistic

R Packages

gWidgetsWWW

- ▶ R package written by John Verzani
- ▶ Facilitates the construction of a GUI that is loaded in web browser
- ▶ Uses R as the computational engine behind GUI commands
- ▶ Acts as a translator between java script and R code

ggplot2

- ▶ R package written by Hadley Wickham
- ▶ Generates clean and attractive statistical graphics
- ▶ Used to create all graphical displays in GUI

Login Page

RecMiler - Mozilla Firefox

Department of Statistics RecMiler

http://wingfold.stat.iastate.edu/gWidgetsWWW/recmiler-9.R

Welcome to the Rec Milers' Club

In 2009/10 we had 324 members who together recorded over 150,000 miles - this is equivalent to the colored area on the map. Each colored road segment corresponds to miles recorded by our members for physical activities and smart nutritional choices.

RecMiler Login

User

Password

Total Miles this year: 134455.05

Miles today: NA

Rec Milers fulfilling [ACSM/AHA recommendations](#) this week: 324

No Login yet? [Register](#) for free.

Powered by RApache and gWidgetsWWW

Data Elements

Capture important elements of workout

- ▶ Date
- ▶ Activity Type
- ▶ Duration
- ▶ Distance
- ▶ Effort level
 - ▶ RPE Rated Perceived Exertion on 1-10 scale

Points System

RecMiles

- ▶ Intuitive for walking/running
- ▶ Timed activities assigned miles per timeblock
- ▶ Want a more precise measure of the workout

Points

- ▶ Designed to be more of a measure of effort
- ▶ Roughly analogous to caloric expenditure
- ▶ Intentionally not a 1-to-1 link with calories
- ▶ Function incorporates time, activity, distance and RPE to assign points value for workout

Entry Page

Record Activity | Summaries | Trophy Room | Trend Analysis | Map My Miles | My Profile | Connect to DB

RecMiles: 952.76 -- Points: 11712.32

Specify Workout Details

Date:

Activity: Jog/Run/Walk (click on activity buttons to change)

Time: minutes

Distance: miles

RPE: [What is RPE?](#)

[click to add workout](#) [remove entry](#)

Choose your Activity

Basketball, Biking, Skiing-cc, Fitness Group, Fruits/Vegetables, Golf-no cart, Jog/Run/Walk, Jumping Rope, Other, Racquetball, Rollerblading, Soccer, Star Machine, Swimming, Tennis, Volleyball, Weight Lifting, Aerobics-water, Elliptical, Handball, Hockey, Rock Climbing, Rowing, Skateboarding, Skating, Skiing-downhill, Snowboarding, Spinning, Squash, Ultimate Frisbee, Water.

Logbook

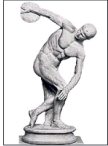
WID	Date	Activity	Duration	Points	Miles	RPE
319	2011-07-22	Spinning	30	36.75	2.01	7
318	2011-07-21	Spinning	25	26.25	1.675	6
317	2011-07-20	Ultimate Frisbee	120	144.242	6	7
315	2011-07-19	Spinning	45	39.375	3.015	5
316	2011-07-18	Spinning	50	61.25	3.35	7
313	2011-07-17	Other	30	15	1.5	5
312	2011-07-16	Swimming	150	103.03	15	4

Powered by RApache and gMidgets/WWW



Virtual Trophies and Ranks

Record Activity | Summaries | **Trophy Room** | Trend Analysis | Map My Miles | My Profile | Connect to DB

Your Rec Points earn you the status of **Olympian**



Next rank in 288 Rec Points
[click to show all medals](#)

250 Miles	500 Miles	750 Miles	1000 Miles
			
5k	10k	Halfmarathon	Marathon

Powered by RApache and gWidgetsWWW

Data Exploration

Ways to Explore in GUI

- ▶ Summary Statistics
- ▶ Time Plots
- ▶ Barplots
- ▶ Mileage Visualization on Map

Options

- ▶ Subset the timeframe
- ▶ Separate by activity
- ▶ Explore either RecMiles or Points

Summary Statistics

Record Activity **Summaries** Trophy Room Trend Analysis Map My Miles My Profile Connect to DB

Summary

Overall
 Weekly
 Bi-Weekly
 Monthly

Metric

Miles
 Points

Activities

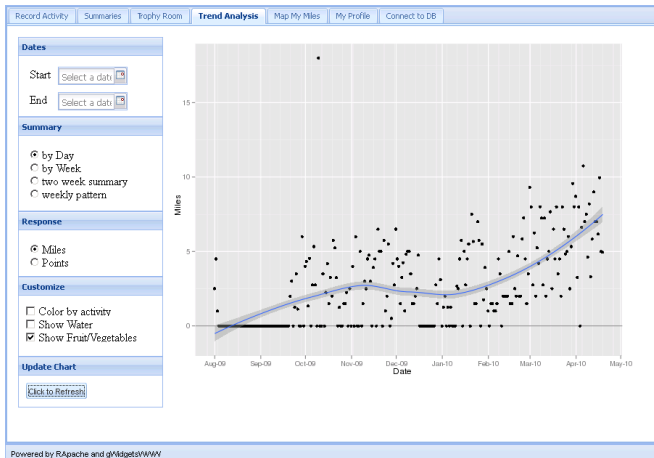
Combined
 Separate

Retresh Table

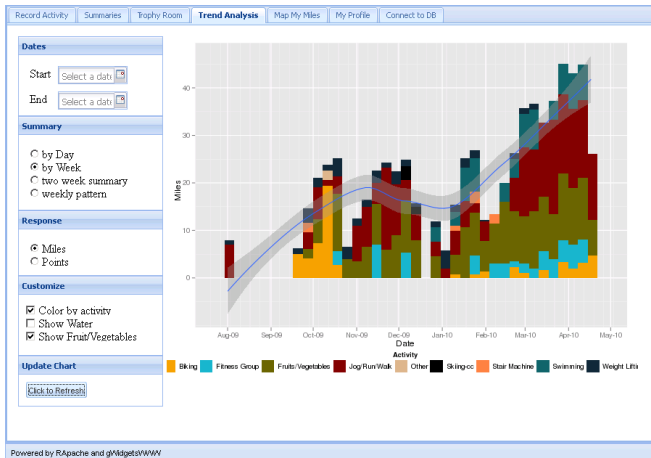
Table of Summary Statistic Values of Miles for Combined Workouts, Summarized Monthly

Date	Activity	Total	Count	Min	Max	Mean	Standard Dev
2009-08-01	All	12	5	1	4.5	2.4	1.29
2009-08-31	All	40.88	21	0.13	3.5	1.95	0.72
2009-09-30	All	124.44	63	0.5	16	1.98	1.87
2009-10-30	All	117.92	56	0.5	5.5	2.11	1.07
2009-11-29	All	102.78	56	0.75	4	1.84	0.6
2009-12-29	All	128.19	69	0.25	4	1.86	0.76
2010-01-28	All	141.96	76	0.25	4	1.87	0.67
2010-02-27	All	207.5	93	0.5	6	2.23	1.09
2010-03-29	All	187.72	73	1.25	7.45	2.57	1.23

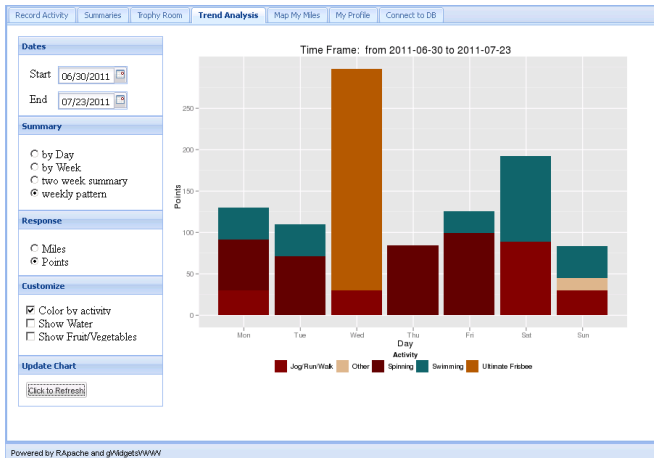
Time Plots



Bar Plot Options



Bar Plots Options



Mapping Rec Miles

Record Activity Summaries Trophy Room Trend Analysis **Map My Miles** My Profile Connect to DB

Current Route

id	city	dist
1	Ames IA	0
2	Minneapolis	203.9
3	Champaign	421
4	Miami Beach	1093.3

Remove Location
 Clear All Cities

Add Destination to Route

FL Miami Beach FL

Add Destination

Map My Progress

Click to Refresh Map

RecMiles: 952.76 -- Points: 11712.0

Miami Beach FL added to your route

Conclusions and Futher Work

Conclusions

- ▶ Unique qualities that improve the usefulness as a tool for improving fitness
- ▶ Allows user to graphically explore trends in activity levels
- ▶ Displays the capabilities of R as a computational engine for a web based GUI

Future Work

- ▶ Evaluating the impact of the GUI on exercise retention of users over traditional logs
- ▶ Explore options for social networking integration into concept

Special Thanks

- ▶ Dr. Heike Hofmann, Nora Hudson and Justin Funk

Thanks!

Thank you for your interest!

Any Question?