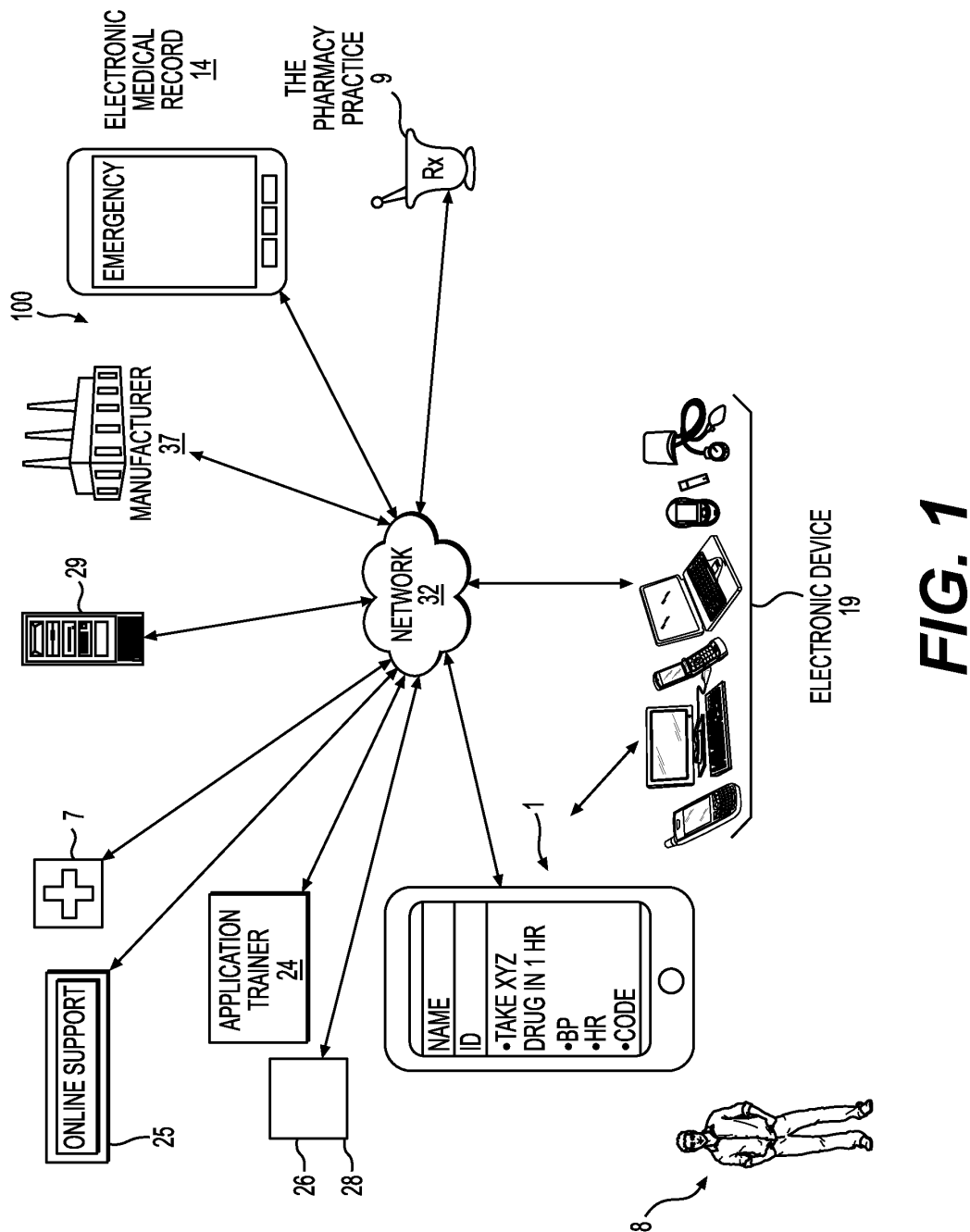




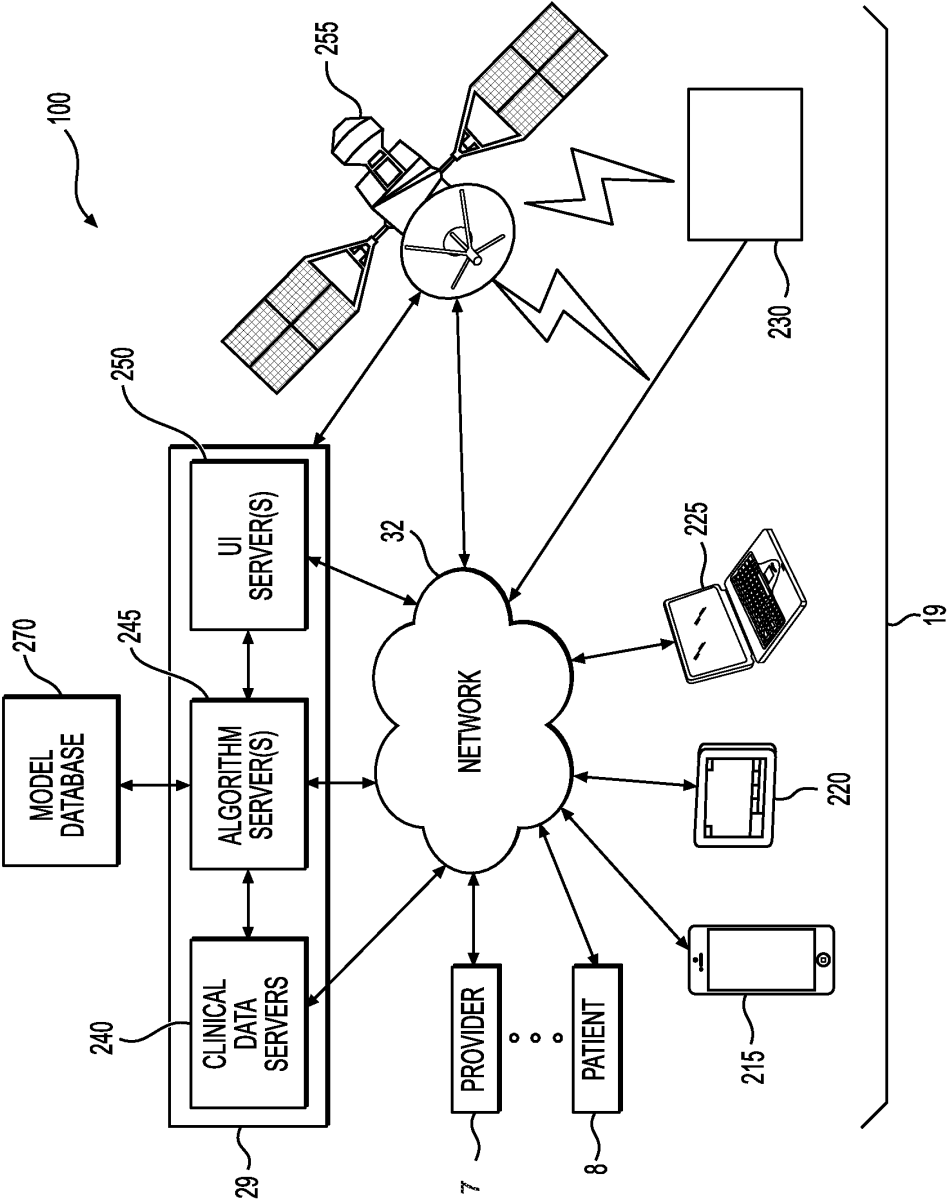


FIG. 2

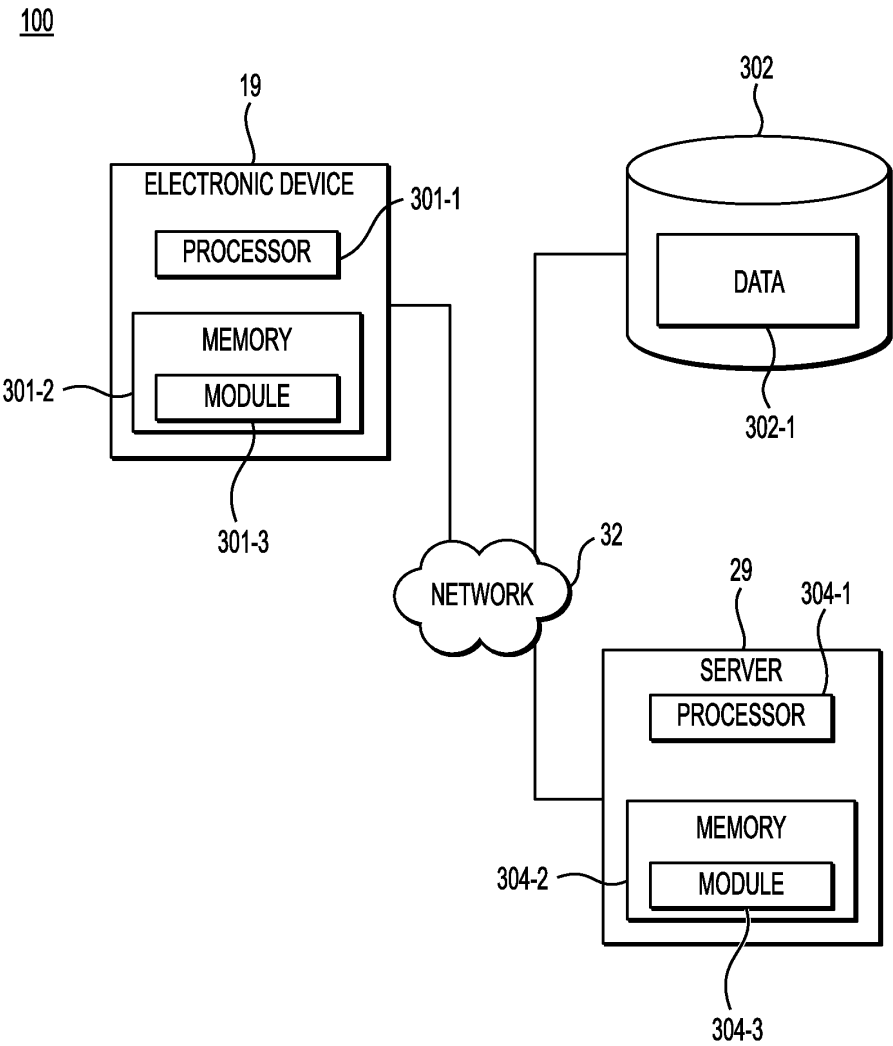


FIG. 3A

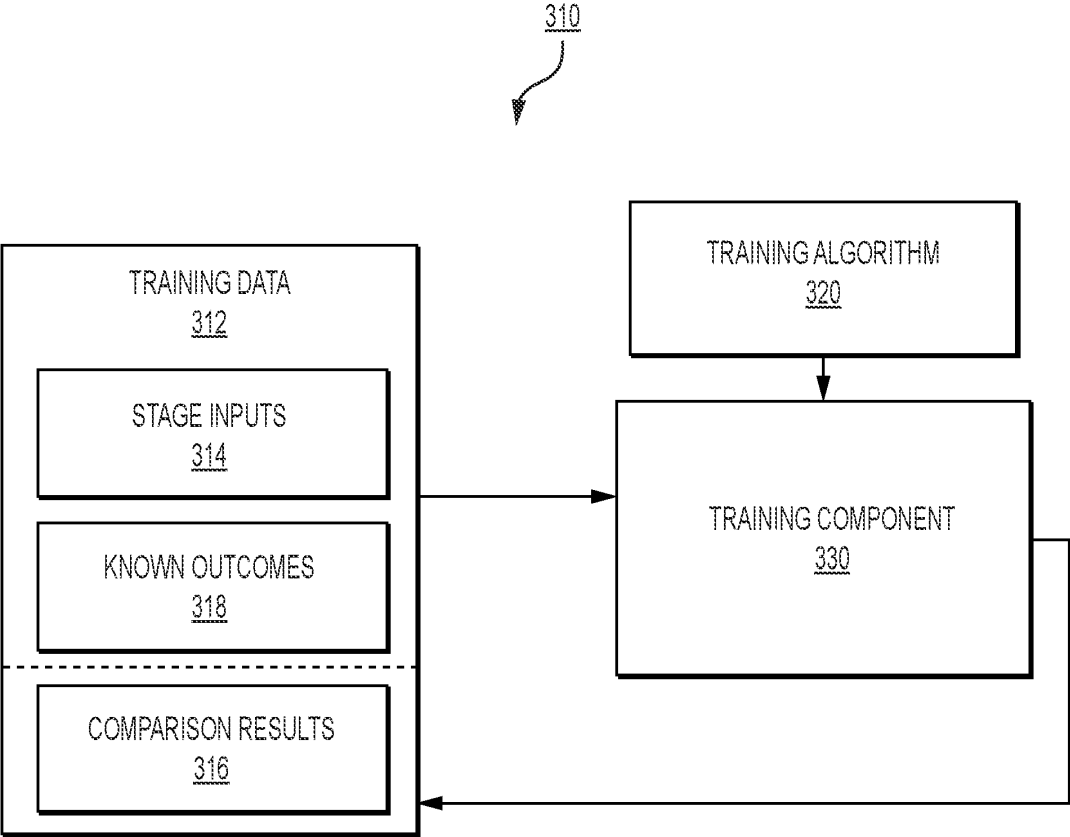


FIG. 3B

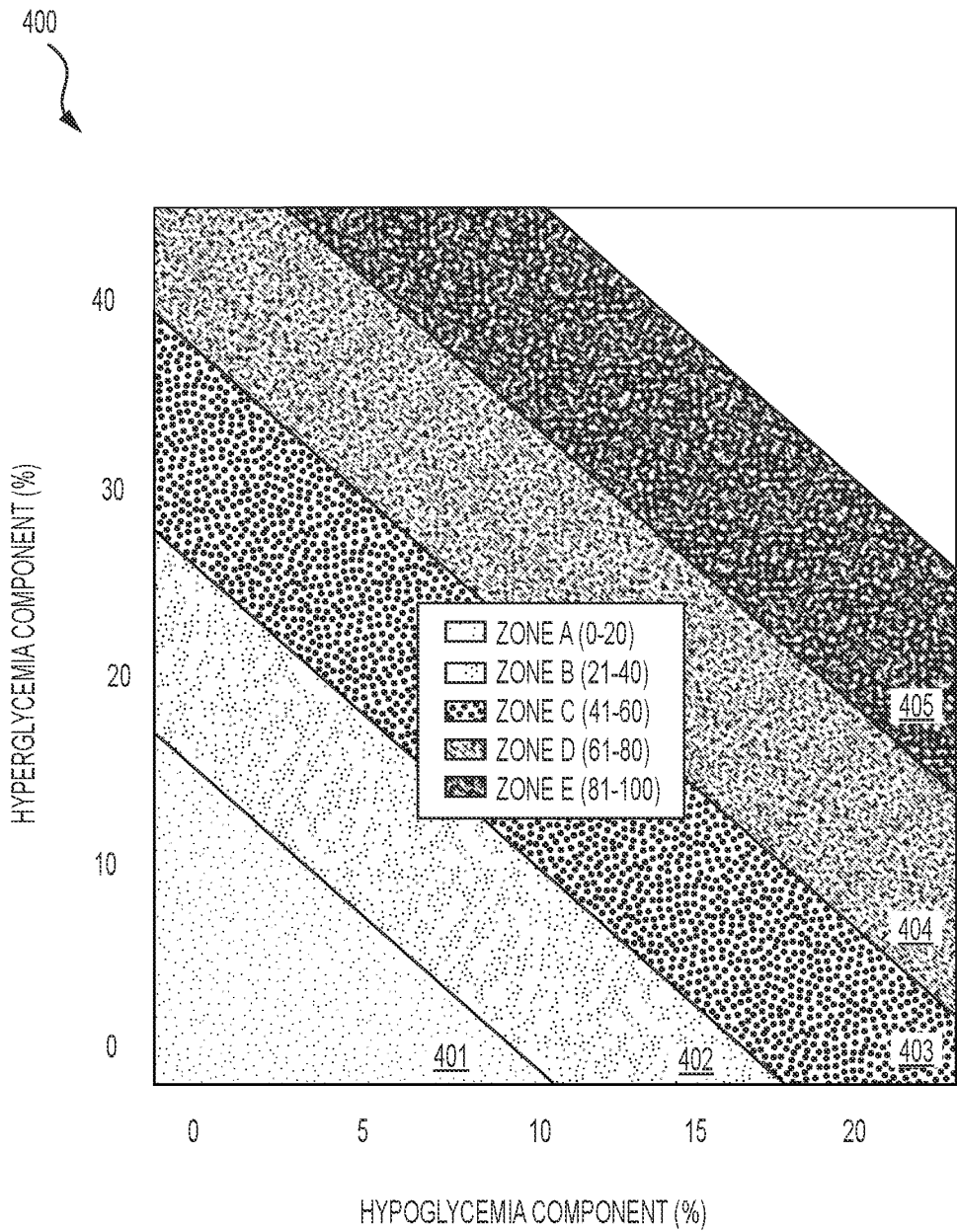
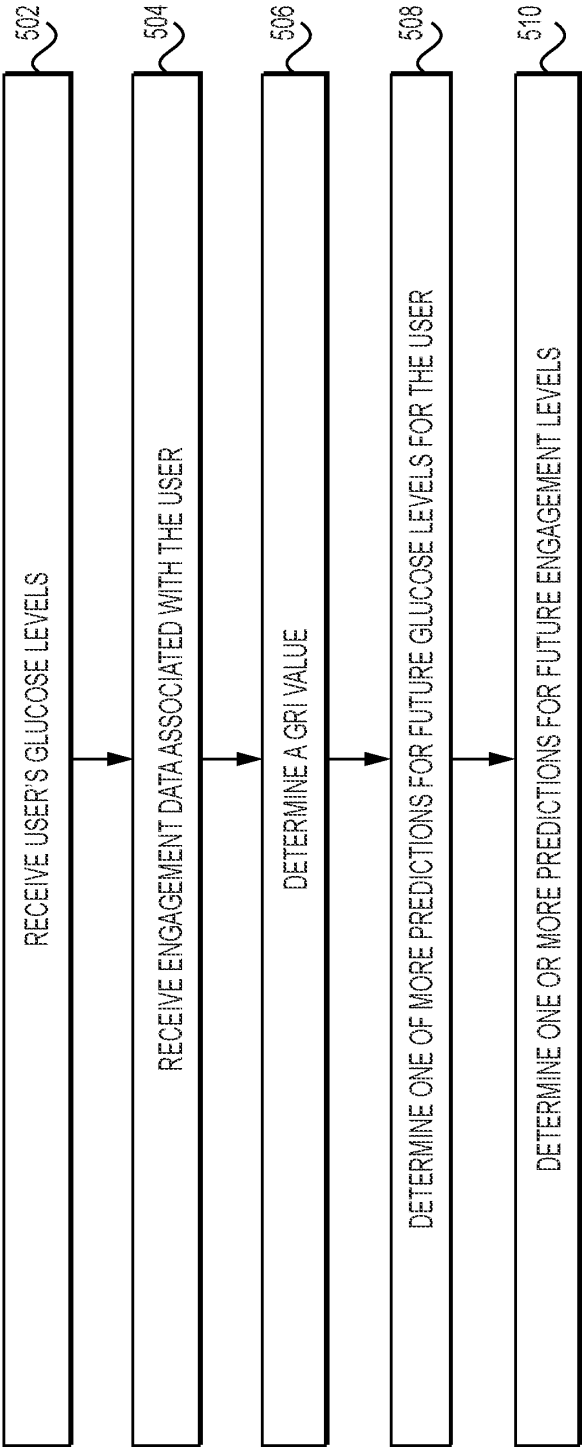


FIG. 4



500

FIG. 5



FIG. 6

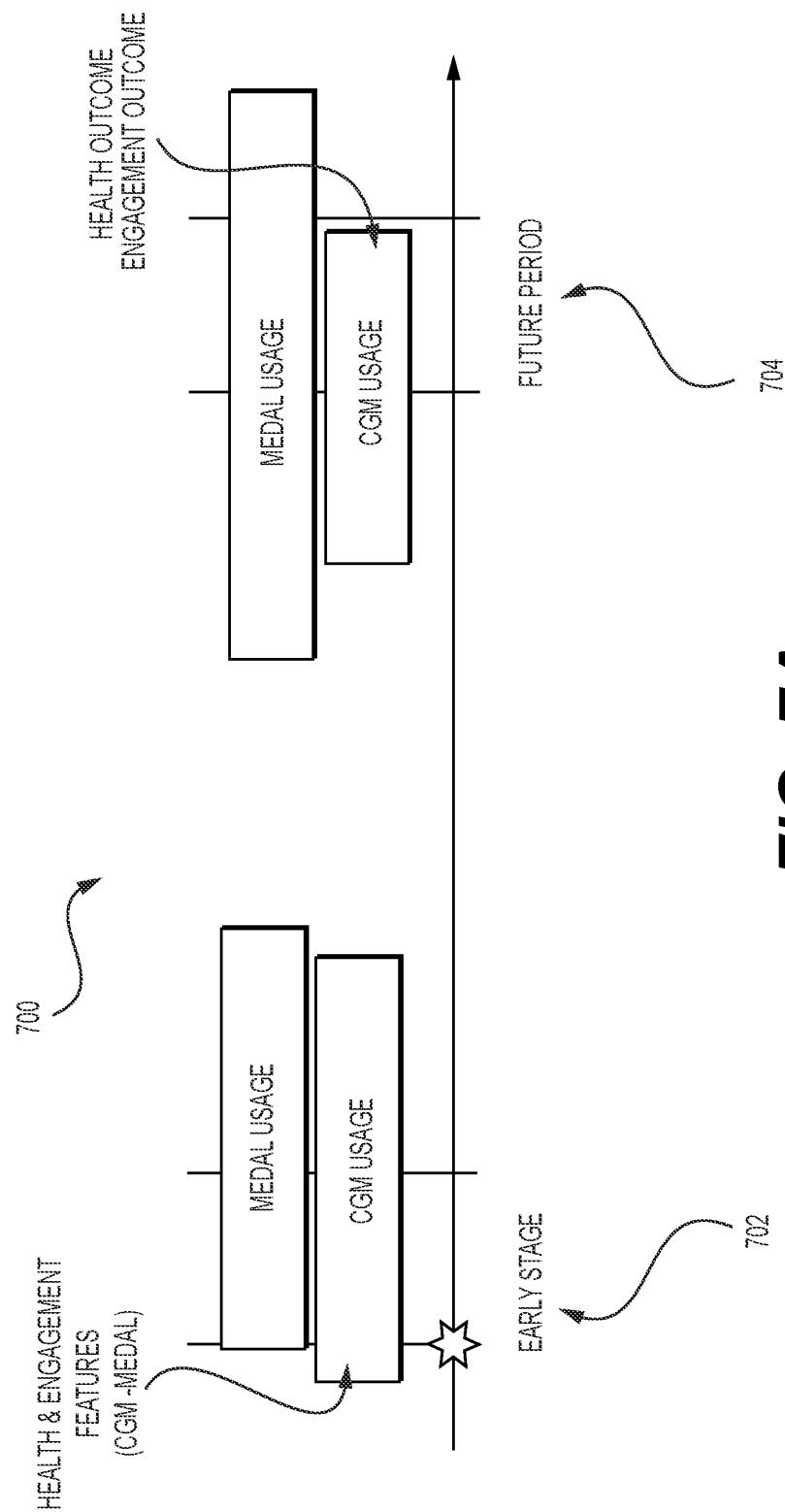
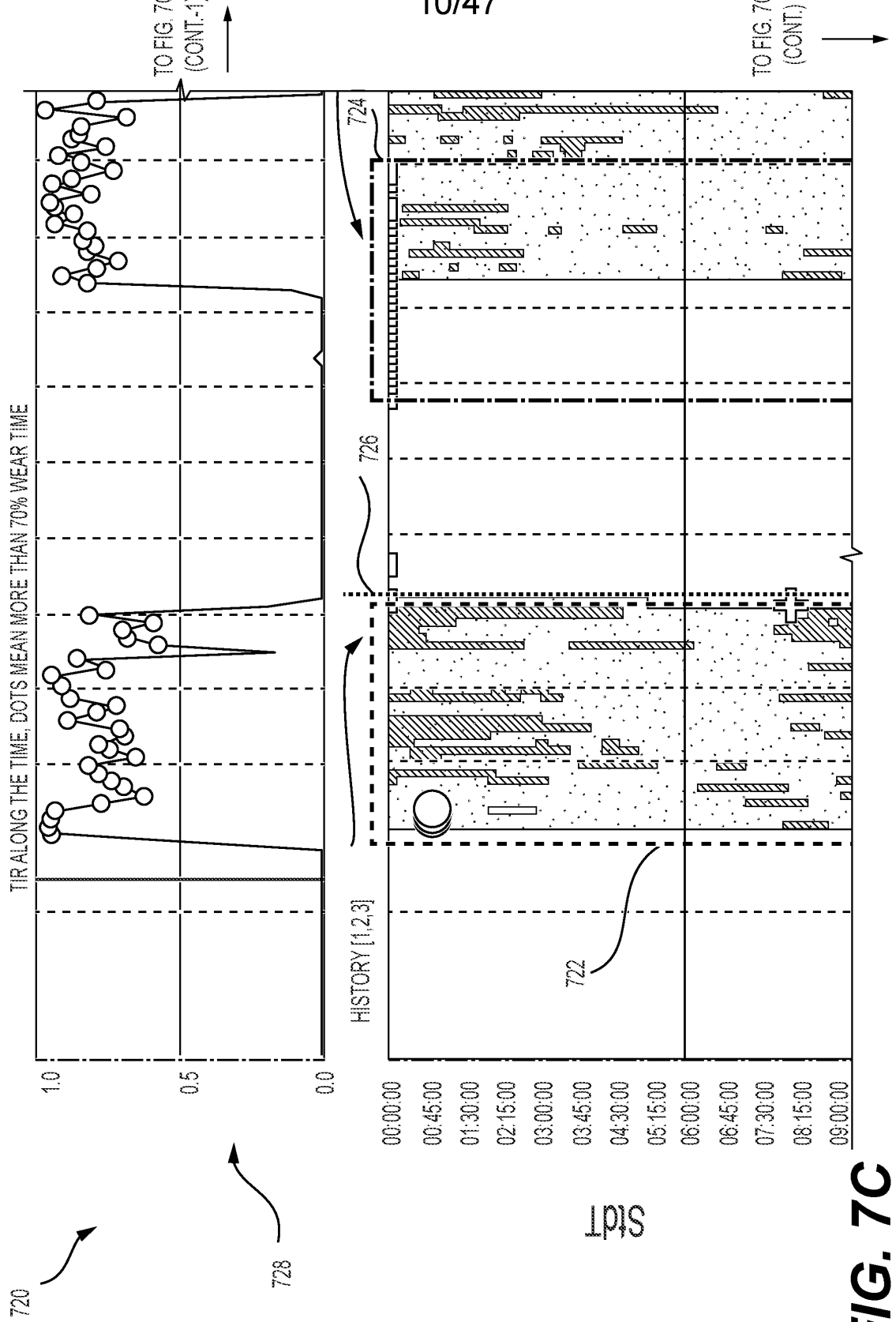


FIG. 7A

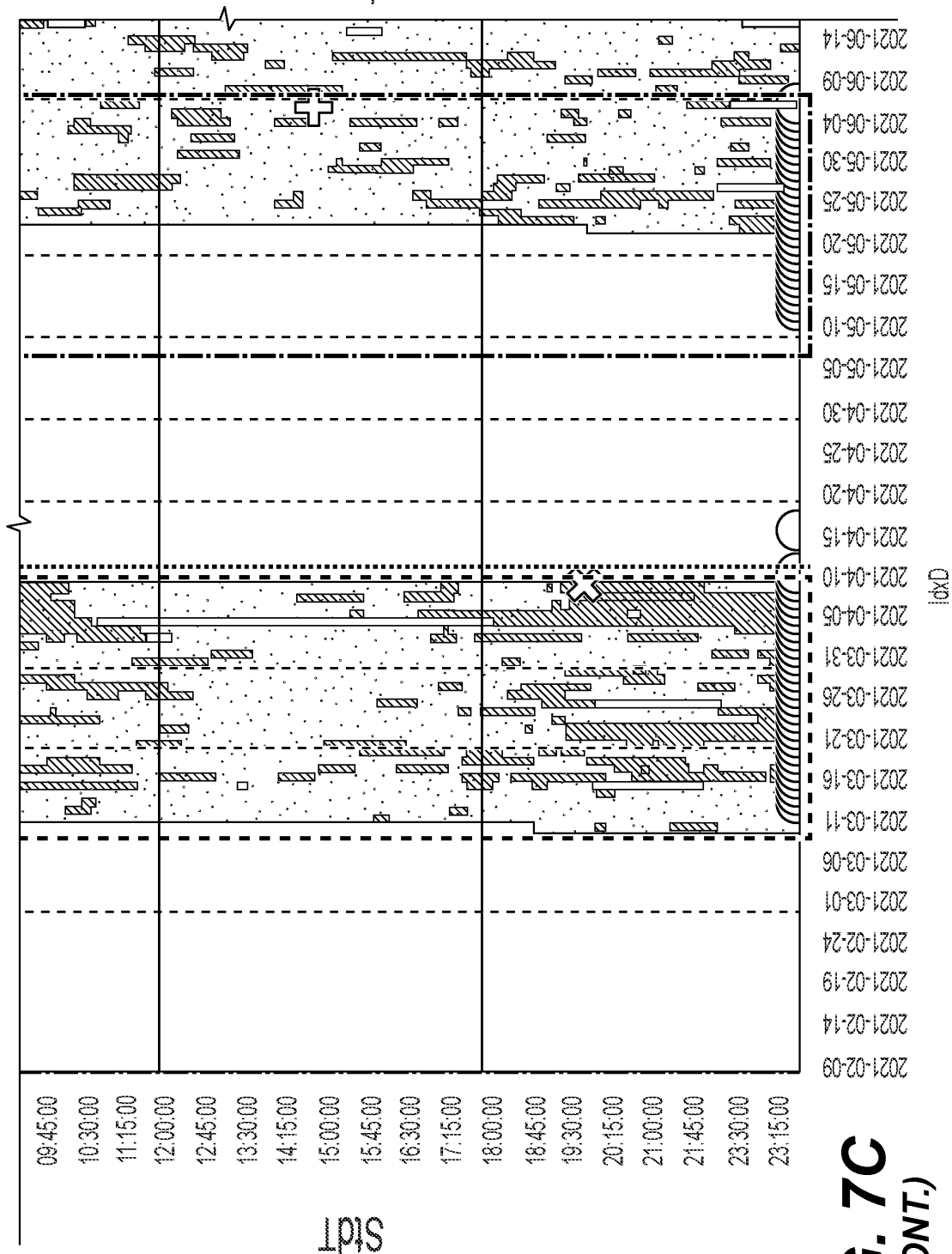
QUESTION	OUTCOME VARIABLE TO OBSERVE	QUESTION #	SCENARIO
CAN WE USE EARLY STAGE DIGITAL HEALTH & CGM ENGAGEMENT TO PREDICT FUTURE TIR OUTCOMES?	TIR	1	2-STATE DIRECTION PREDICTION: GETTING BETTER OR WORSE?
	TIR	2	3-STATE DIRECTION PREDICTION: GETTING BETTER, REMAINING SAME, GETTING WORSE
	TIR	3	2-STATE VALUE PREDICTION: PREDICTING IF THE FUTURE TIR VALUE WILL BE > OR < 70% (GOAL)
CAN WE USE EARLY STAGE DIGITAL HEALTH & CGM ENGAGEMENT TO PREDICT FUTURE TIR OUTCOMES?	GRI	4	2-STATE DIRECTION PREDICTION: GETTING BETTER OR WORSE?
	GRI	5	3-STATE DIRECTION PREDICTION: GETTING BETTER, REMAINING SAME, GETTING WORSE
	GRI	6	2-STATE VALUE PREDICTION: PREDICTING IF THE FUTURE GRI VALUE WILL BE > OR < 40 (GOAL)
CAN WE USE EARLY STAGE DIGITAL HEALTH & CGM ENGAGEMENT TO PREDICT FUTURE DIGITAL HEALTH ENGAGEMENT?	MEDAL ENGAGEMENT	7	2-STATE DIRECTION PREDICTION: IS FUTURE ENGAGEMENT HIGH OR LOW FOR EACH OF MEDICATIONS, EDUCATION, DIET, ACTIVITY, LABS?
	MANUAL ENTRY MEDAL ENGAGEMENT	8	2-STATE DIRECTION PREDICTION: IS FUTURE ENGAGEMENT HIGH OR LOW FOR EACH OF MEDICATIONS, EDUCATION, DIET, LABS?
	CGM WEAR TIME	9	2-STATE VALUE PREDICTION: IS FUTURE CGM WEAR > OR < 70% OF TIME (I.E., 70% OF THE TOTAL 2880 POSSIBLE READINGS IN A WEEK)

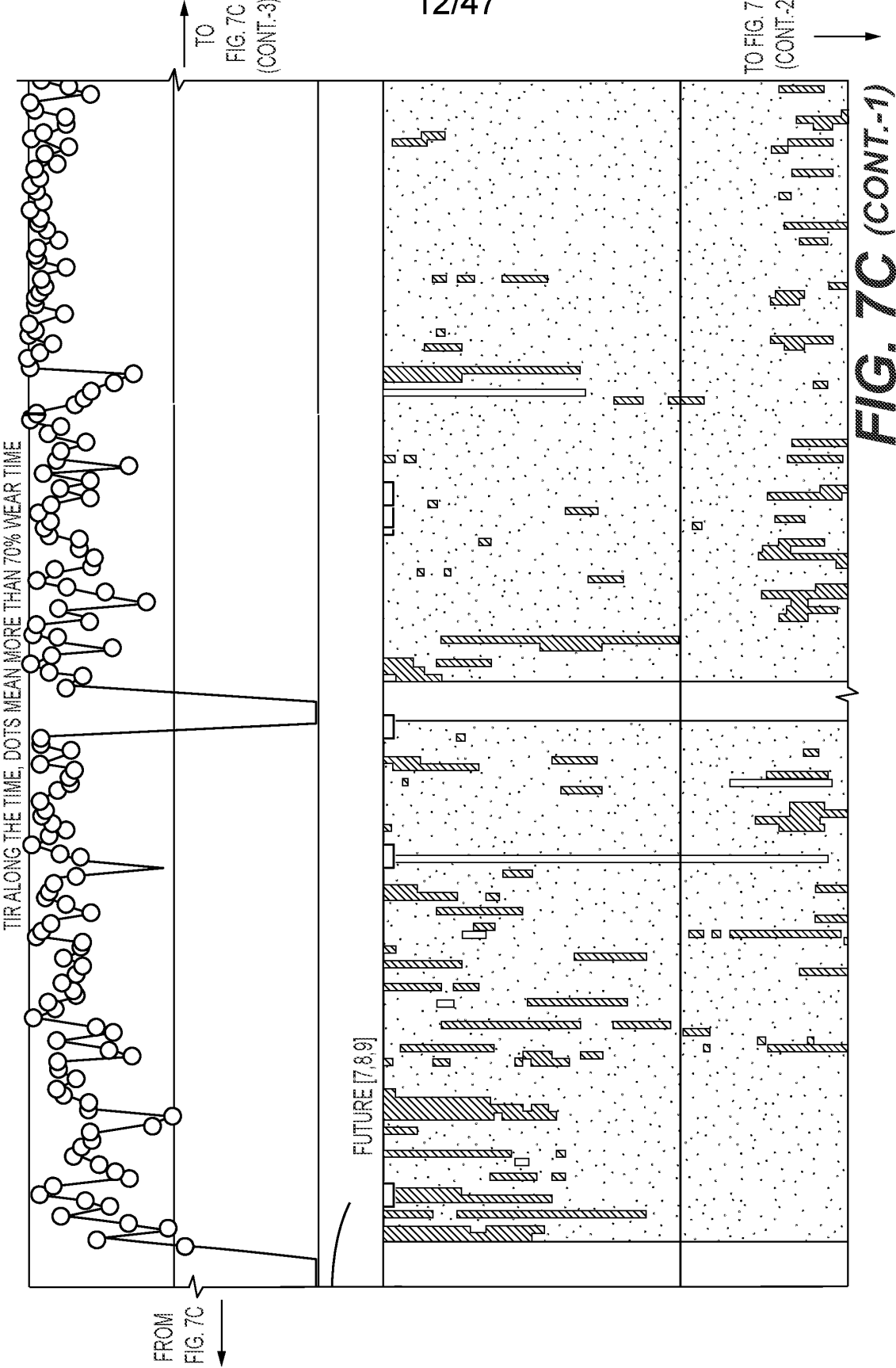
FIG. 7B

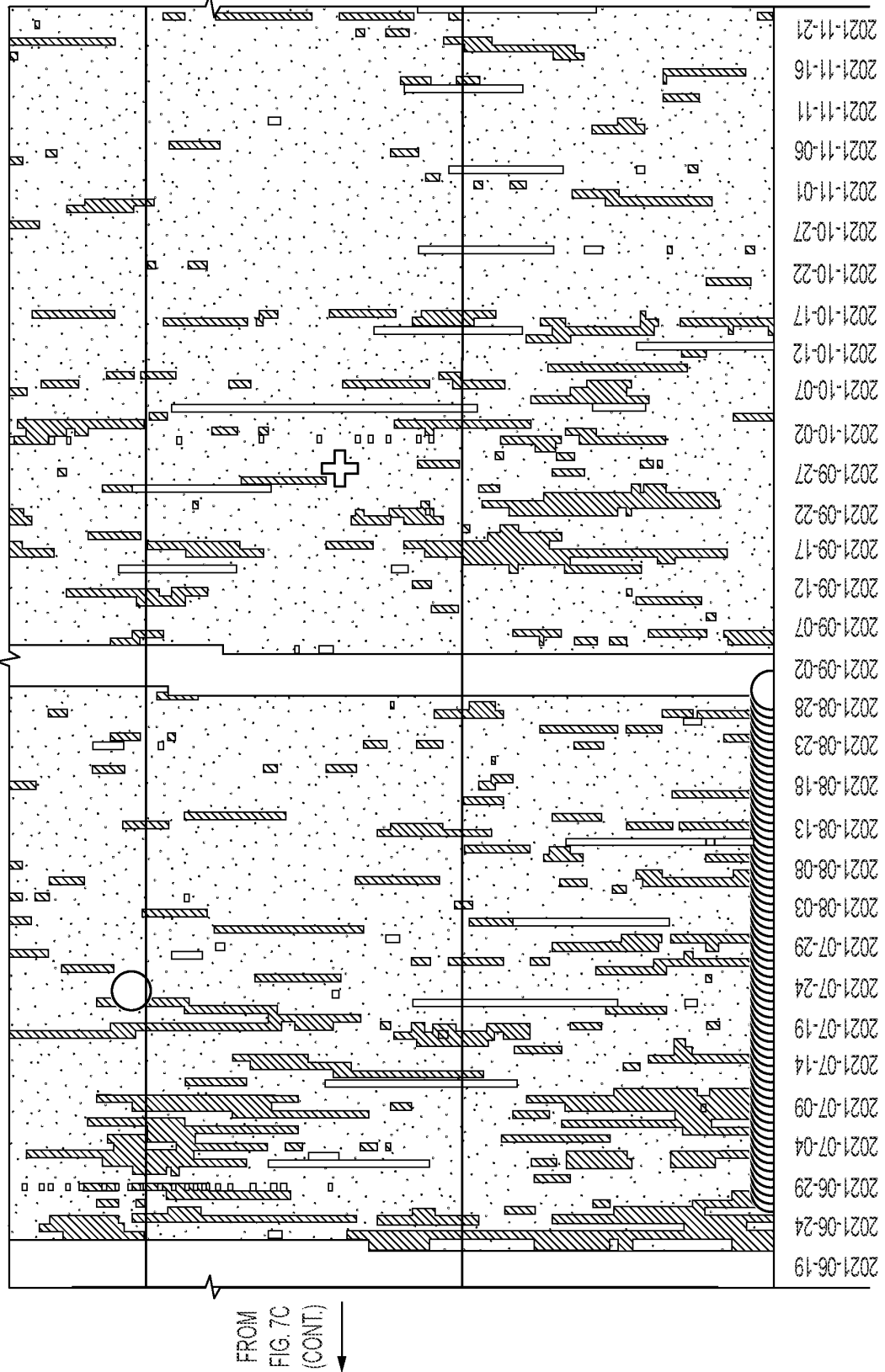


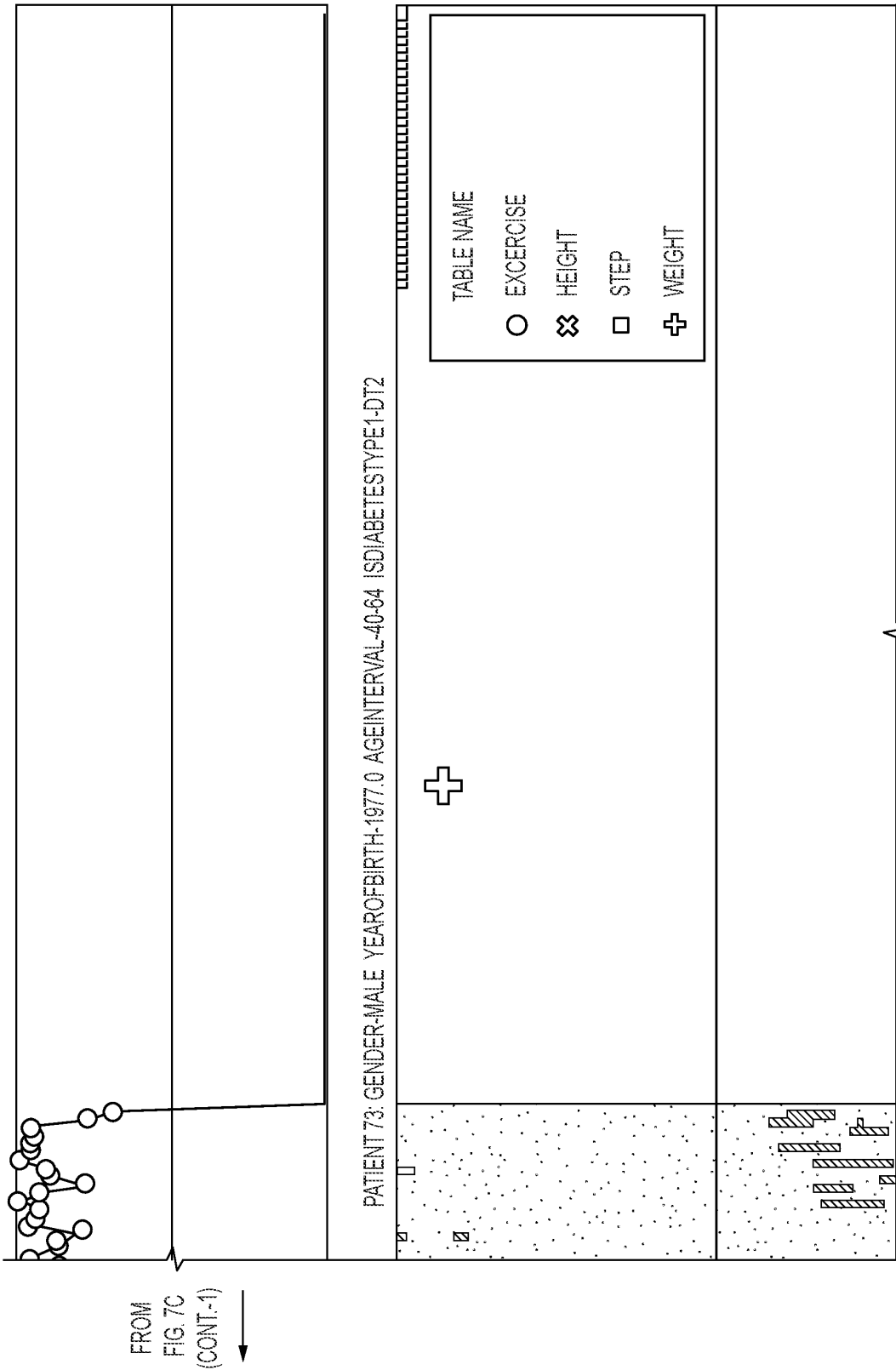
FROM
FIG. 7C

TO FIG. 7C
(CONT. 2)









FROM
FIG. 7C
(CONT.-3)

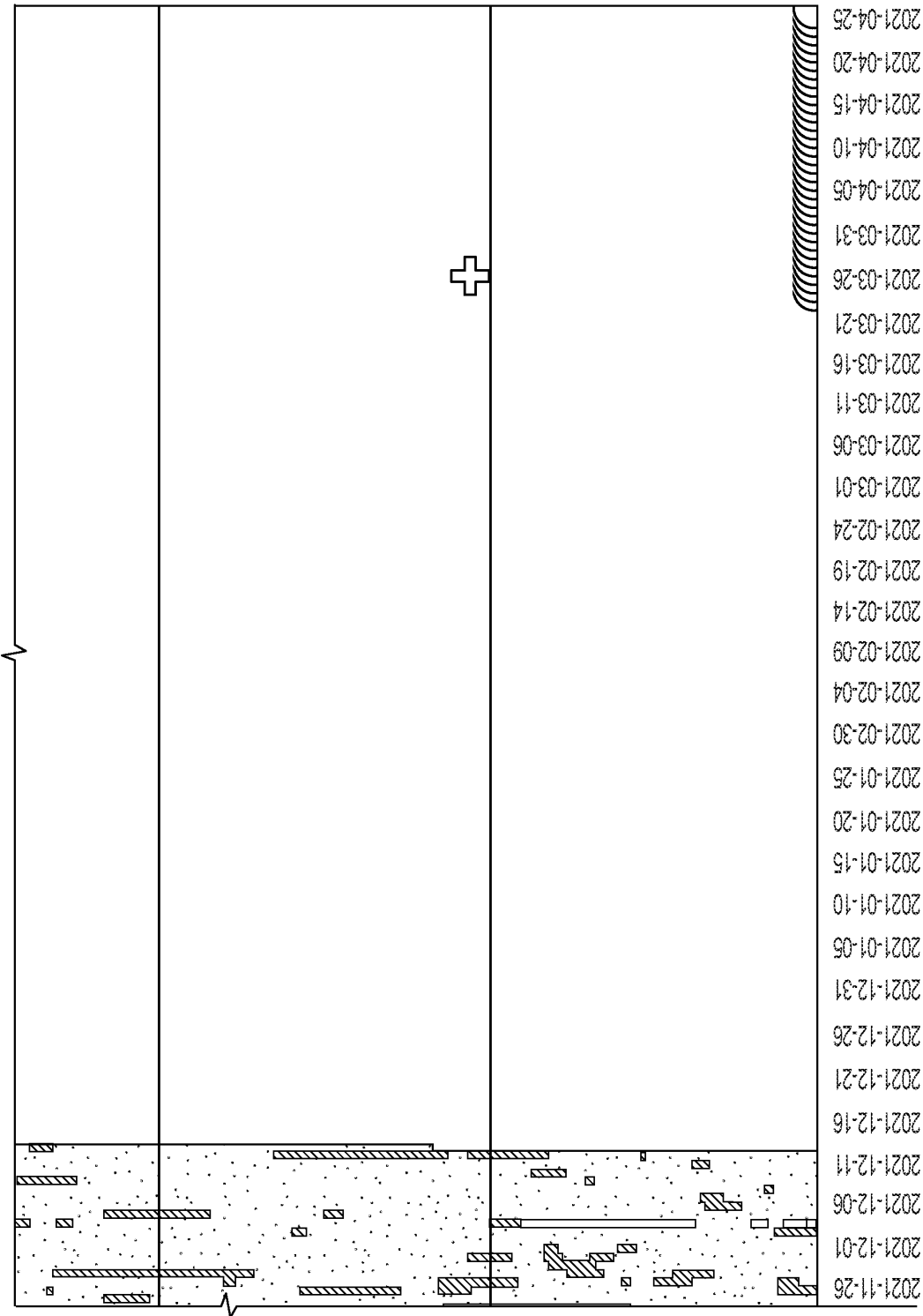


FIG. 7C (CONT.-4)

FROM
FIG. 7C
(CONT.-2)

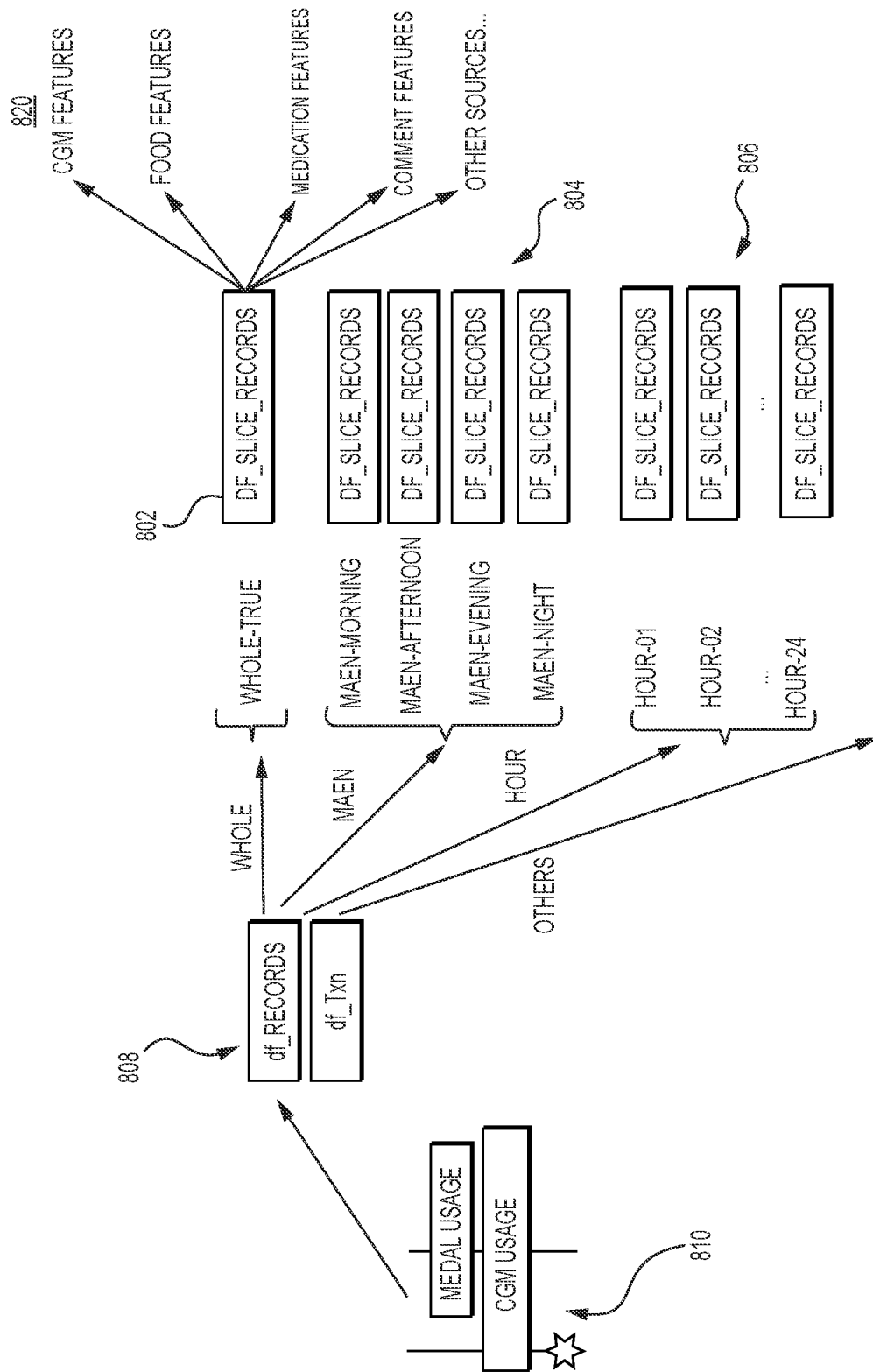


FIG. 8A

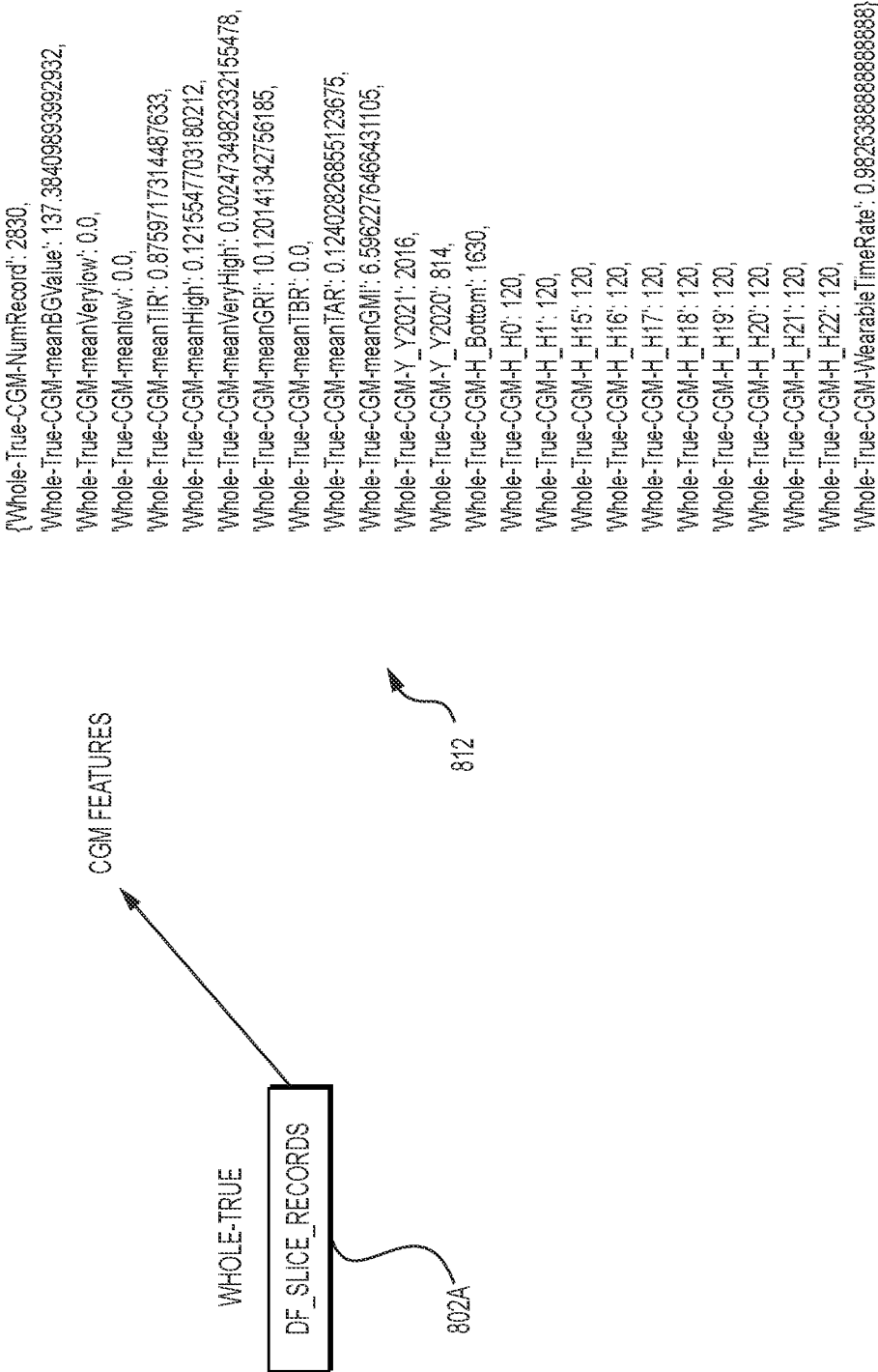


FIG. 8B

{Whole-True-Food-NumRecord': 3,
'Whole-True-Food-meanFromEventToRec': 39.99444444444445,
'Whole-True-Food-meanServingSize': 1.3333333333333333,
'Whole-True-Food-meanServingsConsumed': 1.6666666666666667,
'Whole-True-Food-meanCarbs': 22.653333333333336,
'Whole-True-Food-meanfiber': 0.0,
'Whole-True-Food-meanfat': 5.07,
'Whole-True-Food-meanCalories': 66.33333333333333,
'Whole-True-Food-meanProtein': 4.336666666666667,
'Whole-True-Food-meanSodium': 70.33333333333333,
'Whole-True-Food-meanSaturatedFat': 1.928,
'Whole-True-Food-meanPolyUnSaturatedFat': 0.617,
'Whole-True-Food-meanMonolUnSaturatedFat': 1.8453333333333333,
'Whole-True-Food-meanTransFat': 0.0,
'Whole-True-Food-meanCholesterol': 133.33333333333334,
'Whole-True-Food-meanPotassium': 46.0,
'Whole-True-Food-meanSugar': 0.4766666666666667,
'Whole-True-Food-meanAddedSugars': None,
'Whole-True-Food-Y_Y2021': 3,
'Whole-True-Food-H_H16': 2,
'Whole-True-Food-H_H17': 1,
'Whole-True-Food-FoodName_Just Carbs': 2,
'Whole-True-Food-FoodName_Scrambled Egg': 1,
'Whole-True-Food-ServingType_Missing': 2,
'Whole-True-Food-ServingType_eggs': 1,
'Whole-True-Food-EntrySourceID_1': 3,
'Whole-True-Food-ActivityTypeID_1': 1,
'Whole-True-Food-ActivityTypeID_5': 1,
'Whole-True-Food-ActivityTypeID_3': 1,
'Whole-True-Food-WearableTimeRate': 0.0010416666666666667}}

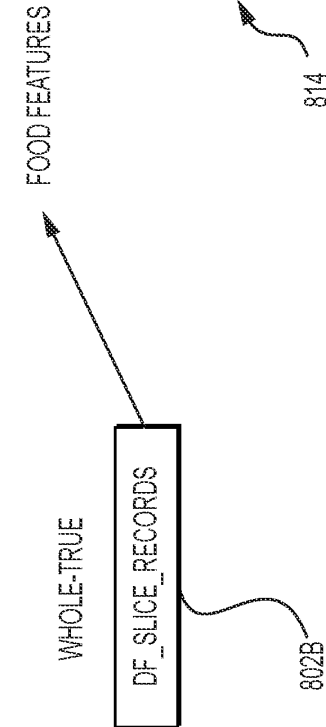


FIG. 8C

```
{'Whole-True-MedAdmin-NumRecord': 11,
'Whole-True-MedAdmin-meanDose': 2.727272727272727,
'Whole-True-MedAdmin-Y_Y2021': 11,
'Whole-True-MedAdmin-H_H18': 6,
'Whole-True-MedAdmin-H_H16': 2,
'Whole-True-MedAdmin-H_H17': 1,
'Whole-True-MedAdmin-H_H6': 1,
'Whole-True-MedAdmin-H_H12': 1,
'Whole-True-MedAdmin-InsulinCalculatorUsageStatus_Missing': 7,
'Whole-True-MedAdmin-InsulinCalculatorUsageStatus_0_0': 4,
'Whole-True-MedAdmin-ActivityTypeID_Missing': 11,
'Whole-True-MedAdmin-MedSourceID_I': 11,
'Whole-True-MedAdmin-StatusID_I': 9,
'Whole-True-MedAdmin-StatusID_2': 2,
'Whole-True-MedAdmin-MedPrescriptionID_127_0': 4,
'Whole-True-MedAdmin-MedPrescriptionID_Missing': 2,
'Whole-True-MedAdmin-MedPrescriptionID_181_0': 2,
'Whole-True-MedAdmin-MedPrescriptionID_188_0': 1,
'Whole-True-MedAdmin-MedPrescriptionID_195_0': 1,
'Whole-True-MedAdmin-MedPrescriptionID_193_0': 1,
'Whole-True-MedAdmin-WearableTimeRate': 0.0038194444444444443}
```

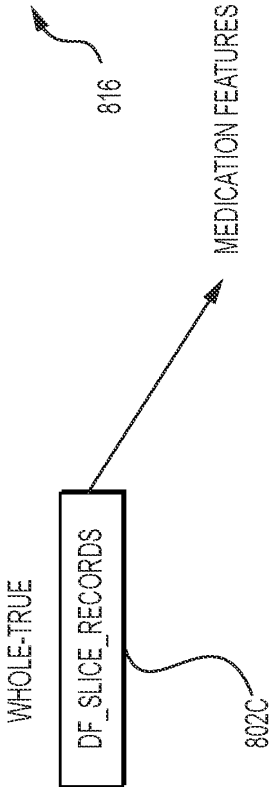


FIG. 8D

INPUT PERIODS: [1, 2, 3]
INPUT: CGM RECORD > 2880, MEDAL RECORD > 0
OUTPUT: CGM RECORD > 2880, MEDAL RECORD > 0

TIR_DELTA: C3

DIABETES TYPE	FUTURE PERIOD	SAMPLE SIZE	LABEL DESCRIPTION	MODEL	ACCURACY	AUC	RECALL	PREC.	F1
ALL	[7, 8, 9]	209	{1: 84, 2: 41, 3: 84}	RANDOM FOREST CLASSIFIER	51.59%	63.79%	51.59%	50.60%	48.87%
ALL	[10, 11, 12]	183	{1: 73, 2: 37, 3: 73}	RANDOM FOREST CLASSIFIER	47.36%	52.26%	47.36%	43.00%	43.26%
ALL	[7, 8, 9, 10, 11, 12]	210	{1: 84, 2: 42, 3: 84}	ADA BOOST CLASSIFIER	48.11%	56.53%	48.11%	49.27%	45.77%
DT1	[7, 8, 9]	116	{1: 47, 2: 23, 3: 46}	LINEAR DISCRIMINANT ANALYSIS	55.24%	61.74%	55.24%	53.40%	51.65%
DT2	[7, 8, 9]	93	{1: 37, 2: 19, 3: 37}	RIDGE CLASSIFIER	43.00%	0.00%	43.00%	36.38%	36.35%

TIR_DELTA: C2

DIABETES TYPE	FUTURE PERIOD	SAMPLE SIZE	LABEL DESCRIPTION	MODEL	ACCURACY	AUC	RECALL	PREC.	F1
ALL	[7, 8, 9]	209	{0: 105, 1: 104}	LOGISTIC REGRESSION	62.95%	65.56%	60.67%	62.61%	58.31%
ALL	[10, 11, 12]	183	{0: 93, 1: 90}	RIDGE CLASSIFIER	60.55%	0.00%	57.67%	66.67%	60.41%
ALL	[7, 8, 9, 10, 11, 12]	210	{0: 114, 1: 96}	LOGISTIC REGRESSION	58.33%	58.63%	53.67%	55.00%	53.38%
DT1	[7, 8, 9]	116	{0: 58, 1: 58}	DECISION TREE CLASSIFIER	62.14%	62.92%	65.00%	68.33%	63.24%
DT2	[7, 8, 9]	93	{0: 47, 1: 46}	RIDGE CLASSIFIER	64.33%	0.00%	60.00%	67.67%	60.88%

FIG. 9A

INPUT PERIODS: [1, 2, 3], OUTPUT PERIODS: [7, 8, 9]
INPUT: CGM RECORD > 0, MEDAL RECORD > 0
OUTPUT: CGM RECORD > 0, MEDAL RECORD > 0

910
ENGAGEMENT OF CGM: C2

DIABETES TYPE	SAMPLE SIZE	LABEL DESCRIPTION	MODEL	ACCURACY	AUC	RECALL	PREC.	F1
DT1	273	{0: 116, 1: 157}	GRADIENT BOOSTING CLASSIFIER	76.25%	80.09%	88.75%	75.85%	81.47%
DT2	226	{0: 90, 1: 136}	RANDOM FOREST CLASSIFIER	79.29%	80.42%	97.50%	76.62%	85.57%

912
ENGAGEMENT OF mHEALTH APPLICATION: C2

DIABETES TYPE	SAMPLE SIZE	LABEL DESCRIPTION	MODEL	ACCURACY	AUC	RECALL	PREC.	F1
DT1	273	{0: 215, 1: 58}	LOGISTIC REGRESSION	90.08%	81.98%	72.50%	84.33%	75.86%
DT2	226	{0: 166, 1: 60}	RANDOM FOREST CLASSIFIER	89.68%	88.26%	74.17%	85.83%	78.64%

FIG. 9B

INPUT PERIODS: [1, 2, 3]; OUTPUT PERIODS: [7, 8, 9]
INPUT: CGM RECORD > 2880, MEDAL RECORD > 0
OUTPUT: CGM RECORD > 2880, MEDAL RECORD > 0

HEALTH: TIR-C3

DIABETES TYPE	SAMPLE SIZE	LABEL DESCRIPTION	MODEL	ACCURACY	AUC	RECALL	PREC.	F1
PROFILE+CGM+MEDAL	209	{1: 84, 2: 41, 3: 84}	RANDOM FOREST CLASSIFIER	51.59%	63.79%	51.59%	50.60%	48.87%
PROFILE+CGM	209	{1: 84, 2: 41, 3: 84}	DECISION TREE CLASSIFIER	47.58%	58.93%	47.58%	49.94%	47.10%

HEALTH: TIR-C2

DIABETES TYPE	SAMPLE SIZE	LABEL DESCRIPTION	MODEL	ACCURACY	AUC	RECALL	PREC.	F1
PROFILE+CGM+MEDAL	209	{0: 105, 1: 104}	LOGISTIC REGRESSION	62.95%	65.56%	60.67%	62.61%	58.31%
PROFILE+CGM	209	{0: 105, 1: 104}	GRADIENT BOOSTING CLASSIFIER	62.21%	60.28%	53.67%	62.89%	59.09%

FIG. 9C

INPUT PERIODS: [1, 2, 3]; OUTPUT PERIODS: [7, 8, 9]
INPUT: CGM RECORD > 2880, MEDAL RECORD > 5
OUTPUT: CGM RECORD > 2880, MEDAL RECORD > 0

HEALTH: TIR-C3

DIABETES TYPE	SAMPLE SIZE	LABEL DESCRIPTION	MODEL	ACCURACY	AUC	RECALL	PREC.	F1
PROFILE+CGM+MEDAL	75	{1: 30, 2: 15, 3: 30}	GRADIENT BOOSTING CLASSIFIER	68.50%	50.50%	68.50%	63.29%	63.33%
PROFILE+CGM	75	{1: 30, 2: 15, 3: 30}	K NEIGHBORS CLASSIFIER	46.50%	36.87%	46.50%	34.52%	36.79%

FOCUS ON THE PATIENTS HAVE BOTH CGM
AND MEDAL IN INPUT PERIODS.

HEALTH: TIR-C2

DIABETES TYPE	SAMPLE SIZE	LABEL DESCRIPTION	MODEL	ACCURACY	AUC	RECALL	PREC.	F1
PROFILE+CGM+MEDAL	75	{0: 39, 1: 36}	DECISION TREE CLASSIFIER	65.50%	64.17%	50.00%	53.33%	49.33%
PROFILE+CGM	75	{0: 39, 1: 36}	DECISION TREE CLASSIFIER	61.00%	62.50%	65.00%	60.00%	57.00%

FIG. 9D

INPUT PERIODS: [1, 2, 3]; OUTPUT PERIODS: [7, 8, 9]
INPUT: CGM RECORD > 0, MEDAL RECORD > 5
OUTPUT: CGM RECORD > 0, MEDAL RECORD > 0

940 ENGAGEMENT OF CGM: C2

DIABETES TYPE	SAMPLE SIZE	LABEL DESCRIPTION	MODEL	ACCURACY	AUC	RECALL	PREC.	F1
PROFILE+CGM+MEDAL	169	{0: 56, 1: 113}	EXTREME GRADIENT BOOSTING	78.78%	80.18%	95.24%	79.19%	85.91%
PROFILE+CGM	169	{0: 56, 1: 113}	EXTRA TREES CLASSIFIER	77.78%	74.72%	89.29%	82.20%	84.18%

942 ENGAGEMENT OF mHEALTH APPLICATION: C2

DIABETES TYPE	SAMPLE SIZE	LABEL DESCRIPTION	MODEL	ACCURACY	AUC	RECALL	PREC.	F1
PROFILE+CGM+MEDAL	169	{0: 64, 1: 105}	RANDOM FOREST CLASSIFIER	69.11%	75.71%	85.00%	73.04%	77.52%
PROFILE+CGM	169	{0: 64, 1: 105}	LINEAR DISCRIMINANT ANALYSIS	67.89%	67.39%	72.67%	77.71%	73.63%

FIG. 9E

TIR DELTA - C3

QUESTION VARIANTS	DATA (COHORT NUMBER, TRAIN/TEST, FEATURES)	BEST MODEL	ACCURACY	AUC	PRECISE	RECALL	F1
Q1: BASELINE	227	RANDOM FOREST CLASSIFIER	0.5696	0.6873	0.5587	0.5204	0.5373
Q2: T2D	102	RANDOM FOREST CLASSIFIER	0.4625	0.6795	0.4879	0.4667	0.4426
Q3: T1D	125	RANDOM FOREST CLASSIFIER	0.5153	0.6412	0.3941	0.3256	0.4395
Q4: NO MEDAL	227	RANDOM FOREST CLASSIFIER	0.4871	0.6624	0.4767	0.4451	0.4654

FIG. 9F

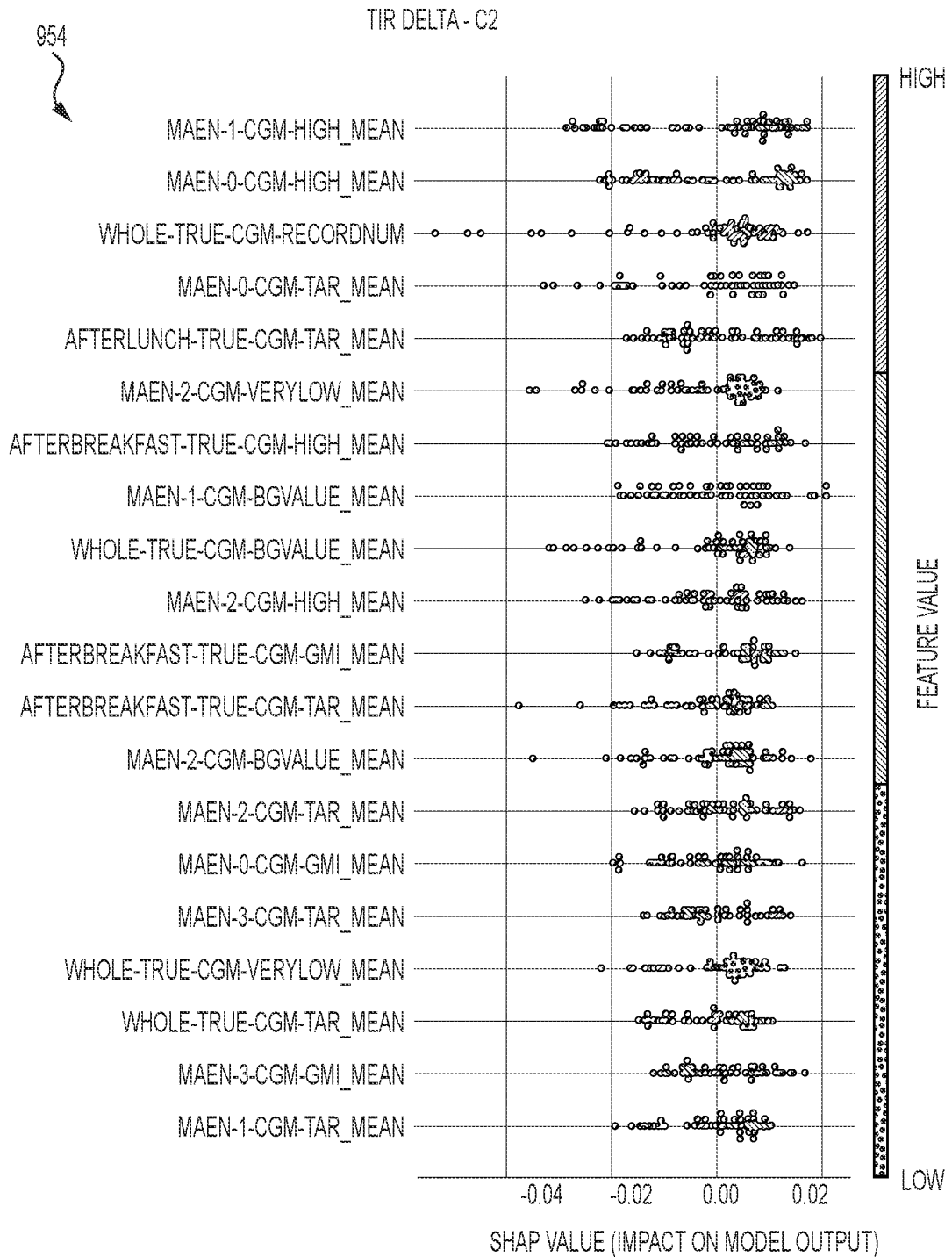
950

952

TIR DELTA - C2

QUESTION VARIANTS	DATA (COHORT NUMBER)	BEST MODEL	ACCURACY	AUC	PRECISE	RECALL	F1
Q1: BASELINE	227	LIGHT GRADIENT BOOSTING MACHINE	0.6892	0.7229	0.6554	0.6554	0.6607
Q2: T2D	102	QUADRATIC DISCRIMINANT ANALYSIS	0.6071	0.6125	0.5750	0.6250	0.5783
Q3: T1D	125	NAIVE BAYES	0.5292	0.5919	0.5444	0.6550	0.5647
Q4: NO MEDAL	227	LIGHT GRADIENT BOOSTING MACHINE	0.6579	0.7139	0.6306	0.6286	0.6255

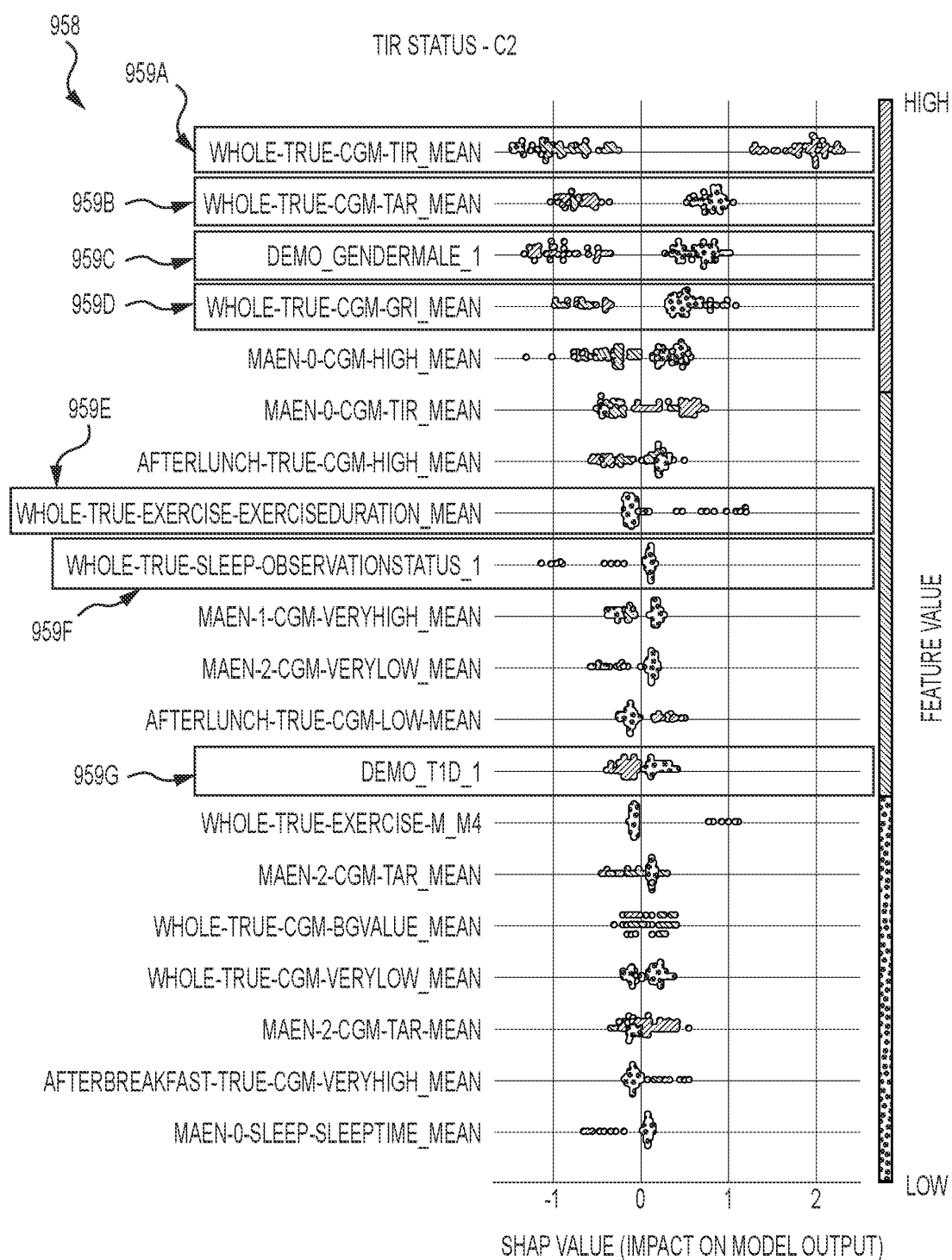
FIG. 9G

**FIG. 9H**

TIR STATUS - C2

QUESTION VARIANTS	DATA (COHORT NUMBER, TRAIN/TEST, FEATURES)	BEST MODEL	ACCURACY	AUC	PRECISE	RECALL	F1
Q1: BASELINE	304	LIGHT GRADIENT BOOSTING MACHINE	0.7970	0.8813	0.8248	0.7500	0.7812
Q2: T2D	140	RANDOM FOREST CLASSIFIER	0.7956	0.8740	0.8198	0.7700	0.7833
Q3: T1D	125	EXTRA TREES CLASSIFIER	0.8403	0.9050	0.8539	0.8850	0.8504
Q4: NO MEDAL	304	LIGHT GRADIENT BOOSTING MACHINE	0.8206	0.8799	0.8528	0.7700	0.8035

FIG. 9I

**FIG. 9J**

960

GRI DELTA - C2

QUESTION VARIANTS	DATA (COHORT NUMBER)	BEST MODEL	ACCURACY	AUC	PRECISE	RECALL	F1
Q1: BASELINE	227	EXTREME GRADIENT BOOSTING	0.6467	0.6993	0.6534	0.5911	0.6029
Q2: T2D	102	GRADIENT BOOSTING CLASSIFIER	0.5214	0.5625	0.4450	0.4917	0.4452
Q3: T1D	125	ADABOOST CLASSIFIER	0.5986	0.6588	0.5667	0.6000	0.5676
Q4: NO MEDAL	227	GRADIENT BOOSTING CLASSIFIER	0.6392	0.6945	0.6234	0.6036	0.6018

FIG. 9K

962

GRI DELTA - C3

QUESTION VARIANTS	DATA (SIZE, TRAIN/TEST)	BEST MODEL	ACCURACY	AUC	PRECISE	RECALL	F1
Q1: BASELINE	227	EXTRA TREES CLASSIFIER	0.5946	0.6411	0.4772	0.5946	0.5186
Q2: T2D	102	RANDOM FOREST CLASSIFIER	0.5025	0.6166	0.4597	0.5625	0.4941
Q3: T1D	125	EXTREME GRADIENT BOOSTING	0.6347	0.6175	0.5031	0.6347	0.5575
Q4: NO MEDAL	227	NAIVE BAYES	0.4046	0.6883	0.4046	0.6698	0.4145

FIG. 9L

GRI STAUTS - C2

QUESTION VARIANTS	DATA (COHORT NUMBER, TRAIN/TEST, FEATURES)	BEST MODEL	ACCURACY	AUC	PRECISE	RECALL	F1
Q1: BASELINE	304	GRADIENT BOOSTING CLASSIFIER	0.8853	0.9135	0.7355	0.7405	0.7287
Q2: T2D	140	EXTREME GRADIENT BOOSTING	0.8033	0.8932	0.7988	0.785	0.7728
Q3: T1D	125	LIGHT GRADIENT BOOSTING MACHINE	0.8864	0.9389	0.7917	0.7167	0.7157
Q4: NO MEDAL	304	EXTREME GRADIENT BOOSTING	0.8392	0.9210	0.7631	0.7381	0.7354

FIG. 9M

964

ENGAGEMENT OF mHEALTH APPLICATION - C2

QUESTION VARIANTS	DATA (SIZE, TRAIN/TEST)	BEST MODEL	ACCURACY	AUC	PRECISE	RECALL	F1
Q1: ALL	499	RANDOM FOREST CLASSIFIER	0.8710	0.8958	0.8167	0.7150	0.7440
Q2: T2D	226	RANDOM FOREST CLASSIFIER	0.8667	0.8944	0.8167	0.7150	0.7440
Q3: T1D	273	EXTRA TREES CLASSIFIER	0.9000	0.9358	0.8117	0.7500	0.7621
Q4: ONLY CGM AND DEMO INFO	499	RANDOM FOREST CLASSIFIER	0.7422	0.5510	0.3333	0.0708	0.1116

FIG. 9N

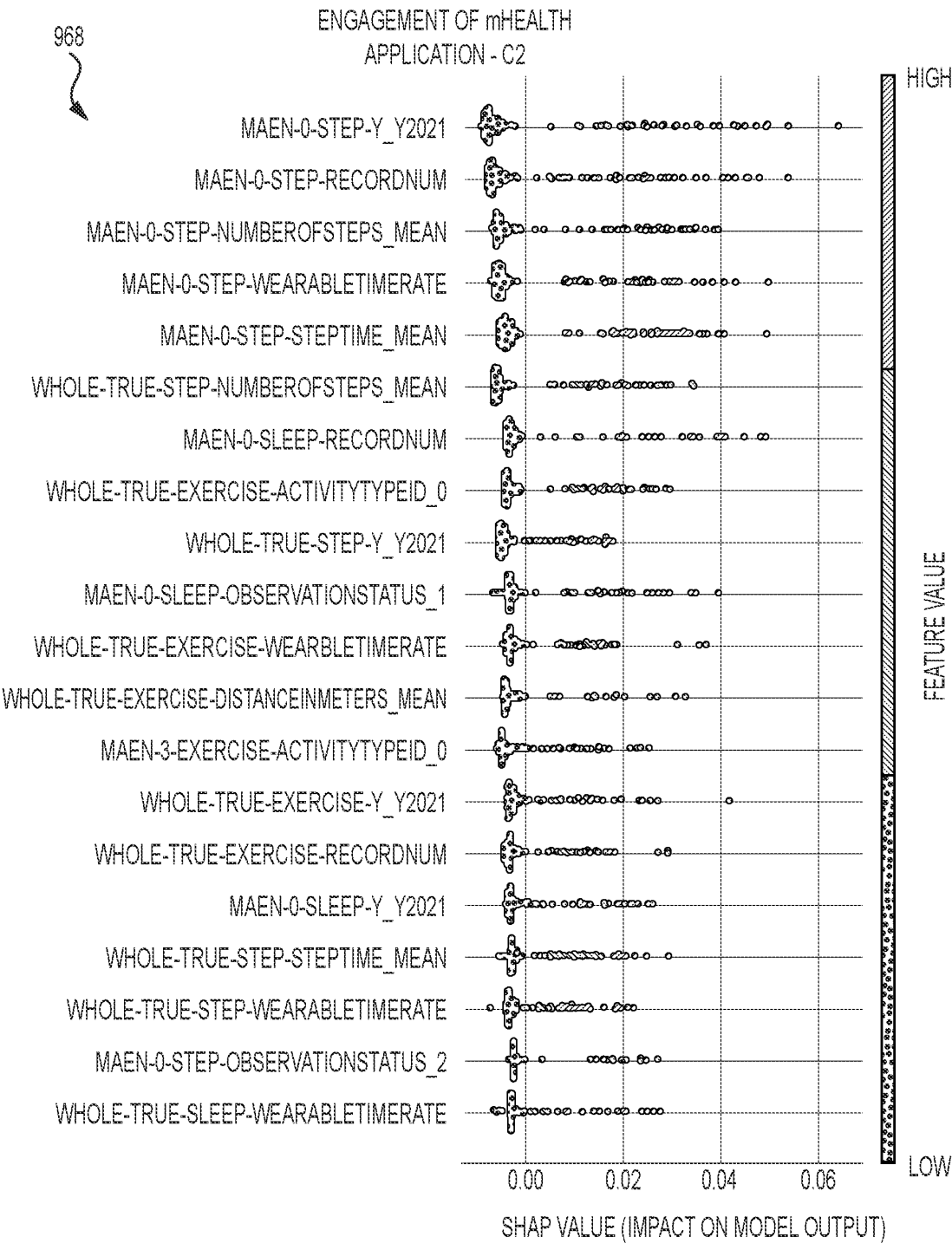


FIG. 90

970

MANUAL ENGAGEMENT OF mHEALTH APPLICATION - C2

QUESTION VARIANTS	DATA (SIZE, TRAIN/TEST)	BEST MODEL	ACCURACY	AUC	PRECISE	RECALL	F1
Q1: ALL	499	RANDOM FOREST CLASSIFIER	0.9313	0.8896	0.7250	0.4583	0.5317
Q2: T2D	226	EXTRA TREES CLASSIFIER	0.9179	0.8634	0.6667	0.5500	0.5767
Q3: T1D	273	RANDOM FOREST CLASSIFIER	0.9479	0.8917	0.2500	0.3000	0.2667
Q4: ONLY CGM AND DEMO INFO	499	RANDOM FOREST CLASSIFIER	0.8164	0.6639	0.1927	0.3333	0.2406

FIG. 9P

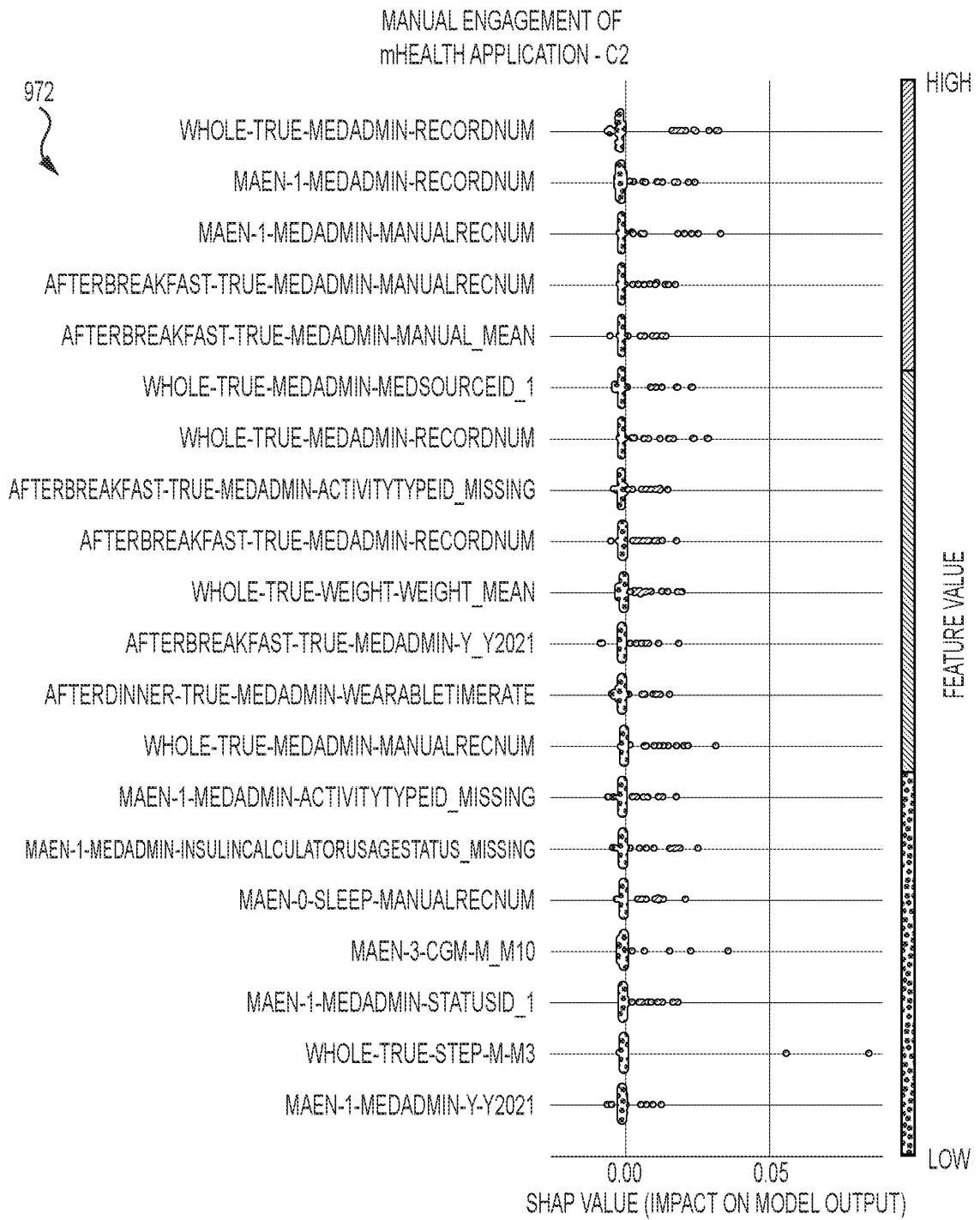
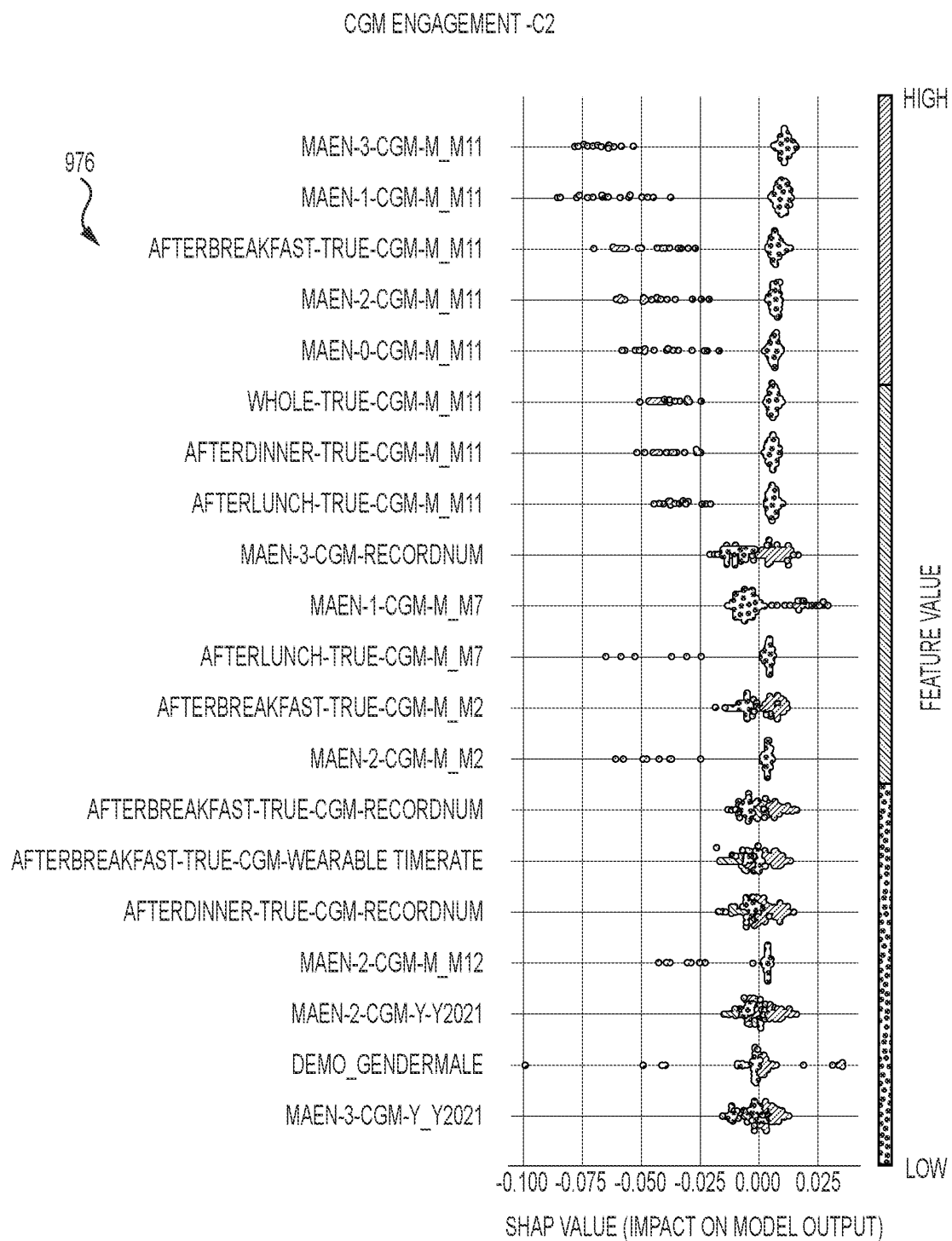


FIG. 9Q

CGM ENGAGEMENT - C2

QUESTION VARIANTS	DATA (SIZE)	BEST MODEL	ACCURACY	AUC	PRECISE	RECALL	F1
Q1: ALL	499	RANDOM FOREST CLASSIFIER	0.8224	0.8643	0.8169	0.9152	0.8622
Q2: T2D	226	EXTRA TREES CLASSIFIER	0.8542	0.8873	0.8486	0.9389	0.8897
Q3: T1D	273	RANDOM FOREST CLASSIFIER	0.8058	0.8118	0.8147	0.8795	0.8440
Q4: ONLY CGM AND DEMO INFO	499	EXTRA TREES CLASSIFIER	0.8282	0.8555	0.8260	0.9106	0.8650

FIG. 9R

**FIG. 9S**

CGM ENGAGEMENT BASED ON MEDAL DATA - C2

QUESTION VARIANTS	DATA (SIZE, TRAIN/TEST)	BEST MODEL	ACCURACY	AUC	PRECISE	RECALL	F1
Q1: ALL	(499, 306) (349, 306) (150, 306)	RANDOM FOREST CLASSIFIER	0.5845	0.5180	0.6212	0.8123	0.7028
Q2: T2D	(226, 314) (158, 314) (68, 314)	LIGHT GRADIENT BOOSTING MACHINE	0.5871	0.4807	0.6122	0.8944	0.7247
Q3: T1D	(273, 264) (191, 264) (82, 264)	LIGHT GRADIENT BOOSTING MACHINE	0.6432	0.5807	0.6884	0.7280	0.7006

FIG. 9T

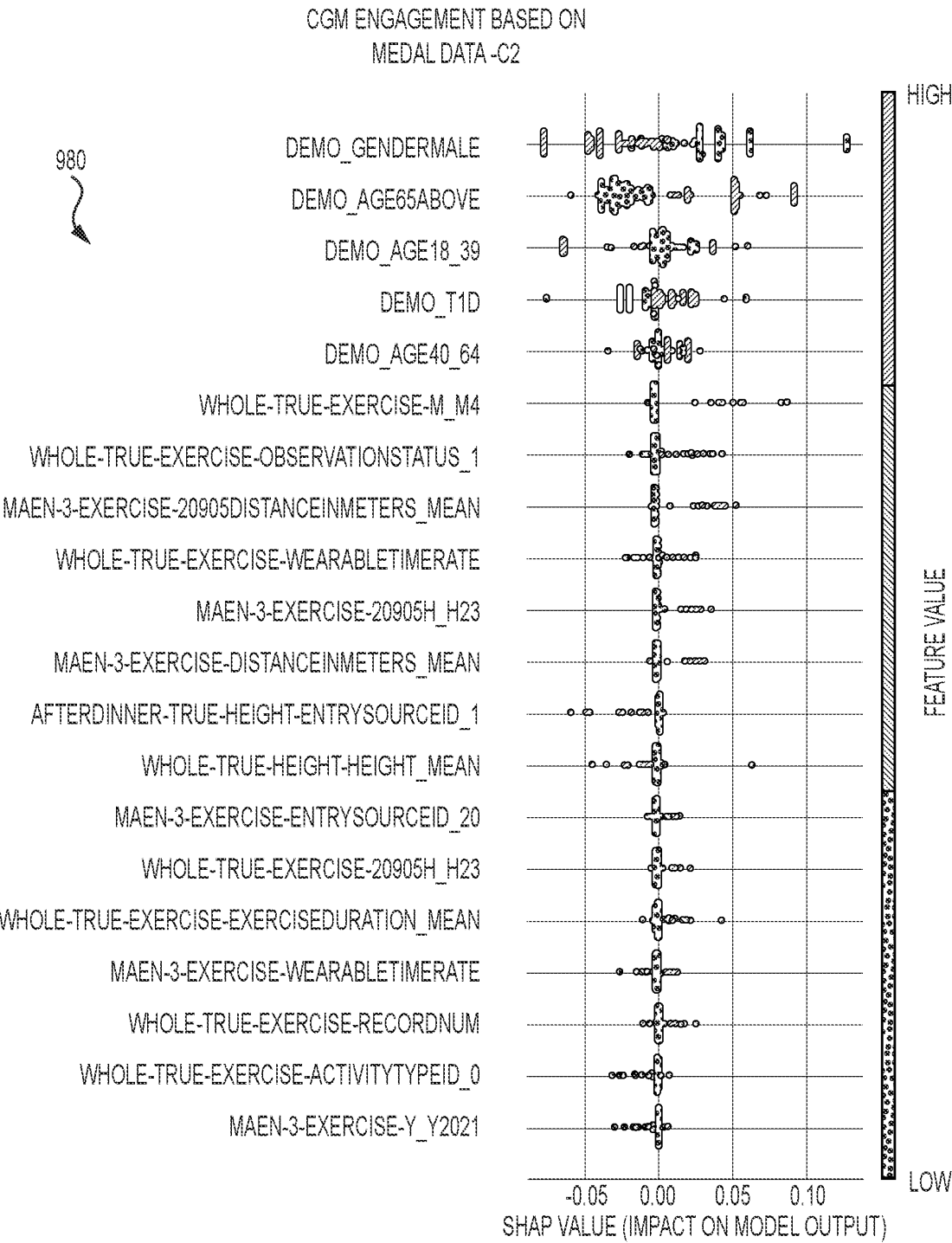
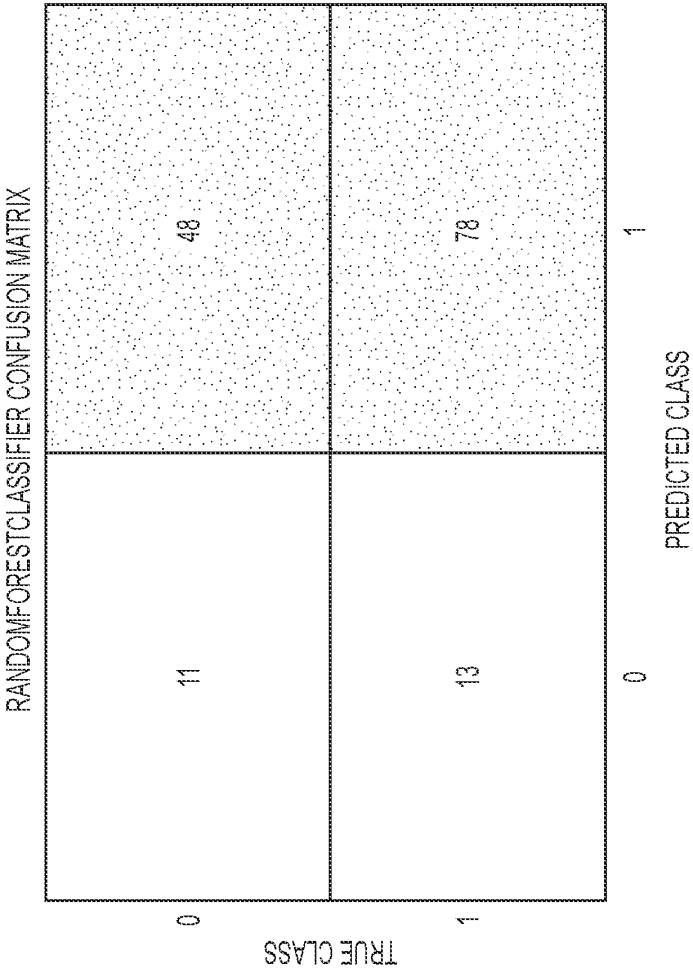


FIG. 9U



982

FIG. 9V

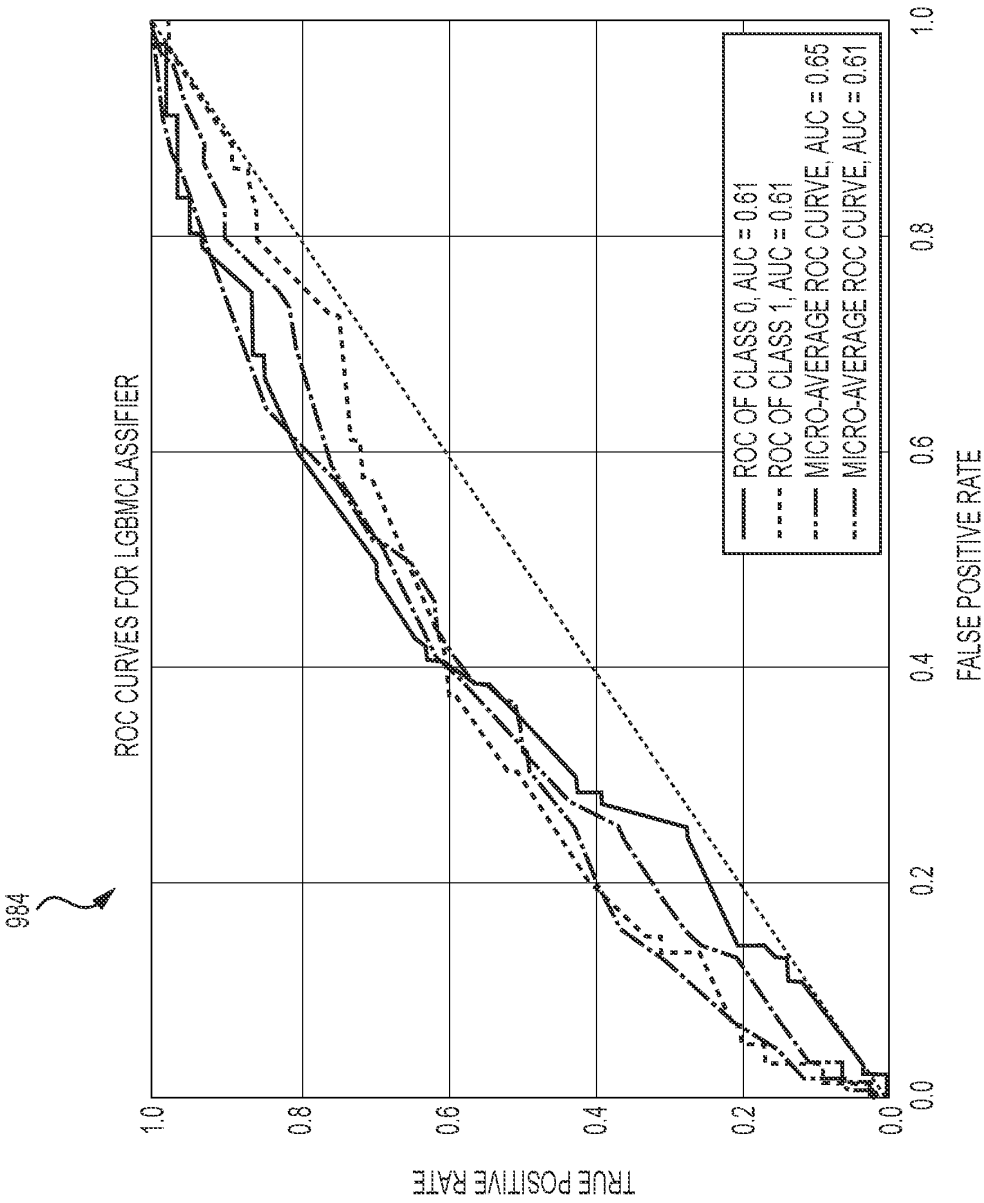


FIG. 9W

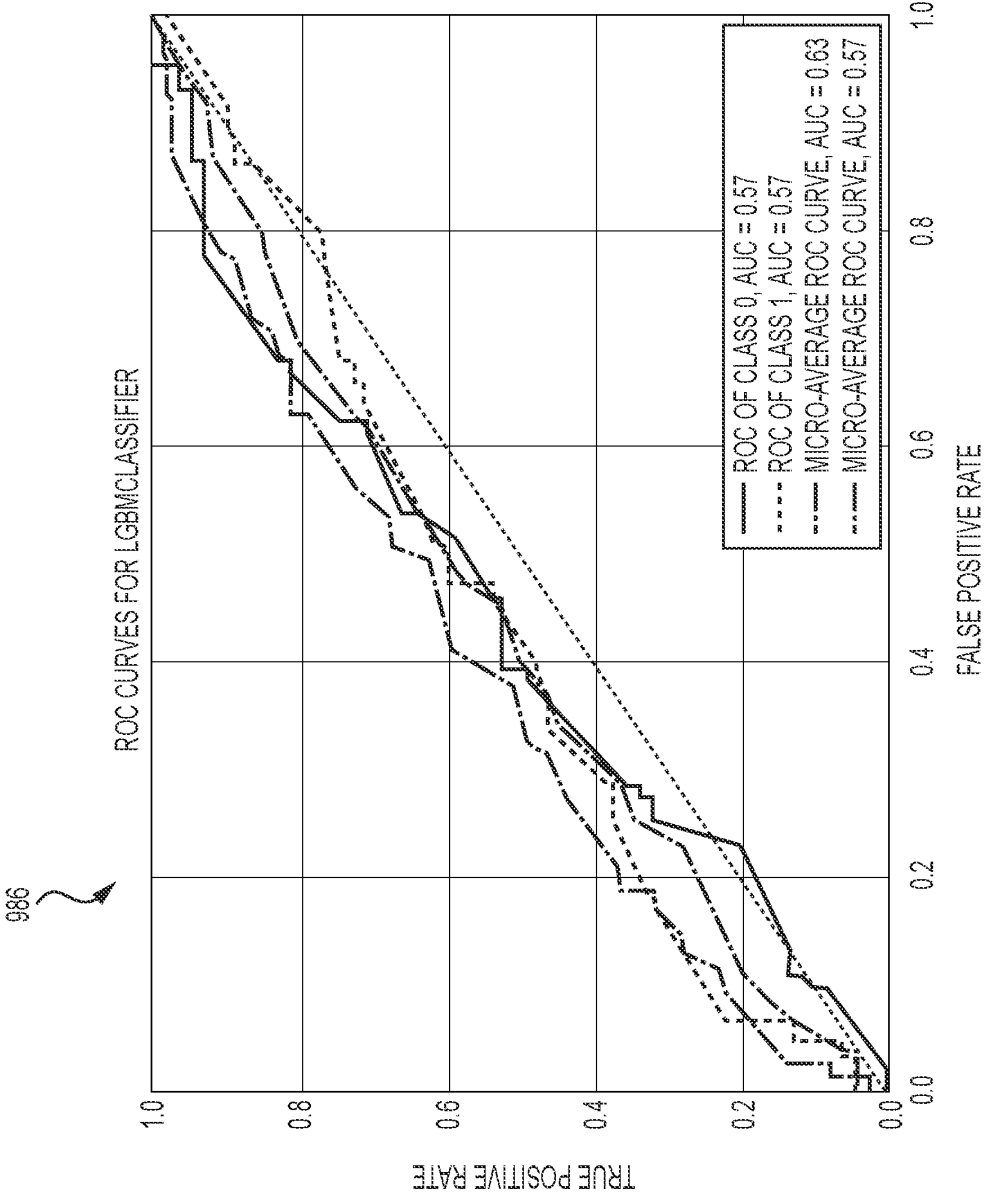


FIG. 9X

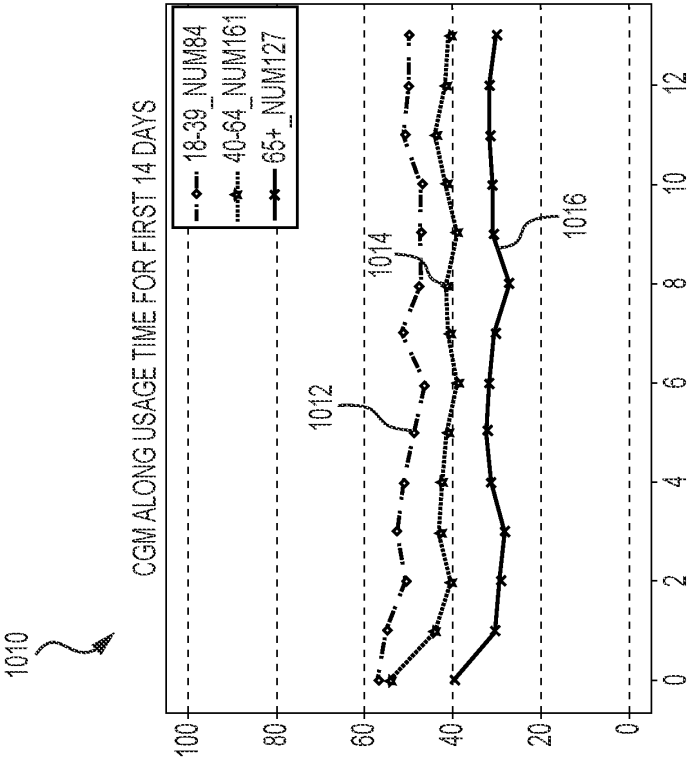


FIG. 10B

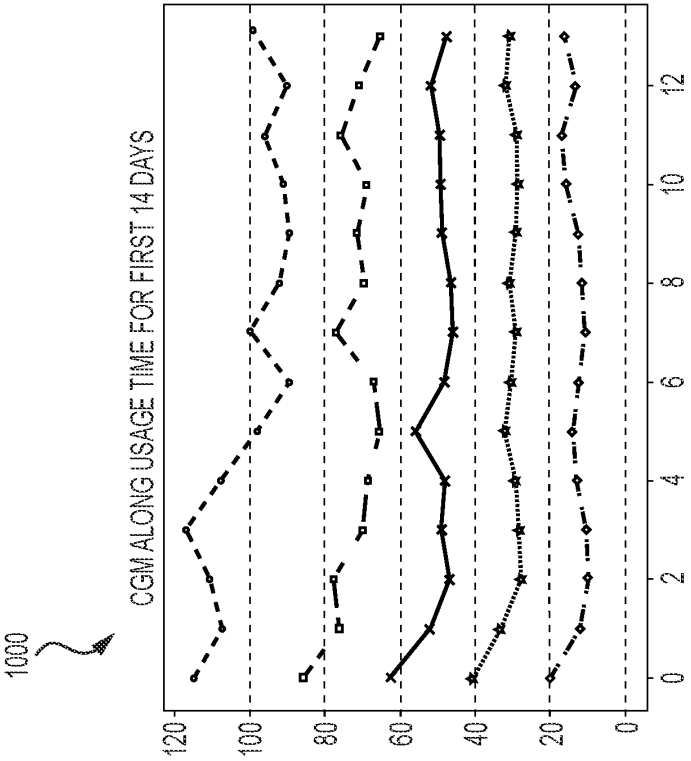


FIG. 10A

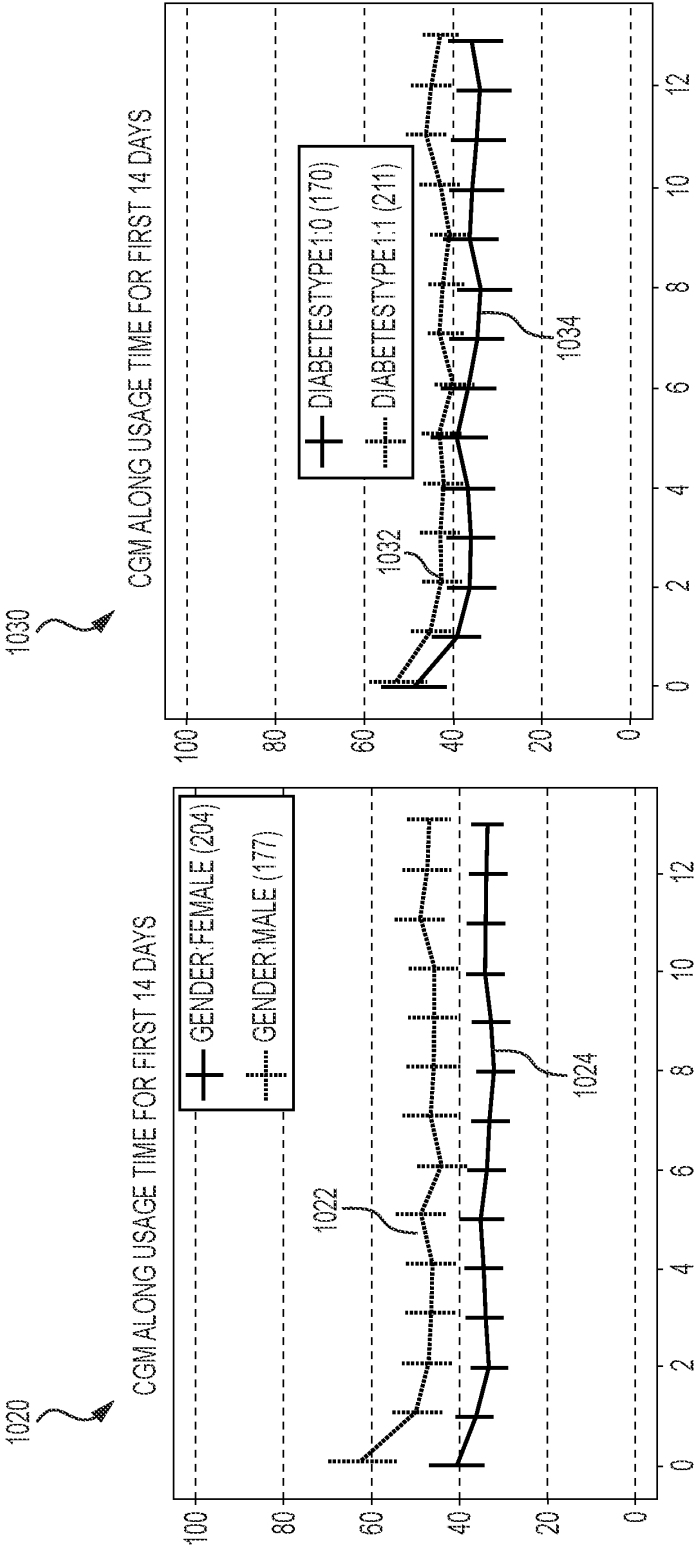


FIG. 10D

FIG. 10C

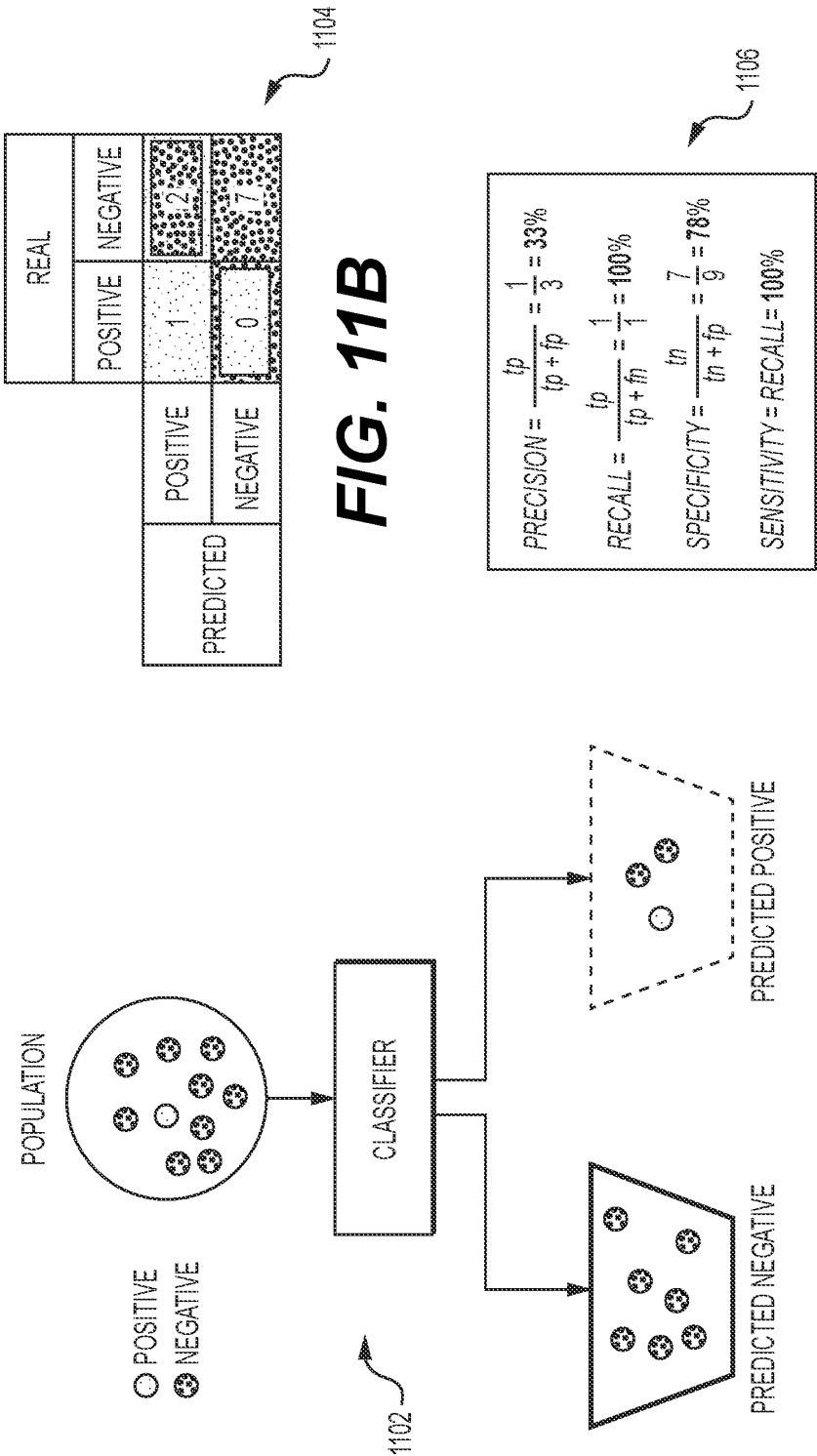


FIG. 11A

FIG. 11C

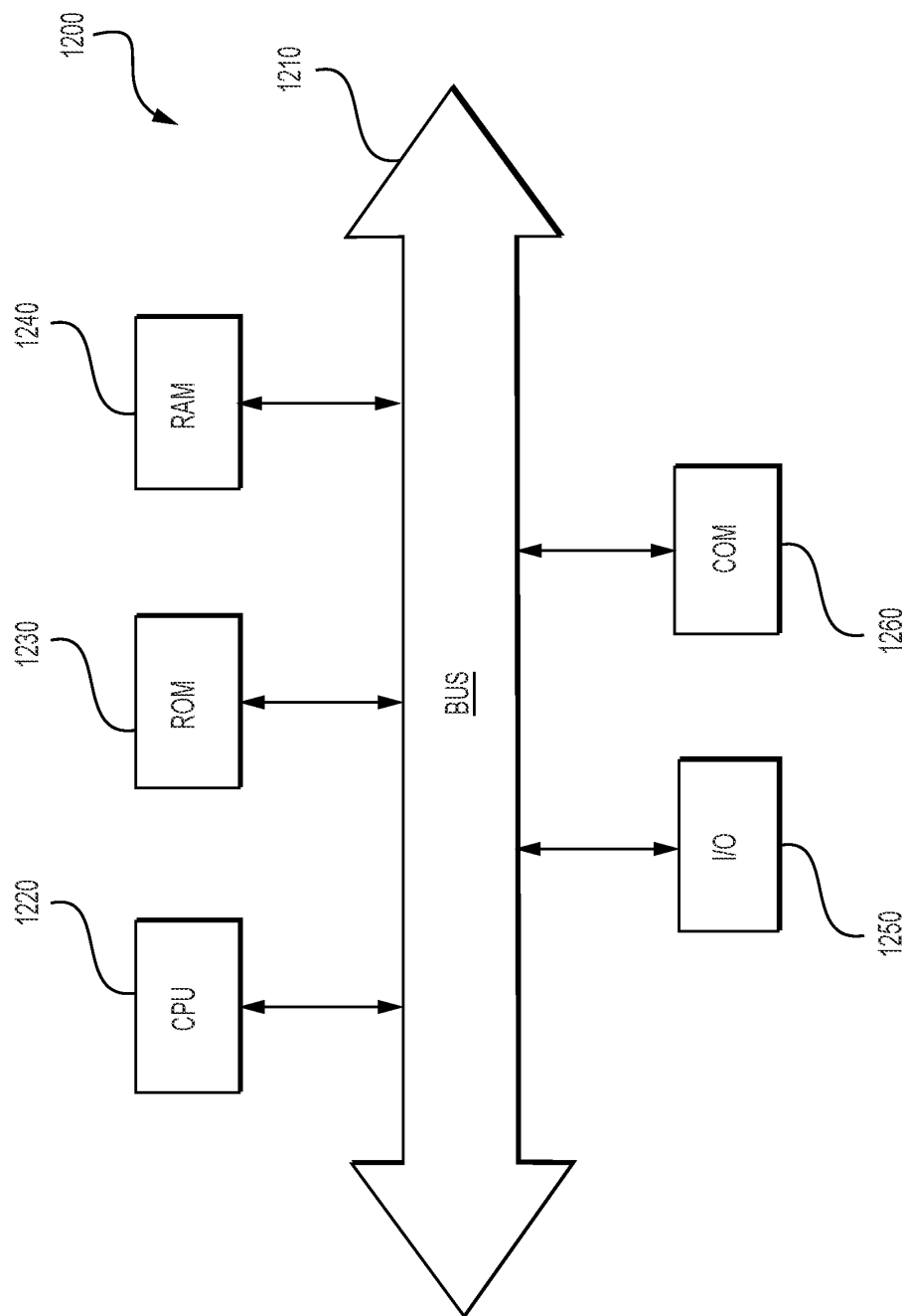


FIG. 12