



Estimating TDEE With Machine Learning



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LogSmarter.net

WHAT IS TOTAL DAILY ENERGY EXPENDITURE (TDEE)?

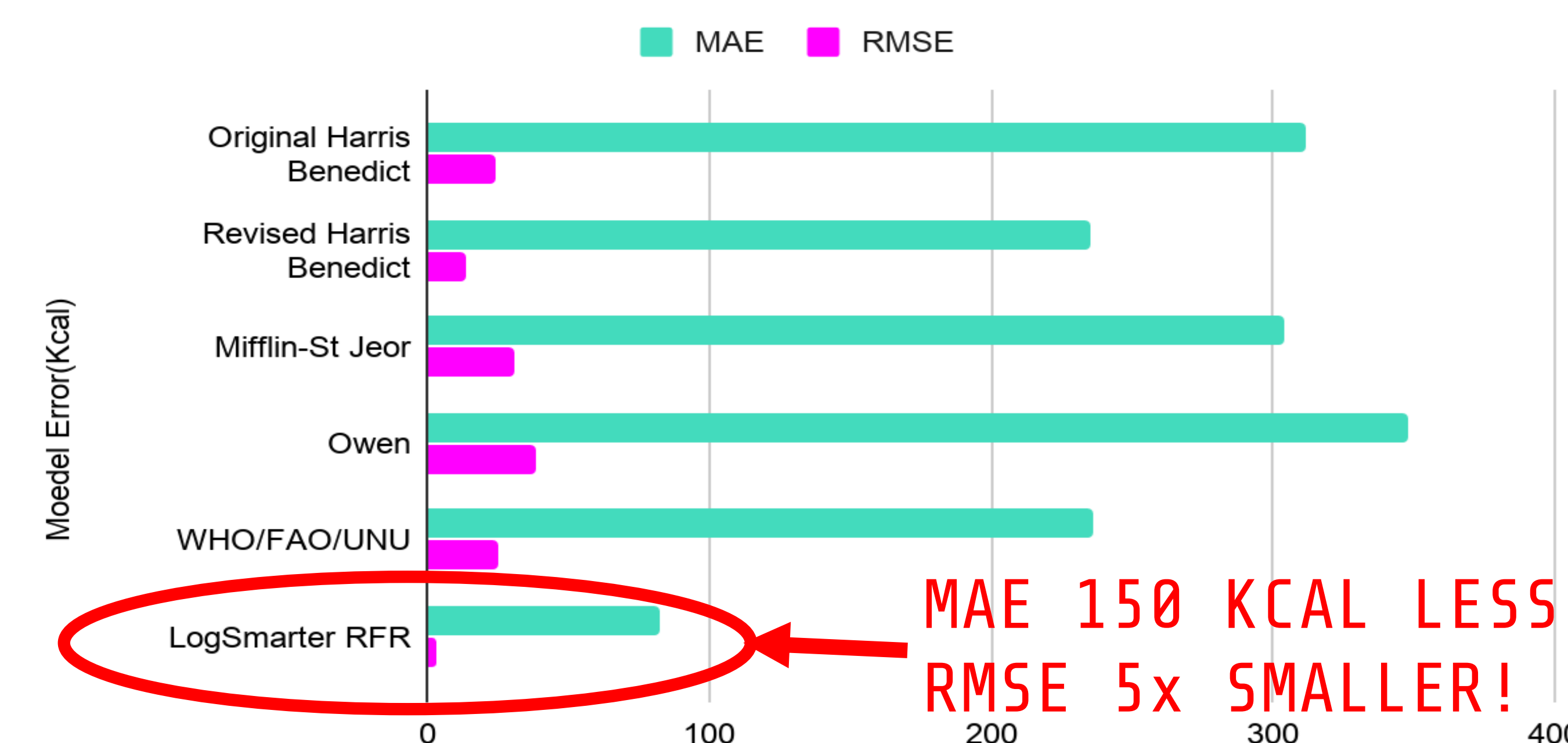
TDEE is the Number of calories an individual burns per day to maintain their weight

PROJECT DEFINITION

Use Doubly Labeled Water (DLW) & nonlinear modeling technique

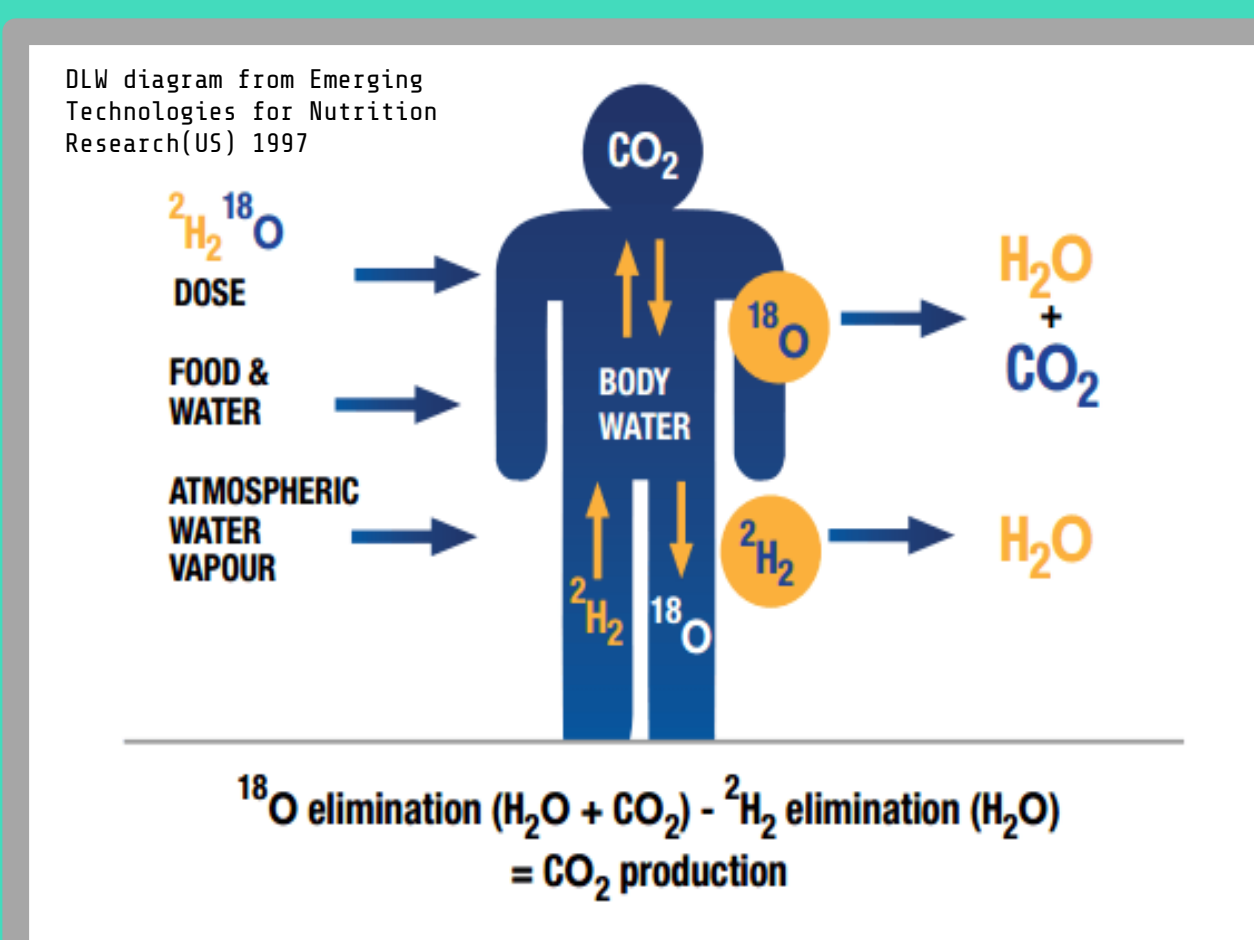
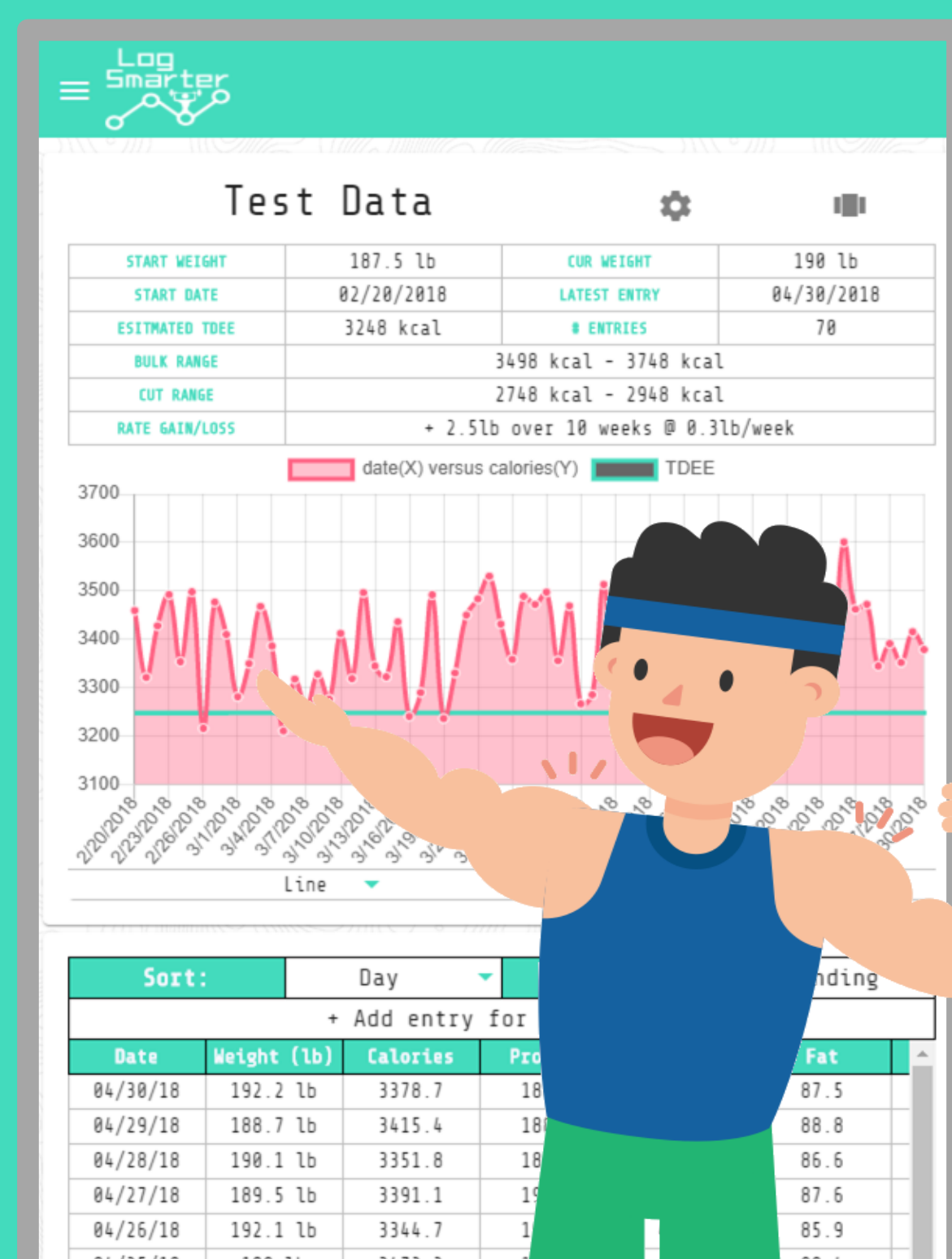
PROJECT RESULTS

MAE and RMSE

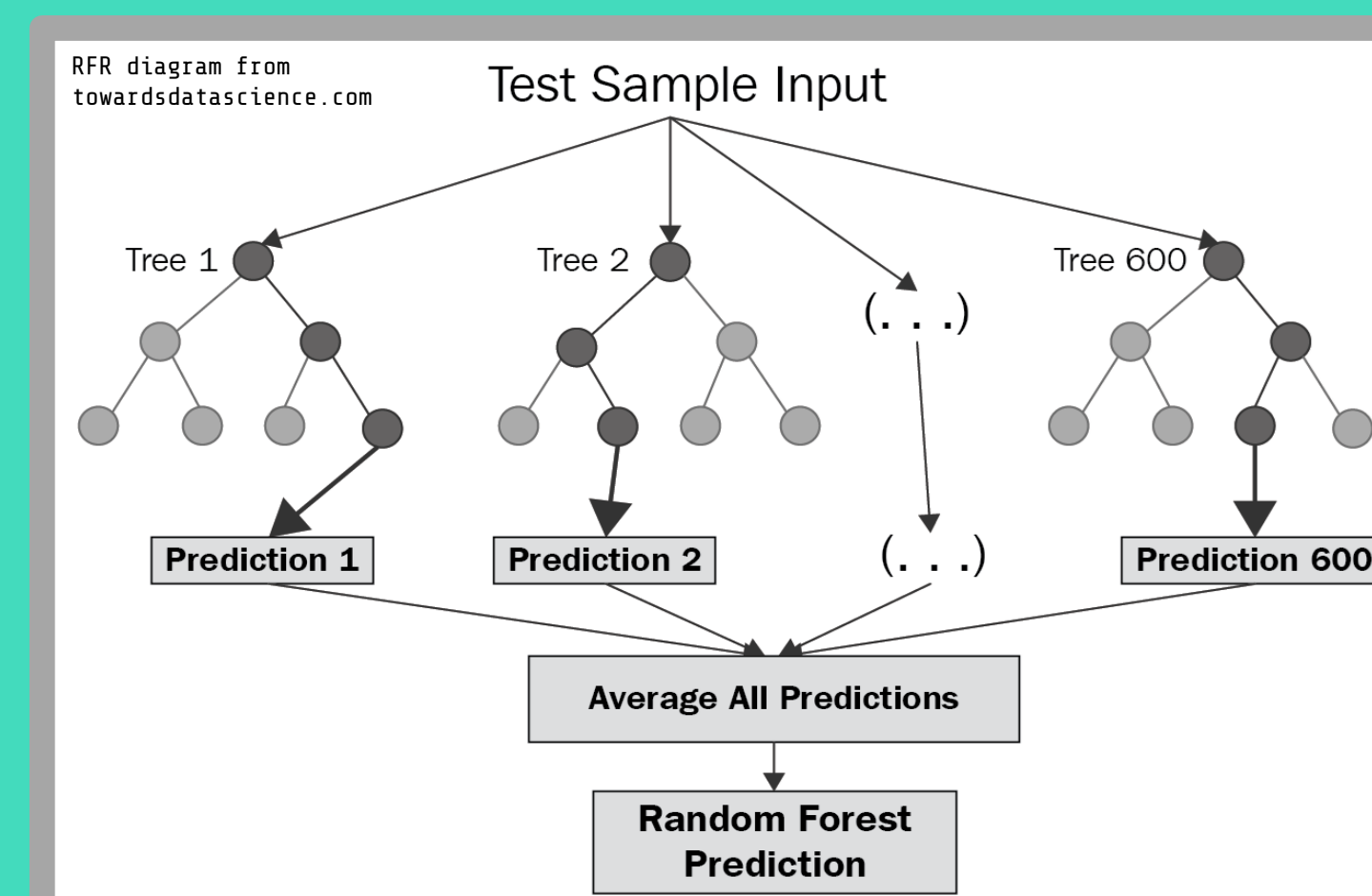


LOGSMARTER™

- Fitness and nutrition tracking platform
- Calorie intake suggestion algorithm
- 700+ alpha users!



DLW is gold standard for measuring TDEE

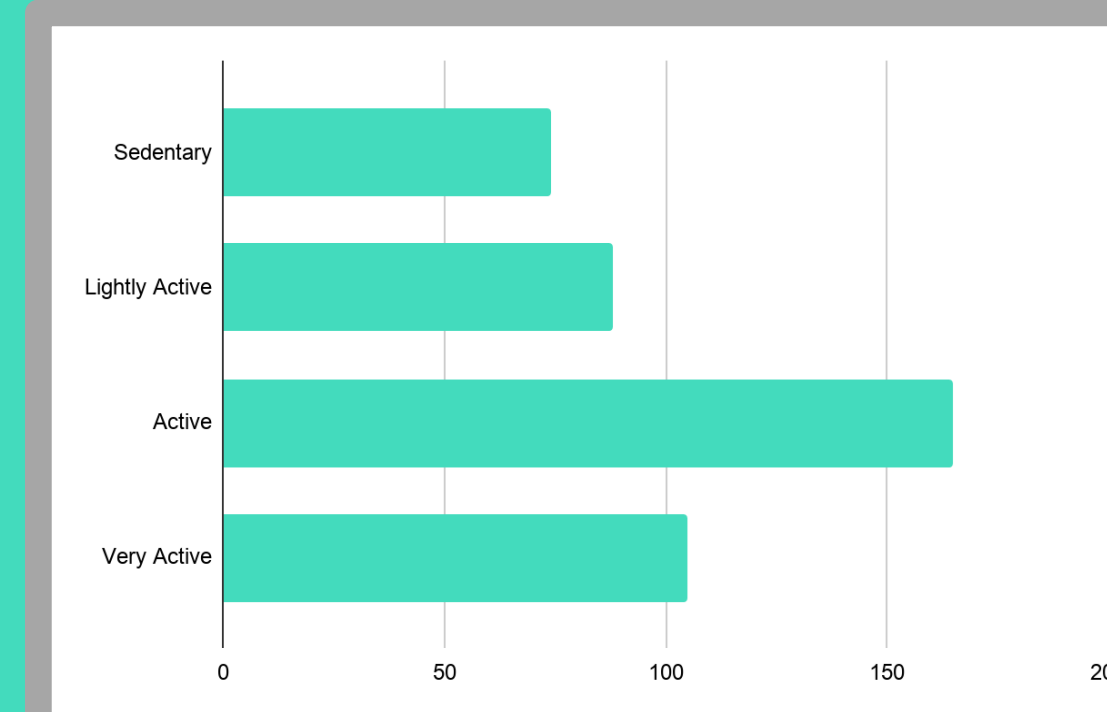


Random Forest Regression (RFR) does not have same limitations as linear models

DATA

DLW Sample (n=766)	Min	Average	Max
Age (years)	20	49.04	96.0
Height (in)	56.3	66.65	77.56
Weight (lbs)	93.72	163.35	474.54
TDEE (kcal)	1017	2597.91	5139

Demographic sample statistics



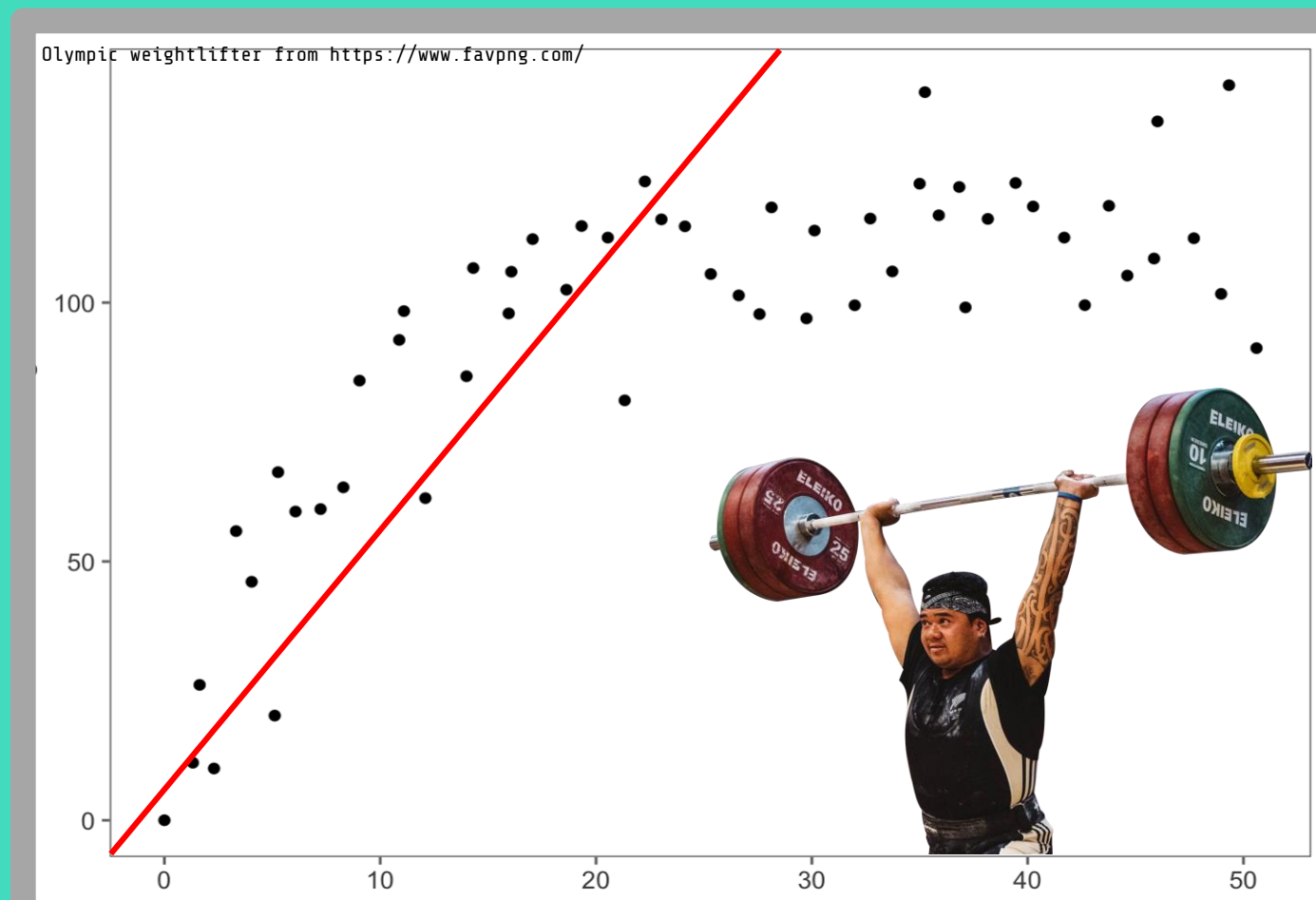
Physical activity level distribution

PROBLEM

Current methods of estimating TDEE are not accurate and not accessible

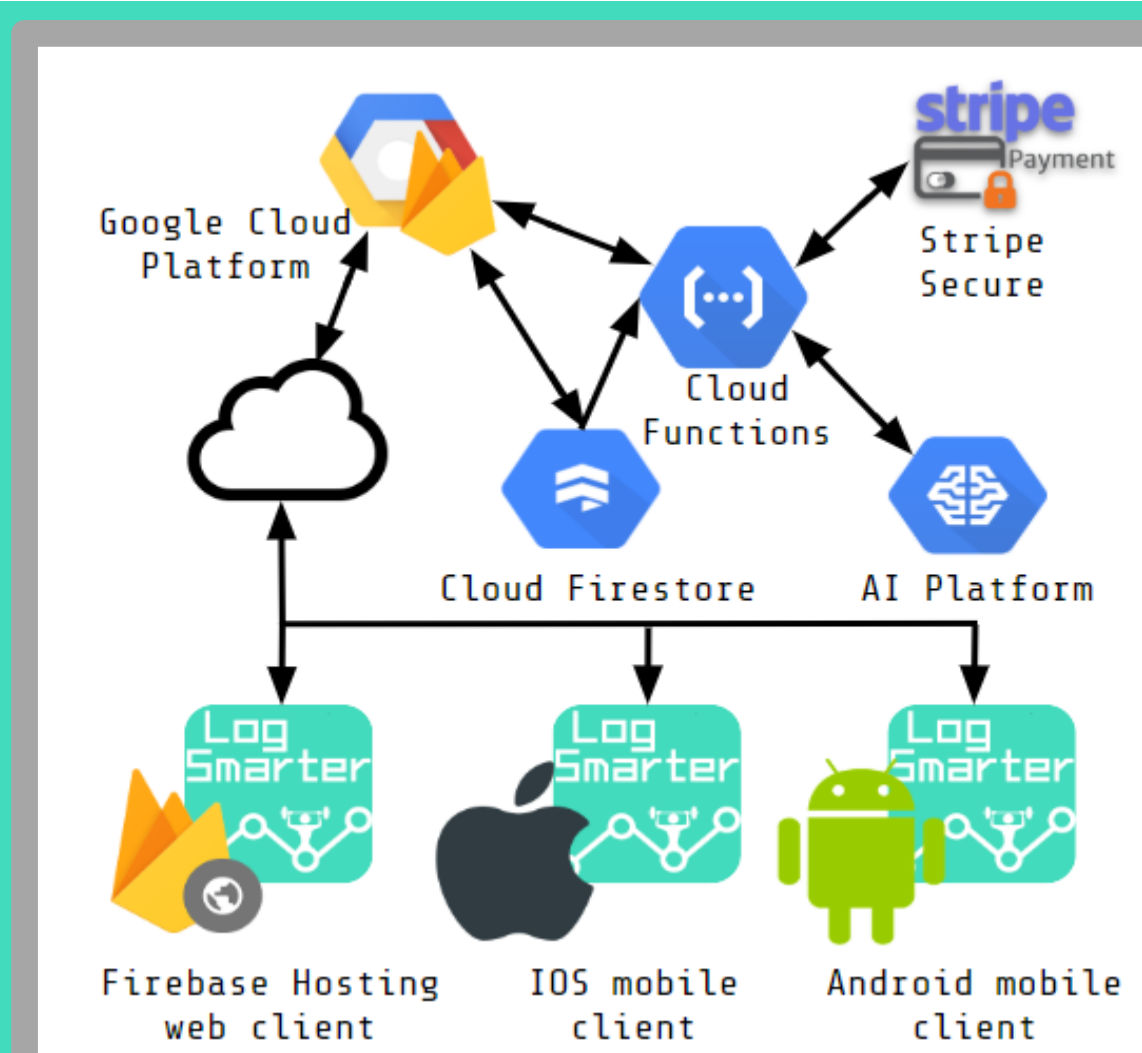


Indirect calorimetry is not a direct measure of TDEE

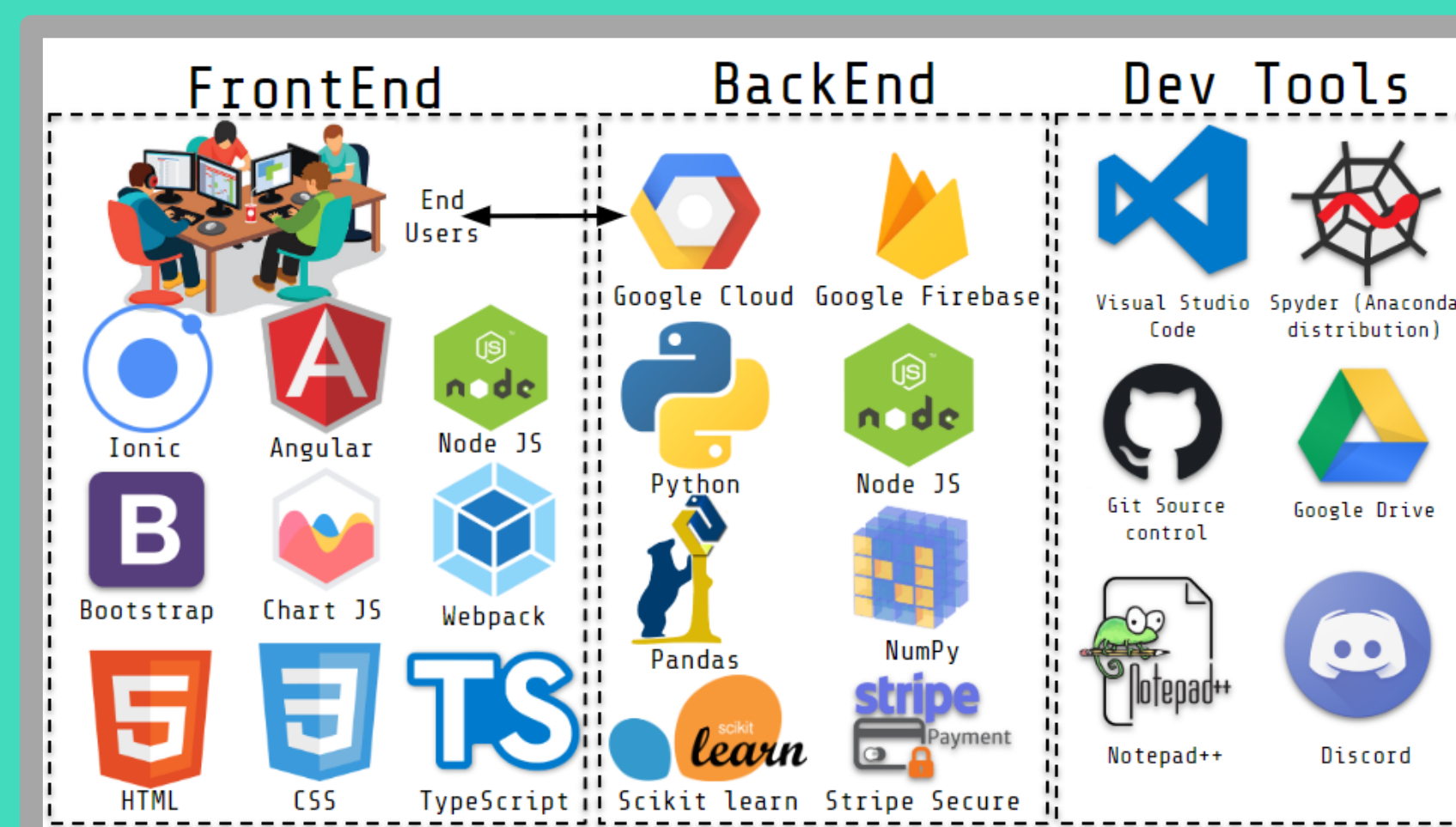


Linear models have large measurement errors for some individuals

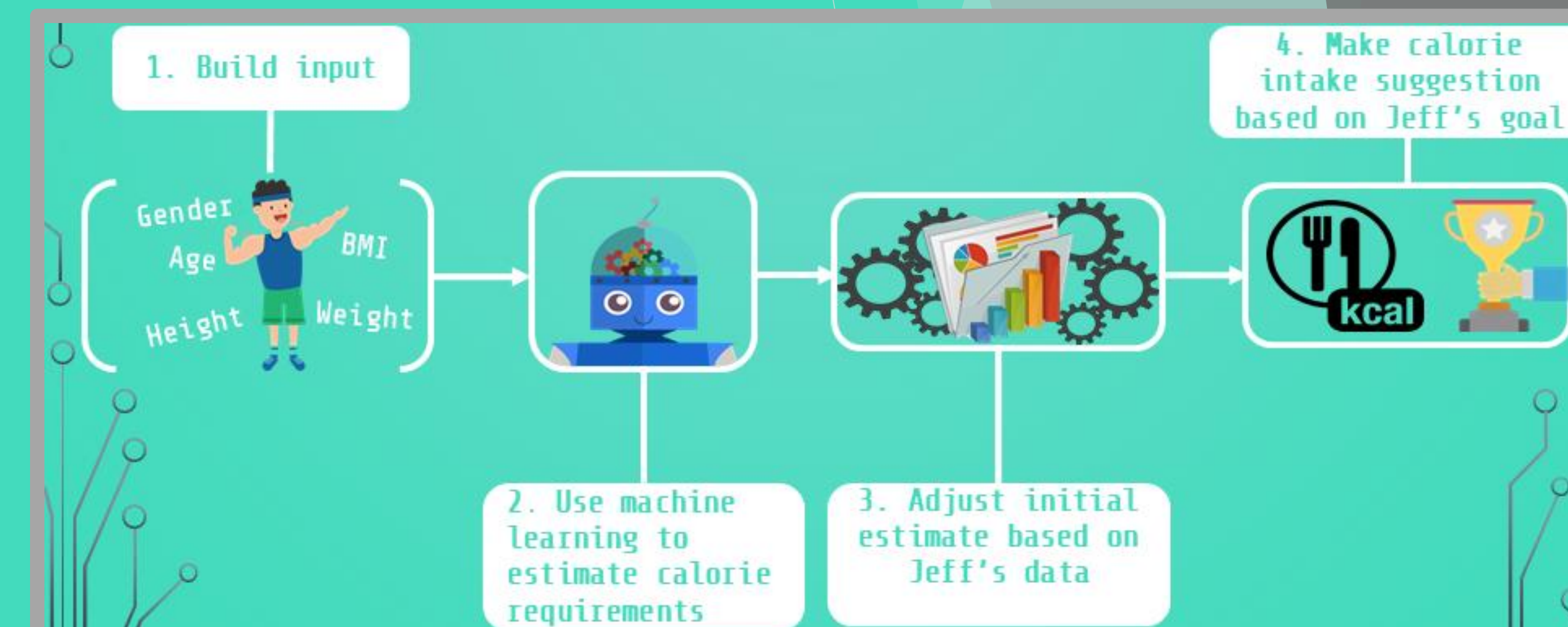
ARCHITECTURE



TECHNOLOGY USED



LOGSMARTER™ ALGORITHM



GOAL

Develop and quantify method of TDEE estimation that is:

1. Accurate
2. Accessible
3. User Friendly



VALIDATION CRITERIA

Compare MAE and RMSE to popular models:

1. Original Harris Benedict
2. Revised Harris Benedict
3. Owen
4. WHO/FAO/UNU
5. Mifflin-St Jeor

CONCLUSION

Project Goal Achieved!

- ✓ Accurate
- ✓ Accessible
- ✓ User Friendly



CURRENT STATUS & NEXT STEPS

- Testing beta version of LogSmarter™
- Reviewing finalized algorithm documentation
- Algorithm Documentation coming soon to LogSmarter.net
- Beta release planned for end of Summer 2020