PERSONALIZED HEALTH INSURANCE PREDICTION USING ACTIVITY TRACKER

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INTRODUCTION

THE IDEA

fitbit

INTEGRATING DOMAINS

PROBLEM DEFINITION

By combining advanced analytics with wearable technology & personal information; insurers can give customers opportunities to take charge of their health insurance premium costs

DATASETS

Fitbit Web API

Healthcare Dataset

TECHNOLOGIES

Anaconda Navigator
-Numpy, Pandas, Seaborn, Matplotlib

APACHE SPARK 2.1.0
-Spark ML, SparkMLLib, SparkSQL
-pyspark

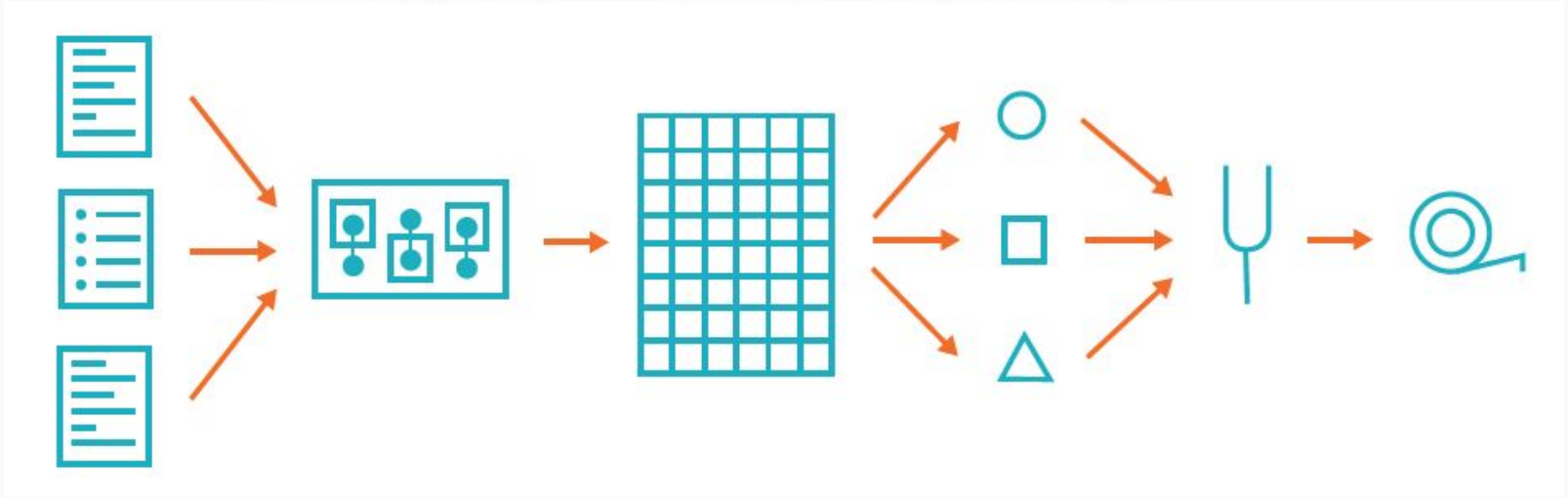
Docker

Zeppelin

Tableau

SYSTEM OVERVIEW

Raw data | Pre-processing & Feature Engineering | Clean &. Structured data | Predictive Modeling | Parameter Tuning | Evaluation



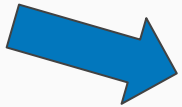
Web API | Numpy, Pandas | Transformers | Estimators & Models | Validation | Evaluator Metrics

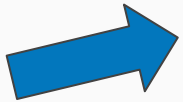
PROPOSED SYSTEM

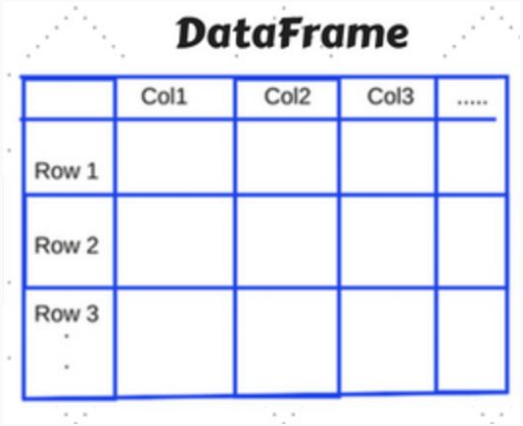
EXTRACTION

HEALTHCARE DATASET

“age”, “sex”, “weight (in lbs)” ,“BMI”,
“no of dependents”, “smoker?”





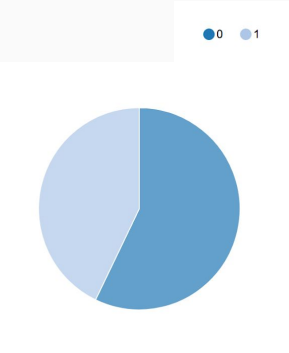


“heart-rate per minute”, “weight-logs”,“calories”,
“daily-activities”, “active-minutes{very active,
moderately active, fairly-active, sedentary-active}”

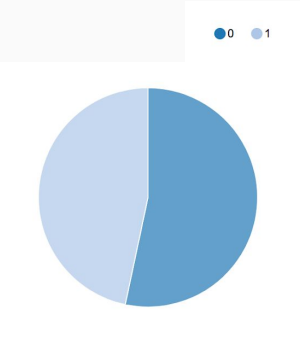
fitbit

FEATURE IMPORTANCE

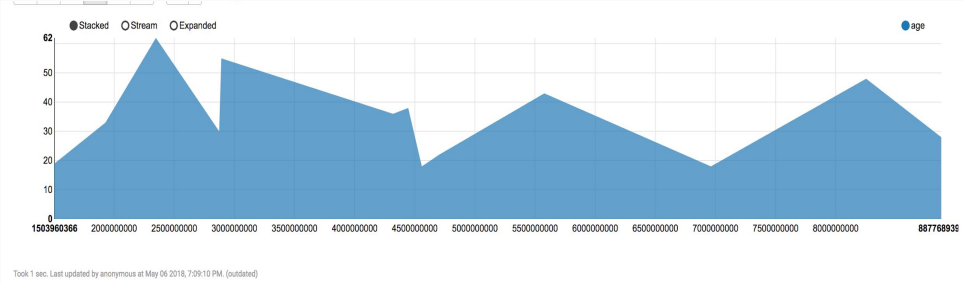
Sex wise Smoker Distribution



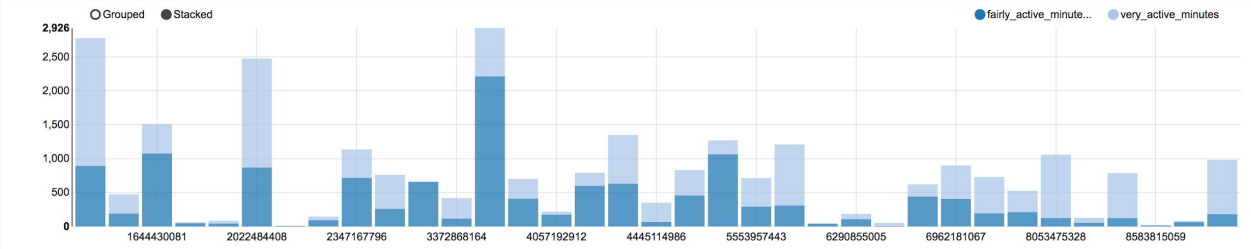
Sex wise Dependent Distribution



Age-range

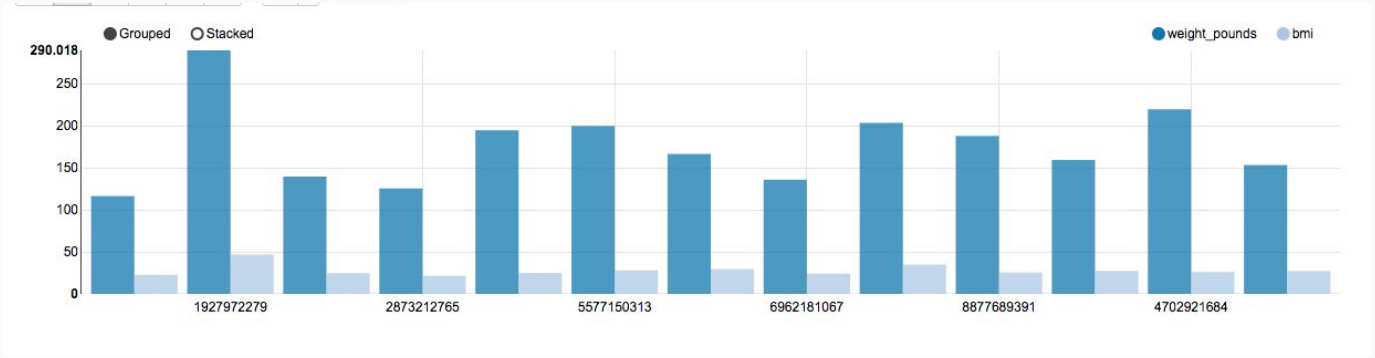


Mapping only fairly and very active minutes as they significantly contribute to the activity tracker and are relevant for insurance

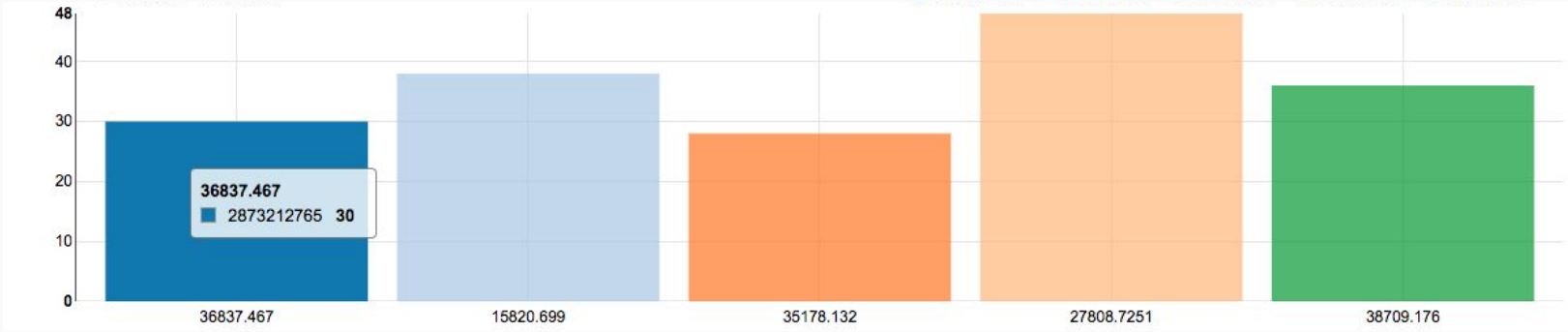


FEATURE IMPORTANCE

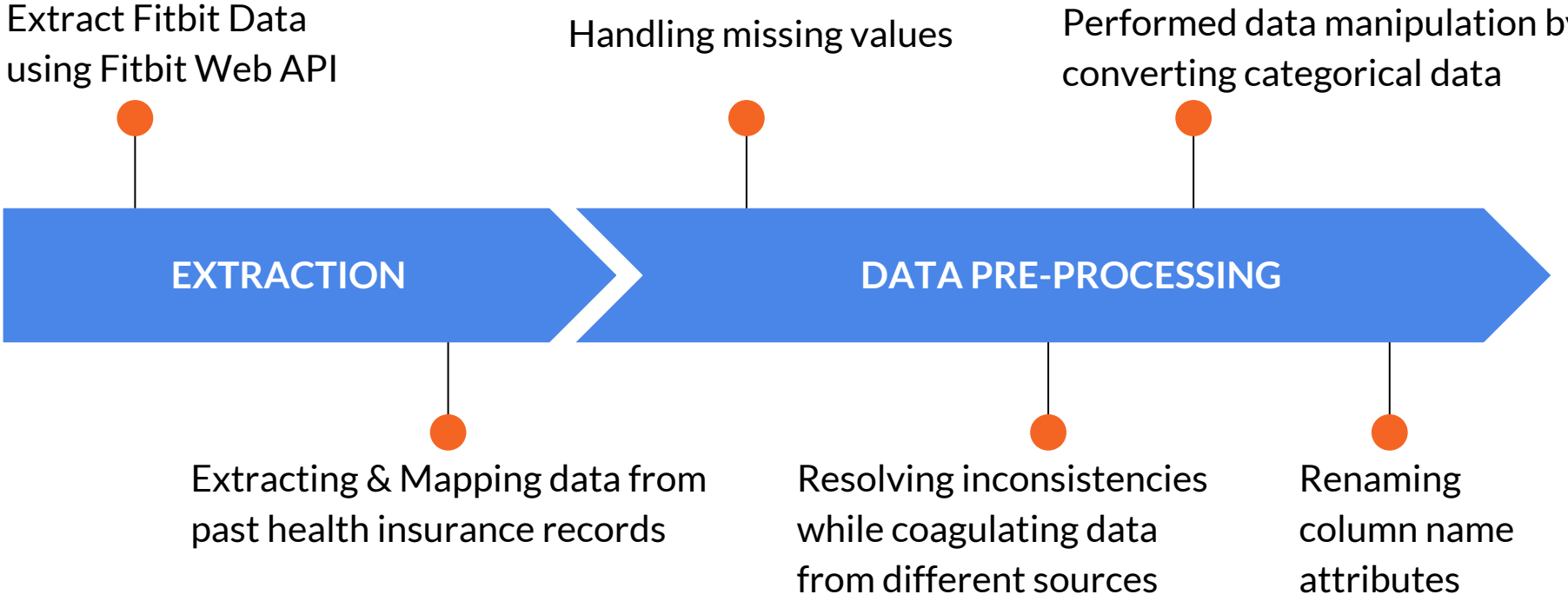
Weight & BMI for each unique participant



Health insurance cost mapped across age & smoker attribute



ANALYSIS: THE PHASES


Extract Fitbit Data using Fitbit Web API
Handling missing values
Performed data manipulation by converting categorical data
EXTRACTION
DATA PRE-PROCESSING
Extracting & Mapping data from past health insurance records
Resolving inconsistencies while coagulating data from different sources
Renaming column name attributes

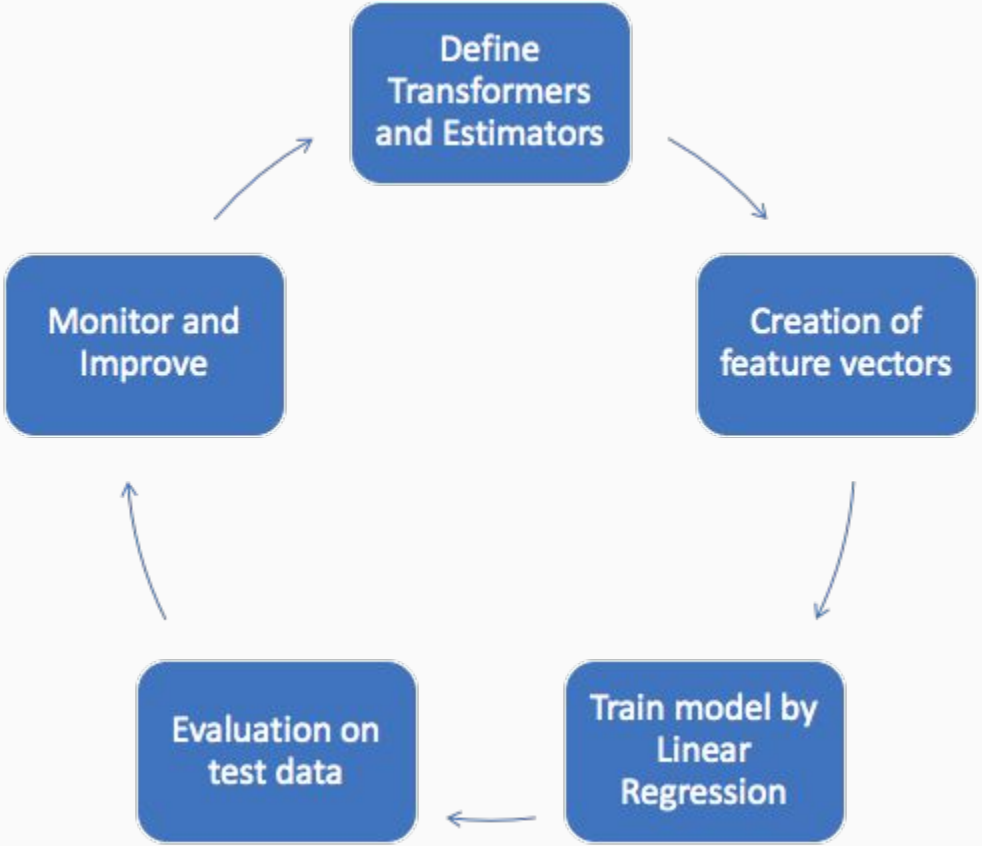
Fetched cleaned, structured & pre-processed data as an input

Performed Linear Regression by parameter tuning which best fits our model

Dropped non-contributing features; thereby retaining only relevant features

Root-Mean-Square Error

PREDICTION & EVALUATION



```
Number of records accounted for prediction
res661: Long = 31505
predictions: org.apache.spark.sql.DataFrame = [features: vector, label: int ... 1 more field]
+--------------------+-----+------------------+
|            features|label|        prediction|
+--------------------+-----+------------------+
|[0.0,18.0,1.0,134...|21345|20936.050129858322|
```

RMSE as the evaluation metric to measure the accuracy

```
+--------------------+-----+------------------+
only showing top 20 rows
rmse: Double = 324.8371506522351
324.8371506522351
```

Took 7 min 53 sec. Last updated by anonymous at May 06 2018, 5:49:17 PM. (outdated)

SCALABILITY

Helped the system to ingest and output larger data.

Scalable Linear Regression in large-scale environments.

CHALLENGES AND LIMITATIONS

Highly sensitive Data.

Data not readily available.

Use of consumer wearables within a clinical population is limited.

FUTURE SCOPE

Customization of medical treatment.

Identify whether the drivers are likely to be involved in an accident, or have their car stolen.

Chronic Disease management.

THANK YOU.