

```
In [1]: from TSForecasting.TSForecasting import TimeSeriesForecast
import pandas as pd
pd.set_option("max_rows", None)
```

Using TensorFlow backend.

Reading all of the data

```
In [2]: hall_raw = pd.read_csv('~/Desktop/NCSA_genomics/Python - notebooks/TSForecasting/Data/Hall/data_hall_raw.csv')

hall_meta = pd.read_csv('~/Desktop/NCSA_genomics/Python - notebooks/TSForecasting/Data/Hall/Hall_meta.csv')

cgm_appended = pd.read_csv('~/Desktop/NCSA_genomics/Python - notebooks/TSForecasting/Data/CGM/CGM_Analyzer_Appended.csv')

cgm_meta = pd.read_csv('~/Desktop/NCSA_genomics/Python - notebooks/TSForecasting/Data/CGM/CGM-meta.csv')

gluvarpro = pd.read_csv('~/Desktop/NCSA_genomics/Python - notebooks/TSForecasting/Data/Gluvarpro/Gluvarpro.csv')

gluvarpro_meta = pd.read_csv('~/Desktop/NCSA_genomics/Python - notebooks/TSForecasting/Data/Gluvarpro/GVP_metadata.csv')

ohio_full = pd.read_csv('~/Desktop/NCSA_genomics/Python - notebooks/TSForecasting/Data/Ohio-Data/OhioFullConsolidated.csv')

ohio_meta = pd.read_csv('~/Desktop/NCSA_genomics/Python - notebooks/TSForecasting/Data/Ohio-Data/Ohio_metadata.csv')

consolidated_paper = pd.read_csv('~/Desktop/NCSA_genomics/Python - notebooks/TSForecasting/Data/consolidatedDataForPaper.csv')

consolidated_pkg = pd.read_csv('~/Desktop/NCSA_genomics/Python - notebooks/TSForecasting/Data/consolidatedDataForPackage.csv')

consolidated_meta = pd.read_csv('~/Desktop/NCSA_genomics/Python - notebooks/TSForecasting/Data/consolidatedMetadata.csv')
```

Creating an object

```
In [3]: obj = TimeSeriesForecast()
```

Object Created!

A description of the HALL dataset

```
In [4]: obj.dataDescribe(hall_raw,hall_meta)
```

Here is a glimpse of the data:

	Display Time	GlucoseValue	subjectId
0	2014-02-03 03:42:12	93	1636-69-001
1	2014-02-03 03:47:12	93	1636-69-001
2	2014-02-03 03:52:12	93	1636-69-001
3	2014-02-03 03:57:12	95	1636-69-001
4	2014-02-03 04:02:12	96	1636-69-001

Total Readings in the data:105426

	Length of readings	Max. Glucose Value	Min. Glucose Value	MAGE Score	Days
count	57.000000	57.000000	57.000000	57.000000	57
mean	1849.578947	183.333333	51.192982	46.774794	29 days 02:20:02.333333
std	104.808149	34.955754	18.966548	17.501540	74 days 06:47:55.221313
min	1584.000000	111.000000	0.000000	21.235955	5 days 16:14:32
25%	1796.000000	153.000000	46.000000	35.487179	6 days 07:39:25
50%	1822.000000	183.000000	54.000000	43.051948	6 days 23:39:38
75%	1877.000000	204.000000	62.000000	55.710145	8 days 07:49:13
max	2361.000000	303.000000	91.000000	128.200000	423 days 11:25:54

Here is the statistical analysis of the data:

	Subject ID	Length of readings	Max. Glucose Value	Min. Glucose Value	MAGE Score	Days	Start	End
0	2133-041	1858	204	51	45.493976	8 days 02:09:26	2017-07-03 18:32:06	2017-07-11 20:41:32
1	2133-040	1792	171	59	40.560000	6 days 10:44:37	2017-06-28 13:34:52	2017-07-05 00:19:29
2	2133-039	2013	204	50	60.892857	9 days 01:34:20	2017-06-05 12:23:22	2017-06-14 13:57:42
3	2133-037	1785	153	48	39.967391	6 days 07:39:25	2017-06-05 14:11:14	2017-06-11 21:50:39
4	2133-036	1954	214	58	63.841270	8 days 15:04:26	2017-06-01 15:26:53	2017-06-10 06:31:19
5	2133-035	1830	190	47	44.032258	7 days 05:49:42	2017-06-01 17:17:00	2017-06-08 23:06:42
6	2133-033	1892	161	49	43.051948	7 days 07:04:31	2017-05-19 12:58:22	2017-05-26 20:02:53
7	2133-032	1781	147	69	34.365079	6 days 04:34:25	2017-05-19 13:31:19	2017-05-25 18:05:44
8	2133-030	1818	147	41	36.596774	6 days 18:44:36	2017-05-03 14:13:09	2017-05-10 08:57:45
9	2133-028	1850	111	45	21.235955	7 days 02:04:30	2017-05-10 00:03:32	2017-05-17 02:08:02
10	2133-027	1936	155	60	33.625000	8 days 02:13:55	2017-04-24 14:49:24	2017-05-02 17:03:19
11	2133-026	1782	166	45	37.147727	6 days 04:39:35	2017-04-19 14:10:22	2017-04-25 18:49:57
12	2133-025	1865	175	45	32.525773	6 days 18:09:38	2017-04-19 13:34:14	2017-04-26 07:43:52
13	2133-024	1821	180	41	46.387097	6 days 13:09:23	2017-04-17 14:14:20	2017-04-24 03:23:43
14	2133-023	1838	142	0	32.804598	7 days 10:09:25	2017-04-17 14:49:45	2017-04-25 00:59:10
15	2133-022	1814	204	0	61.949153	6 days 12:34:33	2017-03-22 13:34:24	2017-03-29 02:08:57

	Subject ID	Length of readings	Max. Glucose Value	Min. Glucose Value	MAGE Score	Days	Start	End
16	2133-021	1797	236	62	83.355556	6 days 07:39:27	2017-03-17 13:34:51	2017-03-23 21:14:18
17	2133-020	1826	201	40	70.418182	6 days 10:04:43	2017-03-17 12:56:49	2017-03-23 23:01:32
18	2133-019	1801	192	53	43.703125	9 days 04:34:17	2017-03-15 16:37:47	2017-03-24 21:12:04
19	2133-018	1775	303	73	128.200000	6 days 04:39:35	2017-03-14 13:30:04	2017-03-20 18:09:39
20	2133-017	1799	182	68	53.517857	6 days 10:04:23	2017-03-13 12:22:38	2017-03-19 22:27:01
21	2133-015	1835	213	58	47.797101	6 days 17:34:22	2017-01-30 13:33:25	2017-02-06 07:07:47
22	2133-013	1960	206	0	47.686567	8 days 07:49:13	2017-01-11 15:25:11	2017-01-19 23:14:24
23	2133-012	1935	148	49	35.575472	12 days 10:14:03	2017-01-11 14:49:44	2017-01-24 01:03:47
24	2133-011	1933	204	0	48.287671	9 days 05:54:03	2017-01-10 15:29:05	2017-01-19 21:23:08
25	2133-010	1832	143	62	30.287037	6 days 17:29:32	2016-11-21 15:28:45	2016-11-28 08:58:17
26	2133-009	1781	183	59	45.100000	6 days 04:34:44	2016-11-21 13:33:38	2016-11-27 18:08:22
27	2133-008	1805	137	49	30.567010	6 days 07:34:31	2016-11-22 00:03:05	2016-11-28 07:37:36
28	2133-007	1877	207	65	47.830986	7 days 23:14:19	2016-11-01 13:30:28	2016-11-09 12:44:47
29	2133-006	1777	148	54	33.437500	6 days 04:29:35	2016-11-01 00:00:51	2016-11-07 04:30:26
30	2133-004	1776	246	61	78.862069	6 days 04:29:28	2016-09-21 00:04:11	2016-09-27 04:33:39
31	2133-003	1805	190	62	58.192982	6 days 07:04:28	2016-09-02 17:51:46	2016-09-09 00:56:14
32	2133-002	1806	163	60	33.593750	6 days 10:44:31	2016-09-09 16:02:22	2016-09-16 02:46:53

	Subject ID	Length of readings	Max. Glucose Value	Min. Glucose Value	MAGE Score	Days	Start	End
33	2133-001	1814	186	47	36.361702	7 days 00:59:29	2016-08-03 00:00:14	2016-08-10 00:59:43
34	1636-70-1010	1820	186	54	53.630137	88 days 21:13:56	2016-03-02 15:29:17	2016-05-30 12:43:13
35	1636-70-1008	1760	223	51	61.707317	6 days 04:34:32	2015-12-07 13:34:23	2015-12-13 18:08:55
36	1636-70-1005	1846	225	52	60.507042	8 days 03:24:24	2016-04-06 14:13:52	2016-04-14 17:38:16
37	1636-70-1003	1895	146	46	39.755814	7 days 07:39:28	2015-12-01 00:03:03	2015-12-08 07:42:31
38	1636-70-1002	1794	168	57	42.459770	6 days 07:34:30	2015-11-12 00:02:25	2015-11-18 07:36:55
39	1636-69-123	1905	138	49	29.847619	8 days 01:34:20	2016-02-17 00:01:50	2016-02-25 01:36:10
40	1636-69-114	1796	163	76	35.773333	6 days 06:59:31	2015-10-13 00:03:47	2015-10-19 07:03:18
41	1636-69-111	1868	135	0	27.220000	21 days 00:18:50	2015-09-15 03:41:33	2015-10-06 04:00:23
42	1636-69-107	1897	195	66	42.875000	7 days 10:09:27	2015-09-24 13:33:14	2015-10-01 23:42:41
43	1636-69-104	2361	152	46	36.252101	201 days 18:23:29	2015-08-05 14:46:39	2016-02-23 09:10:08
44	1636-69-100	1880	153	41	34.094340	175 days 02:10:50	2015-09-15 00:03:15	2016-03-08 02:14:05
45	1636-69-091	1803	163	70	36.440000	6 days 10:09:39	2015-11-04 14:48:20	2015-11-11 00:57:59
46	1636-69-090	1863	195	54	57.235294	6 days 23:39:38	2016-02-10 00:02:40	2016-02-16 23:42:18
47	1636-69-069	1897	187	69	53.274510	22 days 15:48:01	2015-07-20 13:33:11	2015-08-12 05:21:12
48	1636-69-064	1584	218	43	56.810811	5 days 16:14:32	2015-03-26 14:49:42	2015-04-01 07:04:14
49	1636-69-060	1821	191	91	35.487179	6 days 14:59:31	2015-11-17 15:25:53	2015-11-24 06:25:24

	Subject ID	Length of readings	Max. Glucose Value	Min. Glucose Value	MAGE Score	Days	Start	End
50	1636-69-053	1867	183	43	41.277778	299 days 01:32:14	2015-05-07 18:34:18	2016-03-01 20:06:32
51	1636-69-048	1779	144	63	27.657143	6 days 04:34:29	2015-11-26 00:36:15	2015-12-02 05:10:44
52	1636-69-035	2180	234	69	62.825397	11 days 01:04:20	2016-01-27 00:02:25	2016-02-07 01:06:45
53	1636-69-032	1783	191	67	29.622642	6 days 04:34:32	2016-01-13 12:58:17	2016-01-19 17:32:49
54	1636-69-028	1822	216	55	44.171875	75 days 07:45:22	2015-04-02 13:33:15	2015-06-16 21:18:37
55	1636-69-026	1796	182	62	55.710145	7 days 01:29:34	2015-11-24 00:37:20	2015-12-01 02:06:54
56	1636-69-001	1846	250	64	74.276596	423 days 11:25:54	2014-02-03 03:42:12	2015-04-02 15:08:06

A description of the CGM Analyzer and CGM Analysis combined dataset

```
In [5]: obj.dataDescribe(cgm_appended,cgm_meta)
```

Here is a glimpse of the data:

	Display Time	subjectId	GlucoseValue
0	2016-06-25 09:14:00	ID01	108.000
1	2016-06-25 09:17:00	ID01	108.000
2	2016-06-25 09:20:00	ID01	108.000
3	2016-06-25 09:23:00	ID01	107.658
4	2016-06-25 09:26:00	ID01	107.496

Total Readings in the data:31791

	Length of readings	Max. Glucose Value	Min. Glucose Value	MAGE Score	Days
count	14.000000	14.000000	14.000000	14.000000	14
mean	2270.785714	246.283571	61.954286	77.748718	6 days 07:28:30
std	692.305533	93.808260	23.631486	42.317059	3 days 08:57:56.850301
min	1265.000000	163.800000	14.020000	33.992727	3 days 00:06:00
25%	1692.750000	183.442500	49.097500	50.232260	4 days 10:40:30
50%	2338.500000	208.100000	62.890000	62.651429	5 days 09:51:00
75%	2906.500000	286.477500	73.012500	85.838143	6 days 09:47:15
max	3260.000000	508.710000	95.400000	179.607679	13 days 21:59:00

Here is the statistical analysis of the data:

	Subject ID	Length of readings	Max. Glucose Value	Min. Glucose Value	MAGE Score	Days	Start	End
0	ID33	1265	163.80	39.60	33.992727	13 days 15:49:00	2019-02-21 14:59:00	2019-03-07 06:48:00
1	ID32	1337	202.00	47.00	55.223881	13 days 21:59:00	2018-08-01 12:00:00	2018-08-15 09:59:00
2	ID31	1443	182.19	66.47	48.568387	3 days 00:06:00	2016-06-06 16:55:00	2016-06-09 17:01:00
3	ID30	2472	187.20	59.40	39.564706	5 days 03:33:00	2016-12-21 07:29:00	2016-12-26 11:02:00
4	ID29	1728	195.64	75.15	57.160000	3 days 14:21:00	2016-12-19 22:42:00	2016-12-23 13:03:00
5	ID23	3260	326.83	64.53	87.135429	6 days 18:57:00	2016-10-11 15:34:00	2016-10-18 10:31:00
6	ID22	2111	170.39	34.20	56.753500	4 days 09:30:00	2016-12-29 07:35:00	2017-01-02 17:05:00
7	ID21	2686	214.20	66.60	68.142857	5 days 14:15:00	2016-11-22 07:26:00	2016-11-27 21:41:00
8	ID13	1681	246.06	94.75	81.946286	3 days 12:00:00	2016-12-01 07:44:00	2016-12-04 19:44:00
9	ID12	2980	271.80	93.60	78.646154	6 days 04:57:00	2016-08-02 08:19:00	2016-08-08 13:16:00
10	ID11	2205	316.80	95.40	124.305882	4 days 14:12:00	2017-01-07 08:52:00	2017-01-11 23:04:00
11	ID03	3097	508.71	61.25	179.607679	6 days 10:48:00	2016-05-26 06:09:00	2016-06-01 16:57:00
12	ID02	3016	170.98	14.02	40.234656	6 days 06:45:00	2016-05-26 07:50:00	2016-06-01 14:35:00
13	ID01	2510	291.37	55.39	137.199913	5 days 05:27:00	2016-06-25 09:14:00	2016-06-30 14:41:00

A description of the Gluvarpro dataset

```
In [6]: obj.dataDescribe(gluvarpro,gluvarpro_meta)
```

Here is a glimpse of the data:

	Display Time	subjectId	GlucoseValue
0	2016-06-21 00:00:00	GVP01	197.0
1	2016-06-21 00:15:00	GVP01	208.0
2	2016-06-21 00:30:00	GVP01	226.0
3	2016-06-21 00:45:00	GVP01	241.0
4	2016-06-21 01:00:00	GVP01	250.0

Total Readings in the data:46272

	Length of readings	Max. Glucose Value	Min. Glucose Value	MAGE Score	Days
count	2.000000	2.000000	2.00000	2.000000	2
mean	23136.000000	388.000000	12.50000	154.736497	286 days 11:45:00
std	31904.657967	57.982756	17.67767	49.295600	396 days 16:29:08.526824
min	576.000000	347.000000	0.00000	119.879244	5 days 23:45:00
25%	11856.000000	367.500000	6.25000	137.307871	146 days 05:45:00
50%	23136.000000	388.000000	12.50000	154.736497	286 days 11:45:00
75%	34416.000000	408.500000	18.75000	172.165124	426 days 17:45:00
max	45696.000000	429.000000	25.00000	189.593750	566 days 23:45:00

Here is the statistical analysis of the data:

	Subject ID	Length of readings	Max. Glucose Value	Min. Glucose Value	MAGE Score	Days	Start	End
0	GVP03	45696	429.0	25.0	119.879244	566 days 23:45:00	2016-04-24 00:00:00	2017-11-11 23:45:00
1	GVP01	576	347.0	0.0	189.593750	5 days 23:45:00	2016-06-21 00:00:00	2016-06-26 23:45:00

A description of the OHIO dataset

```
In [7]: obj.dataDescribe(ohio_full,ohio_meta)
```

Here is a glimpse of the data:

	Display Time	subjectId	GlucoseValue
0	2021-12-07 16:29:00	OD570	101
1	2021-12-07 16:34:00	OD570	100
2	2021-12-07 16:39:00	OD570	100
3	2021-12-07 16:44:00	OD570	99
4	2021-12-07 16:49:00	OD570	98

Total Readings in the data:166533

	Length of readings	Max. Glucose Value	Min. Glucose Value	MAGE Score	Days
count	12.000000	12.000000	12.000000	12.000000	12
mean	13877.750000	391.416667	41.583333	136.386108	54 days 16:07:58.333333
std	1058.275194	17.536758	2.937480	16.679054	2 days 04:52:22.142062
min	11444.000000	345.000000	40.000000	114.286517	50 days 07:28:00
25%	13331.750000	394.750000	40.000000	125.511687	53 days 16:33:26.500000
50%	13673.500000	400.000000	40.000000	134.900485	54 days 21:50:00
75%	14724.250000	400.000000	41.250000	144.084935	56 days 05:14:08.250000
max	15431.000000	400.000000	48.000000	176.277311	57 days 17:56:00

Here is the statistical analysis of the data:

	Subject ID	Length of readings	Max. Glucose Value	Min. Glucose Value	MAGE Score	Days	Start	End
0	OD596	13620	367	40	124.296748	57 days 17:56:00	2027-04-09 16:15:00	2027-06-06 10:11:00
1	OD591	13607	397	40	131.562874	54 days 04:07:00	2021-11-30 17:06:00	2022-01-23 21:13:00
2	OD588	15431	400	40	114.286517	55 days 12:05:00	2021-08-30 11:53:00	2021-10-24 23:58:00
3	OD584	14815	400	40	143.393293	56 days 09:29:00	2025-05-14 00:03:00	2025-07-09 09:32:00
4	OD575	14456	400	40	138.238095	54 days 22:25:00	2021-11-17 12:04:00	2022-01-11 10:29:00
5	OD570	13727	388	46	149.743169	50 days 07:28:00	2021-12-07 16:29:00	2022-01-26 23:57:00
6	OD567	13247	400	40	146.159864	56 days 23:07:43	2026-12-28 00:04:30	2027-02-22 23:12:13
7	OD563	14694	400	40	118.305263	54 days 19:40:00	2021-09-13 12:33:00	2021-11-07 08:13:00
8	OD559	13310	400	40	176.277311	51 days 22:21:00	2021-12-07 01:17:00	2022-01-27 23:38:00
9	OD552	11444	345	45	125.916667	52 days 05:52:46	2025-04-16 11:17:05	2025-06-07 17:09:51
10	OD544	13339	400	48	138.623529	54 days 21:15:00	2027-05-11 00:02:00	2027-07-04 21:17:00
11	OD540	14843	400	40	129.829971	56 days 03:49:11	2027-05-19 11:36:29	2027-07-14 15:25:40

A description of the consolidated dataset for the paper

(cgmanalysis, CGManalyzer, gluvarpro, Ohio)

```
In [8]: obj.dataDescribe(consolidated_paper,consolidated_meta)
```

Here is a glimpse of the data:

	Display Time	subjectId	GlucoseValue
0	2016-06-21 00:00:00	GVP01	197.0
1	2016-06-21 00:15:00	GVP01	208.0
2	2016-06-21 00:30:00	GVP01	226.0
3	2016-06-21 00:45:00	GVP01	241.0
4	2016-06-21 01:00:00	GVP01	250.0

Total Readings in the data:212853

	Length of readings	Max. Glucose Value	Min. Glucose Value	MAGE Score	Days
count	28.000000	28.000000	28.000000	28.000000	28
mean	7601.892857	317.106071	49.691429	108.196373	42 days 14:19:02.678571
std	8762.341947	98.519774	22.217624	45.395263	104 days 12:44:49.738624
min	576.000000	163.800000	0.000000	33.992727	3 days 00:06:00
25%	2181.500000	211.150000	40.000000	65.397143	5 days 12:03:00
50%	3178.500000	346.000000	42.500000	120.877433	13 days 18:54:00
75%	10903.250000	400.000000	62.070000	139.814124	45 days 11:30:00
max	45696.000000	508.710000	95.400000	189.593750	566 days 23:45:00

Here is the statistical analysis of the data:

	Subject ID	Length of readings	Max. Glucose Value	Min. Glucose Value	MAGE Score	Days	Start	End
0	OD596	10877	367.00	40.00	121.875622	47 days 07:44:00	2027-04-09 16:15:00	2027-05-26 23:59:00
1	OD591	10847	397.00	40.00	133.250923	44 days 06:52:00	2021-11-30 17:06:00	2022-01-13 23:58:00
2	OD588	12640	400.00	40.00	112.819398	45 days 12:02:00	2021-08-30 11:53:00	2021-10-14 23:55:00
3	OD584	12150	400.00	40.00	143.566308	45 days 23:53:00	2025-05-14 00:03:00	2025-06-28 23:56:00
4	OD575	11866	400.00	40.00	140.910156	45 days 11:51:00	2021-11-17 12:04:00	2022-01-01 23:55:00
5	OD570	10982	377.00	46.00	145.633333	40 days 07:30:00	2021-12-07 16:29:00	2022-01-16 23:59:00
6	OD567	10858	400.00	40.00	145.016461	46 days 23:54:51	2026-12-28 00:04:30	2027-02-12 23:59:21
7	OD563	12124	400.00	40.00	119.387931	45 days 11:23:00	2021-09-13 12:33:00	2021-10-28 23:56:00
8	OD559	10796	400.00	40.00	179.030303	41 days 22:39:00	2021-12-07 01:17:00	2022-01-17 23:56:00
9	OD552	9080	345.00	45.00	125.322917	38 days 12:42:09	2025-04-16 11:17:05	2025-05-24 23:59:14
10	OD544	10623	400.00	48.00	139.448780	43 days 23:53:00	2027-05-11 00:02:00	2027-06-23 23:55:00
11	OD540	11947	369.00	40.00	125.281250	45 days 12:20:15	2027-05-19 11:36:29	2027-07-03 23:56:44
12	ID33	1265	163.80	39.60	33.992727	13 days 15:49:00	2019-02-21 14:59:00	2019-03-07 06:48:00
13	ID32	1337	202.00	47.00	55.223881	13 days 21:59:00	2018-08-01 12:00:00	2018-08-15 09:59:00
14	ID31	1443	182.19	66.47	48.568387	3 days 00:06:00	2016-06-06 16:55:00	2016-06-09 17:01:00
15	ID30	2472	187.20	59.40	39.564706	5 days 03:33:00	2016-12-21 07:29:00	2016-12-26 11:02:00

	Subject ID	Length of readings	Max. Glucose Value	Min. Glucose Value	MAGE Score	Days	Start	End
16	ID29	1728	195.64	75.15	57.160000	3 days 14:21:00	2016-12-19 22:42:00	2016-12-23 13:03:00
17	ID23	3260	326.83	64.53	87.135429	6 days 18:57:00	2016-10-11 15:34:00	2016-10-18 10:31:00
18	ID22	2111	170.39	34.20	56.753500	4 days 09:30:00	2016-12-29 07:35:00	2017-01-02 17:05:00
19	ID21	2686	214.20	66.60	68.142857	5 days 14:15:00	2016-11-22 07:26:00	2016-11-27 21:41:00
20	ID13	1681	246.06	94.75	81.946286	3 days 12:00:00	2016-12-01 07:44:00	2016-12-04 19:44:00
21	ID12	2980	271.80	93.60	78.646154	6 days 04:57:00	2016-08-02 08:19:00	2016-08-08 13:16:00
22	ID11	2205	316.80	95.40	124.305882	4 days 14:12:00	2017-01-07 08:52:00	2017-01-11 23:04:00
23	ID03	3097	508.71	61.25	179.607679	6 days 10:48:00	2016-05-26 06:09:00	2016-06-01 16:57:00
24	ID02	3016	170.98	14.02	40.234656	6 days 06:45:00	2016-05-26 07:50:00	2016-06-01 14:35:00
25	ID01	2510	291.37	55.39	137.199913	5 days 05:27:00	2016-06-25 09:14:00	2016-06-30 14:41:00
26	GVP03	45696	429.00	25.00	119.879244	566 days 23:45:00	2016-04-24 00:00:00	2017-11-11 23:45:00
27	GVP01	576	347.00	0.00	189.593750	5 days 23:45:00	2016-06-21 00:00:00	2016-06-26 23:45:00

A description of the consolidated dataset for the package (cgmanalysis, CGManalyzer, gluvarpro, Ohio, Hall)

```
In [9]: obj.dataDescribe(consolidated_pkg,consolidated_meta)
```

Here is a glimpse of the data:

	Display Time	subjectId	GlucoseValue
0	2016-06-21 00:00:00	GVP01	197.0
1	2016-06-21 00:15:00	GVP01	208.0
2	2016-06-21 00:30:00	GVP01	226.0
3	2016-06-21 00:45:00	GVP01	241.0
4	2016-06-21 01:00:00	GVP01	250.0

Total Readings in the data:316527

	Length of readings	Max. Glucose Value	Min. Glucose Value	MAGE Score	Days
count	88.000000	88.000000	88.000000	88.000000	88
mean	3596.897727	225.158750	54.401818	66.413985	18 days 02:02:08.431818
std	5608.523425	88.449577	15.749254	41.071826	60 days 15:06:20.611443
min	576.000000	111.000000	0.000000	21.235955	2 days 01:54:50
25%	1778.500000	165.450000	44.750000	36.557581	6 days 04:34:32
50%	1821.000000	191.500000	52.500000	48.596693	6 days 12:51:58
75%	2128.250000	246.015000	64.132500	79.633123	8 days 02:10:33.250000
max	45696.000000	508.710000	95.400000	189.593750	566 days 23:45:00

Here is the statistical analysis of the data:

	Subject ID	Length of readings	Max. Glucose Value	Min. Glucose Value	MAGE Score	Days	Start	End
0	OD596	10877	367.00	40.00	121.875622	47 days 07:44:00	2027-04-09 16:15:00	2027-05-26 23:59:00
1	OD591	10847	397.00	40.00	133.250923	44 days 06:52:00	2021-11-30 17:06:00	2022-01-13 23:58:00
2	OD588	12640	400.00	40.00	112.819398	45 days 12:02:00	2021-08-30 11:53:00	2021-10-14 23:55:00
3	OD584	12150	400.00	40.00	143.566308	45 days 23:53:00	2025-05-14 00:03:00	2025-06-28 23:56:00
4	OD575	11866	400.00	40.00	140.910156	45 days 11:51:00	2021-11-17 12:04:00	2022-01-01 23:55:00
5	OD570	10982	377.00	46.00	145.633333	40 days 07:30:00	2021-12-07 16:29:00	2022-01-16 23:59:00
6	OD567	10858	400.00	40.00	145.016461	46 days 23:54:51	2026-12-28 00:04:30	2027-02-12 23:59:21
7	OD563	12124	400.00	40.00	119.387931	45 days 11:23:00	2021-09-13 12:33:00	2021-10-28 23:56:00
8	OD559	10796	400.00	40.00	179.030303	41 days 22:39:00	2021-12-07 01:17:00	2022-01-17 23:56:00
9	OD552	9080	345.00	45.00	125.322917	38 days 12:42:09	2025-04-16 11:17:05	2025-05-24 23:59:14
10	OD544	10623	400.00	48.00	139.448780	43 days 23:53:00	2027-05-11 00:02:00	2027-06-23 23:55:00
11	OD540	11947	369.00	40.00	125.281250	45 days 12:20:15	2027-05-19 11:36:29	2027-07-03 23:56:44
12	ID33	1265	163.80	39.60	33.992727	13 days 15:49:00	2019-02-21 14:59:00	2019-03-07 06:48:00
13	ID32	1337	202.00	47.00	55.223881	13 days 21:59:00	2018-08-01 12:00:00	2018-08-15 09:59:00
14	ID31	1443	182.19	66.47	48.568387	3 days 00:06:00	2016-06-06 16:55:00	2016-06-09 17:01:00
15	ID30	2472	187.20	59.40	39.564706	5 days 03:33:00	2016-12-21 07:29:00	2016-12-26 11:02:00

	Subject ID	Length of readings	Max. Glucose Value	Min. Glucose Value	MAGE Score	Days	Start	End
16	ID29	1728	195.64	75.15	57.160000	3 days 14:21:00	2016-12-19 22:42:00	2016-12-23 13:03:00
17	ID23	3260	326.83	64.53	87.135429	6 days 18:57:00	2016-10-11 15:34:00	2016-10-18 10:31:00
18	ID22	2111	170.39	34.20	56.753500	4 days 09:30:00	2016-12-29 07:35:00	2017-01-02 17:05:00
19	ID21	2686	214.20	66.60	68.142857	5 days 14:15:00	2016-11-22 07:26:00	2016-11-27 21:41:00
20	ID13	1681	246.06	94.75	81.946286	3 days 12:00:00	2016-12-01 07:44:00	2016-12-04 19:44:00
21	ID12	2980	271.80	93.60	78.646154	6 days 04:57:00	2016-08-02 08:19:00	2016-08-08 13:16:00
22	ID11	2205	316.80	95.40	124.305882	4 days 14:12:00	2017-01-07 08:52:00	2017-01-11 23:04:00
23	ID03	3097	508.71	61.25	179.607679	6 days 10:48:00	2016-05-26 06:09:00	2016-06-01 16:57:00
24	ID02	3016	170.98	14.02	40.234656	6 days 06:45:00	2016-05-26 07:50:00	2016-06-01 14:35:00
25	ID01	2510	291.37	55.39	137.199913	5 days 05:27:00	2016-06-25 09:14:00	2016-06-30 14:41:00
26	GVP03	45696	429.00	25.00	119.879244	566 days 23:45:00	2016-04-24 00:00:00	2017-11-11 23:45:00
27	GVP01	576	347.00	0.00	189.593750	5 days 23:45:00	2016-06-21 00:00:00	2016-06-26 23:45:00
28	2133-041	1858	204.00	51.00	45.493976	8 days 02:09:26	2017-07-03 18:32:06	2017-07-11 20:41:32
29	2133-040	1792	171.00	59.00	40.560000	6 days 10:44:37	2017-06-28 13:34:52	2017-07-05 00:19:29
30	2133-039	2013	204.00	50.00	60.892857	9 days 01:34:20	2017-06-05 12:23:22	2017-06-14 13:57:42
31	2133-037	1785	153.00	48.00	39.967391	6 days 07:39:25	2017-06-05 14:11:14	2017-06-11 21:50:39
32	2133-036	1954	214.00	58.00	63.841270	8 days 15:04:26	2017-06-01 15:26:53	2017-06-10 06:31:19

	Subject ID	Length of readings	Max. Glucose Value	Min. Glucose Value	MAGE Score	Days	Start	End
33	2133-035	1830	190.00	47.00	44.032258	7 days 05:49:42	2017-06-01 17:17:00	2017-06-08 23:06:42
34	2133-033	1892	161.00	49.00	43.051948	7 days 07:04:31	2017-05-19 12:58:22	2017-05-26 20:02:53
35	2133-032	1781	147.00	69.00	34.365079	6 days 04:34:25	2017-05-19 13:31:19	2017-05-25 18:05:44
36	2133-030	1818	147.00	41.00	36.596774	6 days 18:44:36	2017-05-03 14:13:09	2017-05-10 08:57:45
37	2133-028	1850	111.00	45.00	21.235955	7 days 02:04:30	2017-05-10 00:03:32	2017-05-17 02:08:02
38	2133-027	1936	155.00	60.00	33.625000	8 days 02:13:55	2017-04-24 14:49:24	2017-05-02 17:03:19
39	2133-026	1782	166.00	45.00	37.147727	6 days 04:39:35	2017-04-19 14:10:22	2017-04-25 18:49:57
40	2133-025	1865	175.00	45.00	32.525773	6 days 18:09:38	2017-04-19 13:34:14	2017-04-26 07:43:52
41	2133-024	1821	180.00	41.00	46.387097	6 days 13:09:23	2017-04-17 14:14:20	2017-04-24 03:23:43
42	2133-023	1838	142.00	44.00	31.505882	7 days 10:09:25	2017-04-17 14:49:45	2017-04-25 00:59:10
43	2133-022	1814	204.00	40.00	60.593220	6 days 12:34:33	2017-03-22 13:34:24	2017-03-29 02:08:57
44	2133-021	1797	236.00	62.00	83.355556	6 days 07:39:27	2017-03-17 13:34:51	2017-03-23 21:14:18
45	2133-020	1826	201.00	40.00	70.418182	6 days 10:04:43	2017-03-17 12:56:49	2017-03-23 23:01:32
46	2133-019-2	580	168.00	63.00	51.421053	2 days 01:54:50	2017-03-15 16:37:47	2017-03-17 18:32:37
47	2133-019	1221	192.00	53.00	45.166667	4 days 07:29:40	2017-03-20 13:42:24	2017-03-24 21:12:04
48	2133-018	1775	303.00	73.00	128.200000	6 days 04:39:35	2017-03-14 13:30:04	2017-03-20 18:09:39
49	2133-017	1799	182.00	68.00	53.517857	6 days 10:04:23	2017-03-13 12:22:38	2017-03-19 22:27:01

	Subject ID	Length of readings	Max. Glucose Value	Min. Glucose Value	MAGE Score	Days	Start	End
50	2133-015	1835	213.00	58.00	47.797101	6 days 17:34:22	2017-01-30 13:33:25	2017-02-06 07:07:47
51	2133-013	1960	206.00	41.00	46.462687	8 days 07:49:13	2017-01-11 15:25:11	2017-01-19 23:14:24
52	2133-012	1809	148.00	49.00	36.120879	6 days 20:34:29	2017-01-11 14:49:44	2017-01-18 11:24:13
53	2133-011	1933	204.00	47.00	45.389610	9 days 05:54:03	2017-01-10 15:29:05	2017-01-19 21:23:08
54	2133-010	1832	143.00	62.00	30.287037	6 days 17:29:32	2016-11-21 15:28:45	2016-11-28 08:58:17
55	2133-009	1781	183.00	59.00	45.100000	6 days 04:34:44	2016-11-21 13:33:38	2016-11-27 18:08:22
56	2133-008	1805	137.00	49.00	30.567010	6 days 07:34:31	2016-11-22 00:03:05	2016-11-28 07:37:36
57	2133-007	1877	207.00	65.00	47.830986	7 days 23:14:19	2016-11-01 13:30:28	2016-11-09 12:44:47
58	2133-006	1777	148.00	54.00	33.437500	6 days 04:29:35	2016-11-01 00:00:51	2016-11-07 04:30:26
59	2133-004	1776	246.00	61.00	78.862069	6 days 04:29:28	2016-09-21 00:04:11	2016-09-27 04:33:39
60	2133-003	1805	190.00	62.00	58.192982	6 days 07:04:28	2016-09-02 17:51:46	2016-09-09 00:56:14
61	2133-002	1806	163.00	60.00	33.593750	6 days 10:44:31	2016-09-09 16:02:22	2016-09-16 02:46:53
62	2133-001	1814	186.00	47.00	36.361702	7 days 00:59:29	2016-08-03 00:00:14	2016-08-10 00:59:43
63	1636-70-1010	1393	186.00	75.00	48.625000	5 days 02:04:34	2016-05-25 10:38:39	2016-05-30 12:43:13
64	1636-70-1008	1760	223.00	51.00	61.707317	6 days 04:34:32	2015-12-07 13:34:23	2015-12-13 18:08:55
65	1636-70-1005	1846	225.00	52.00	60.507042	8 days 03:24:24	2016-04-06 14:13:52	2016-04-14 17:38:16
66	1636-70-1003	1895	146.00	46.00	39.755814	7 days 07:39:28	2015-12-01 00:03:03	2015-12-08 07:42:31

	Subject ID	Length of readings	Max. Glucose Value	Min. Glucose Value	MAGE Score	Days	Start	End
67	1636-70-1002	1794	168.00	57.00	42.459770	6 days 07:34:30	2015-11-12 00:02:25	2015-11-18 07:36:55
68	1636-69-123	1905	138.00	49.00	29.847619	8 days 01:34:20	2016-02-17 00:01:50	2016-02-25 01:36:10
69	1636-69-114	1796	163.00	76.00	35.773333	6 days 06:59:31	2015-10-13 00:03:47	2015-10-19 07:03:18
70	1636-69-111	1720	135.00	48.00	26.976471	6 days 06:24:41	2015-09-15 03:41:33	2015-09-21 10:06:14
71	1636-69-107	1897	195.00	66.00	42.875000	7 days 10:09:27	2015-09-24 13:33:14	2015-10-01 23:42:41
72	1636-69-104-2	1153	140.00	46.00	35.805970	6 days 08:49:31	2016-02-17 00:20:37	2016-02-23 09:10:08
73	1636-69-104	969	152.00	61.00	36.097561	5 days 14:59:34	2015-08-05 14:46:39	2015-08-11 05:46:13
74	1636-69-100	1716	153.00	66.00	28.298507	6 days 08:49:28	2015-09-15 00:03:15	2015-09-21 08:52:43
75	1636-69-091	1803	163.00	70.00	36.440000	6 days 10:09:39	2015-11-04 14:48:20	2015-11-11 00:57:59
76	1636-69-090	1863	195.00	54.00	57.235294	6 days 23:39:38	2016-02-10 00:02:40	2016-02-16 23:42:18
77	1636-69-069	1591	187.00	69.00	49.666667	6 days 20:39:24	2015-07-20 13:33:11	2015-07-27 10:12:35
78	1636-69-064	1584	218.00	43.00	56.810811	5 days 16:14:32	2015-03-26 14:49:42	2015-04-01 07:04:14
79	1636-69-060	1821	191.00	91.00	35.487179	6 days 14:59:31	2015-11-17 15:25:53	2015-11-24 06:25:24
80	1636-69-053	1804	183.00	43.00	42.567164	6 days 16:49:39	2015-05-07 18:34:18	2015-05-14 11:23:57
81	1636-69-048	1779	144.00	63.00	27.657143	6 days 04:34:29	2015-11-26 00:36:15	2015-12-02 05:10:44
82	1636-69-035	2180	234.00	69.00	62.825397	11 days 01:04:20	2016-01-27 00:02:25	2016-02-07 01:06:45
83	1636-69-032	1783	191.00	67.00	29.622642	6 days 04:34:32	2016-01-13 12:58:17	2016-01-19 17:32:49

	Subject ID	Length of readings	Max. Glucose Value	Min. Glucose Value	MAGE Score	Days	Start	End
84	1636-69-028	1543	168.00	75.00	36.701754	5 days 19:59:40	2015-04-02 13:33:15	2015-04-08 09:32:55
85	1636-69-026	1796	182.00	62.00	55.710145	7 days 01:29:34	2015-11-24 00:37:20	2015-12-01 02:06:54
86	1636-69-001-2	1092	250.00	64.00	66.657143	4 days 03:14:35	2015-03-29 11:53:31	2015-04-02 15:08:06
87	1636-69-001	754	225.00	68.00	94.916667	2 days 14:49:45	2014-02-03 03:42:12	2014-02-05 18:31:57

In []: