AI in HealthCare

Operational Use Cases

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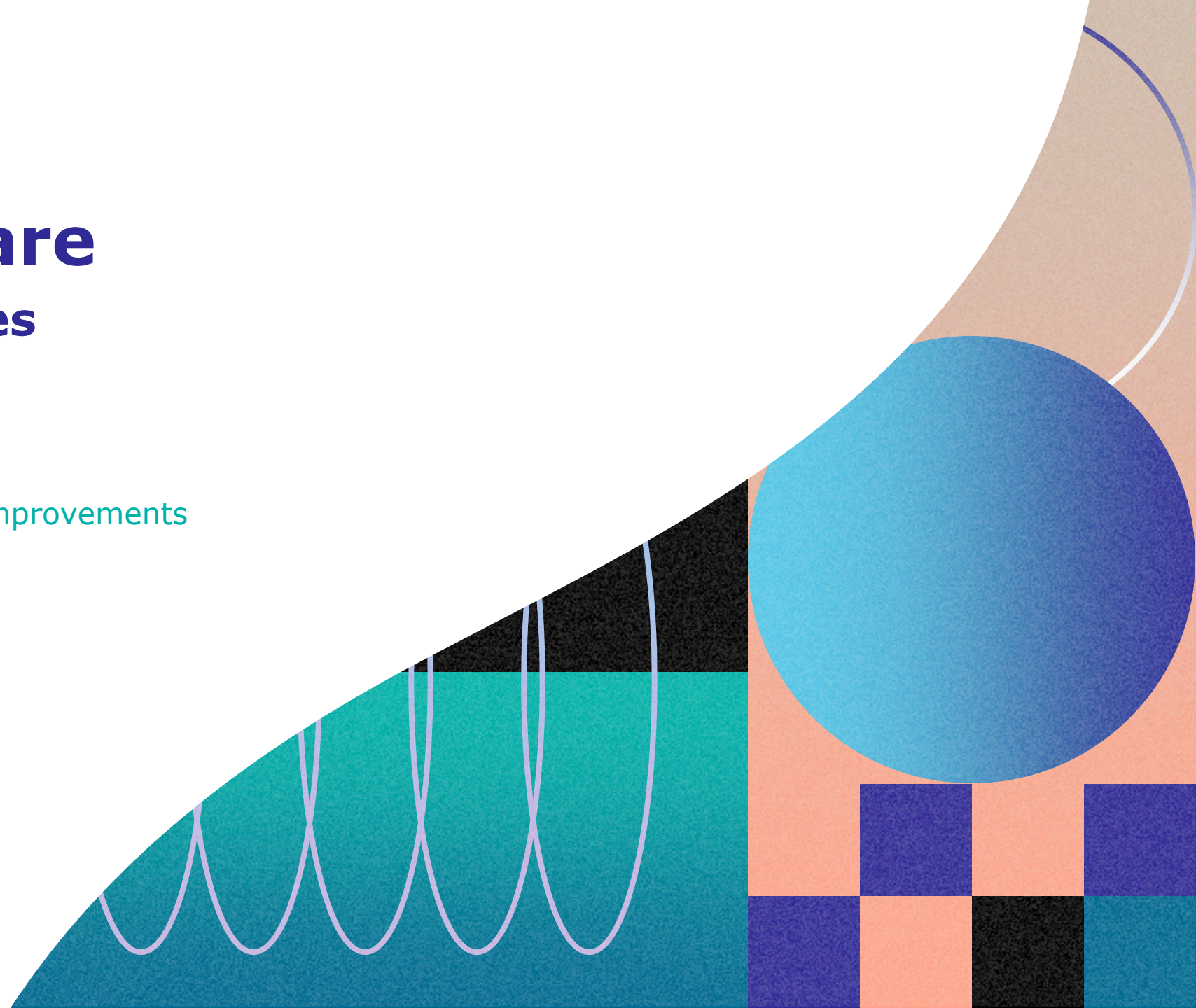


InterSystems®
Creative data technology

A Blend of Care and Innovation at the Clinic

Mr. Thompson

Dr. Brew

Digital Barista

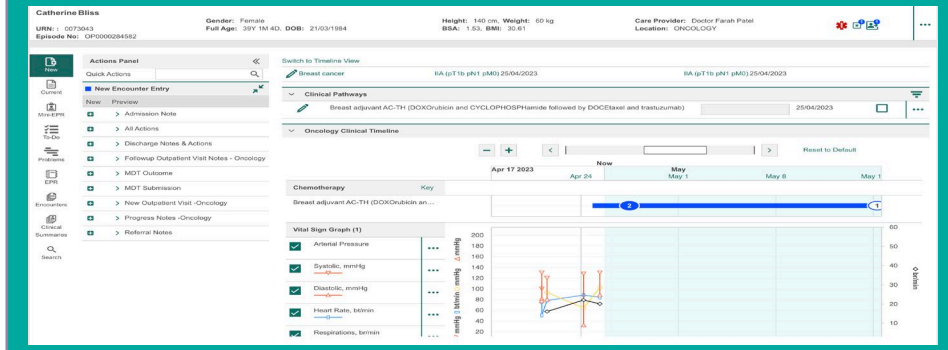
Tabular vs Generative AI

Tabular	Generative
• Structured Data • Clinical data analysis • Predictive modeling • Decision support systems • Highly interpretable • Well-suited for rule-based systems • Requires relatively smaller amounts of data • Easier to anonymize • Well-suited for scaling	• Unstructured Data • Medical image analysis • Natural language processing • Drug discovery, genomics • Less interpretable • Capable of generating new insights and recommendations • Typically requires a large amount of data • May pose challenges in protecting patient privacy • May require significant computational resources

Tabular AI: Solution Design

TrakCare / HealthShare

Data Sources

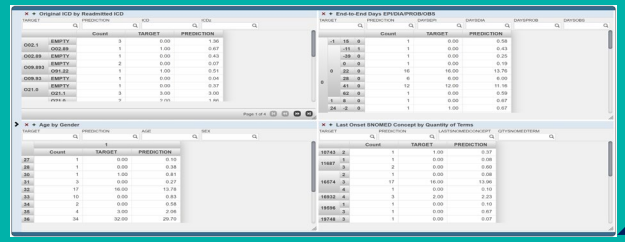


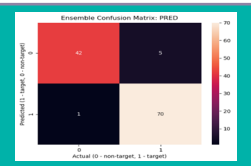
ID	EPISODE	ICD	ICD2	PATIENT	PREDICTION
2355	332358	O01.1	O	17368	.1589245025
2356	332357	O03.30	O	36227	.7598029655
2357	332355	O01.0	O	69945	.687845037
2358	332356	O02.1	O	72892	.3542701191
2359	332354	O00.8	O	123816	.6549654726

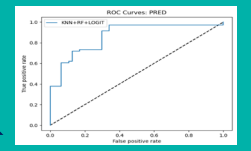
MODEL PROBABILITY

IRIS Analytics

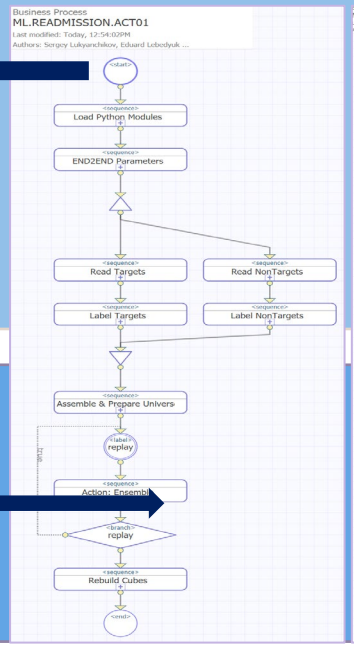
ACCURACY MONITORING

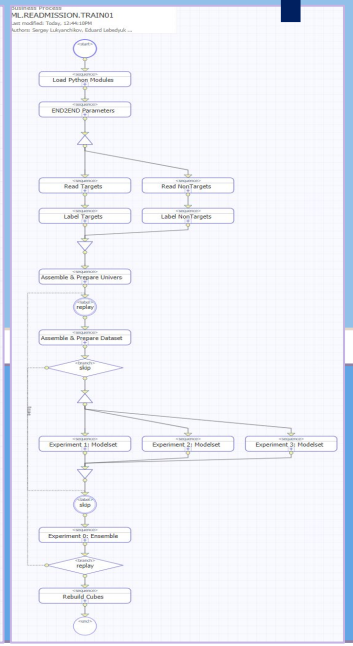






IRIS Interoperability





Python

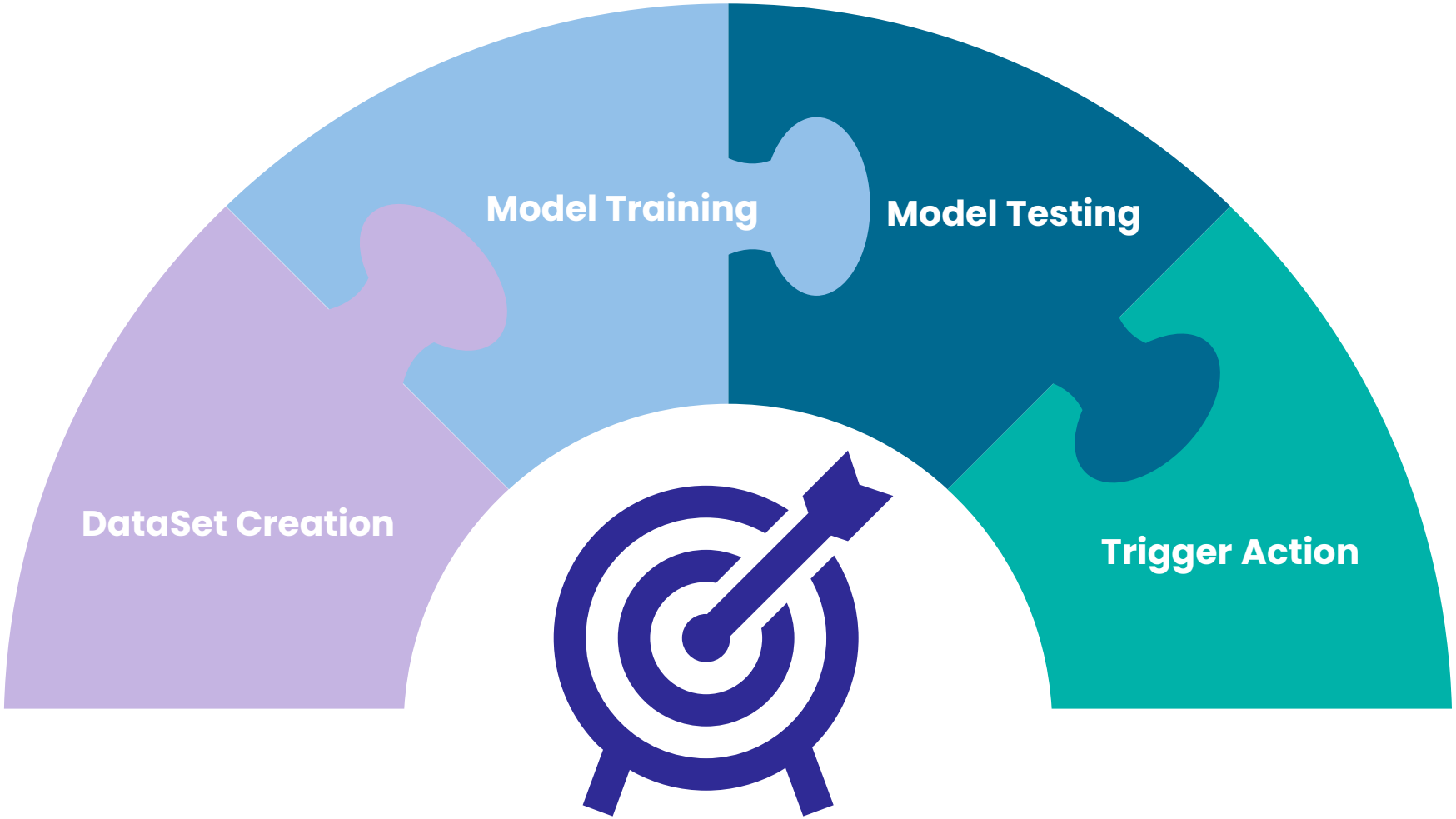
IRIS DBMS

ML PIPELINES

RAW EPISODES

PAADM_RowID	PAADM_ADMNo	PAADM_PAPMI_DR	PAADM_PatType_DR	PAADM_DepCode_DR	PAADM_AdmCateg_DR	PAADM_AdmDate	PAADM_AdmTime	PAADM_Type
2607	IP0000000001	4		1396	7	2018-08-28	16:00:00	I
2632	IP0000000002	1776		1398	7	2018-08-29	12:00:00	I
2635	IP0000000003	1776		1398	7	2018-08-29	12:00:00	I
2638	IP0000000004	4		1398	7	2018-08-29	10:00:00	I
3625	IP0000000005	1818		1413	7	2018-09-03	13:56:00	I
3626	IP0000000006	1605		1413	7	2018-09-03	14:33:00	I
3631	IP0000000007	1535		1413	7	2018-09-03	14:10:00	I
3794	IP0000000008	1706		670	7	2018-09-04	11:51:17	I
7444	IP0000000009	4917		1398	7	2018-09-22	07:07:00	I
7447	IP0000000010	4919		1398	10	2018-09-22	07:40:00	I
7454	IP0000000011	4926		1398	10	2018-09-22	08:09:00	I
7467	IP0000000012	4937		1398	10	2018-09-22	08:28:00	I
7476	IP0000000013	4940		1398	10	2018-09-22	08:43:00	I
7482	IP0000000014	4941		1398	7	2018-09-22	08:48:25	I
7484	IP0000000015	4952		1398	10	2018-09-22	08:51:00	I

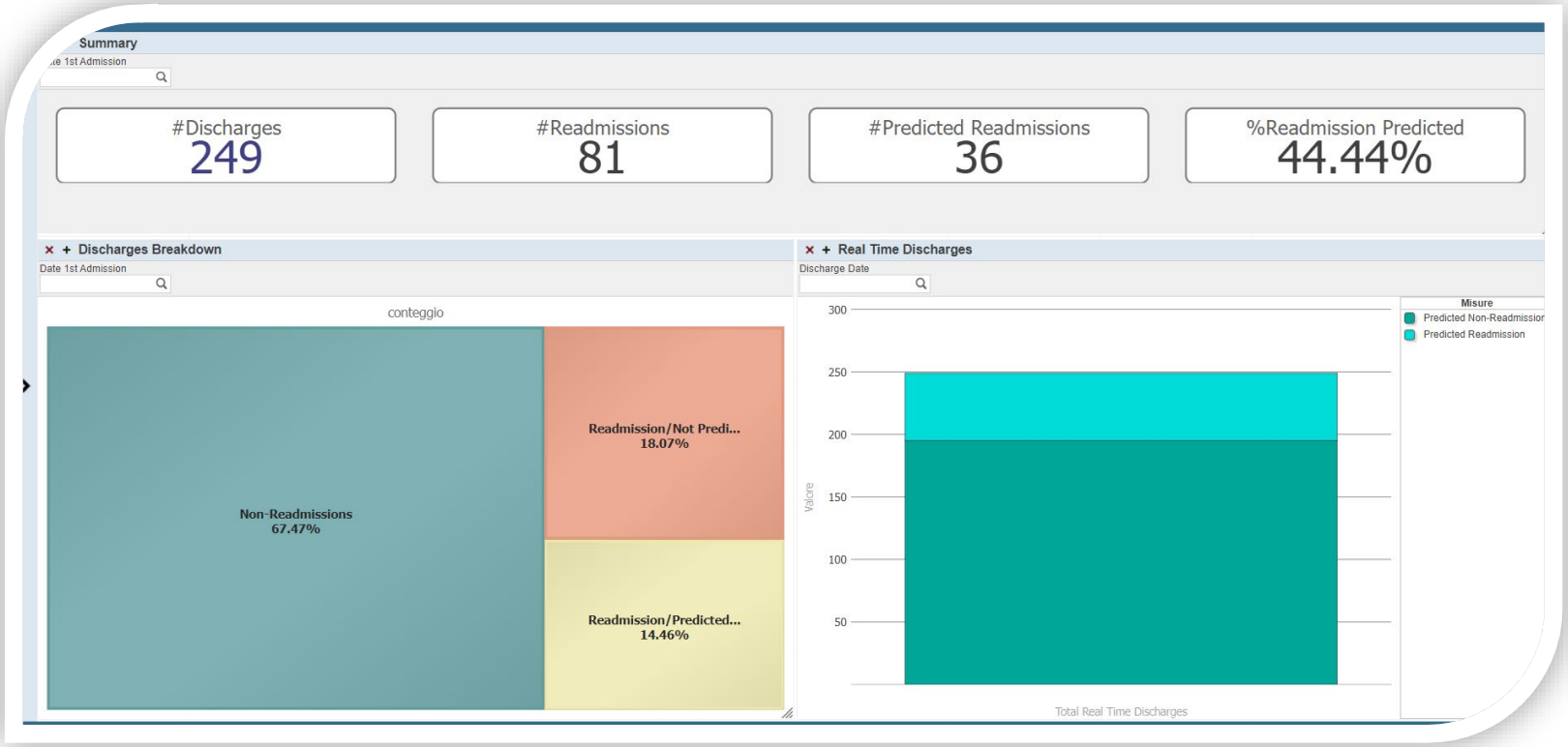
4 Step Approach



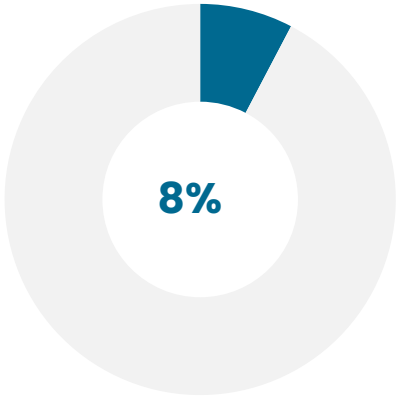
ML Use Case: Reducing Rate of Readmissions

Problem description: Identify the probability that patients will be readmitted to the hospital with a diagnosis linked to the original admission.

Objective: Reduce the readmission rate to improve patient outcome and reduce costs/loss of revenue.



True Reduction in Readmission



Clinically validated for data from 2021 against the predicted episodes

Financial Impact

5000

5000 IP Episodes / Year

400 IP Readmissions can be avoided

25000 AED

Average Cost per IP Episode 25000 AED

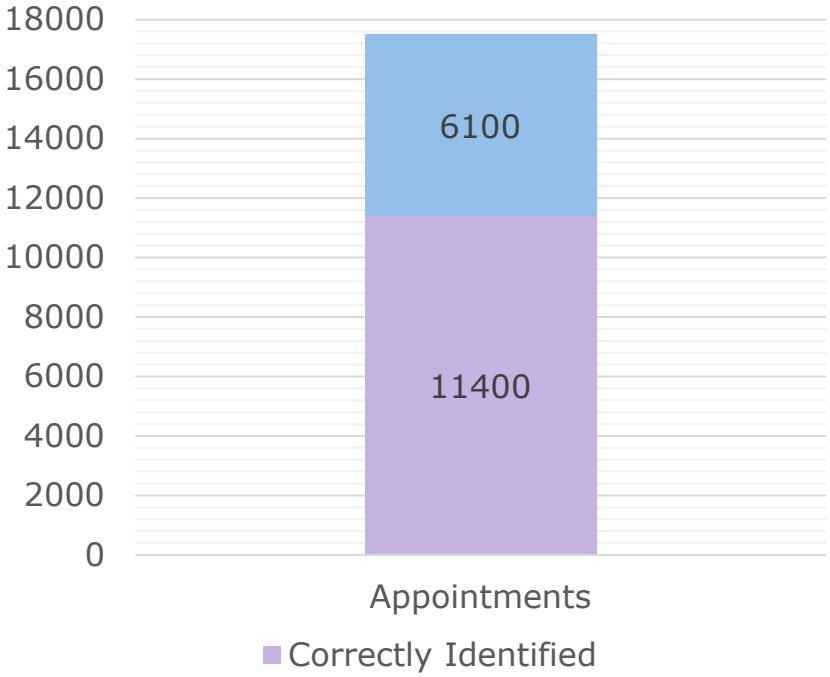
50% can be deducted by Payor if readmission within 30 days

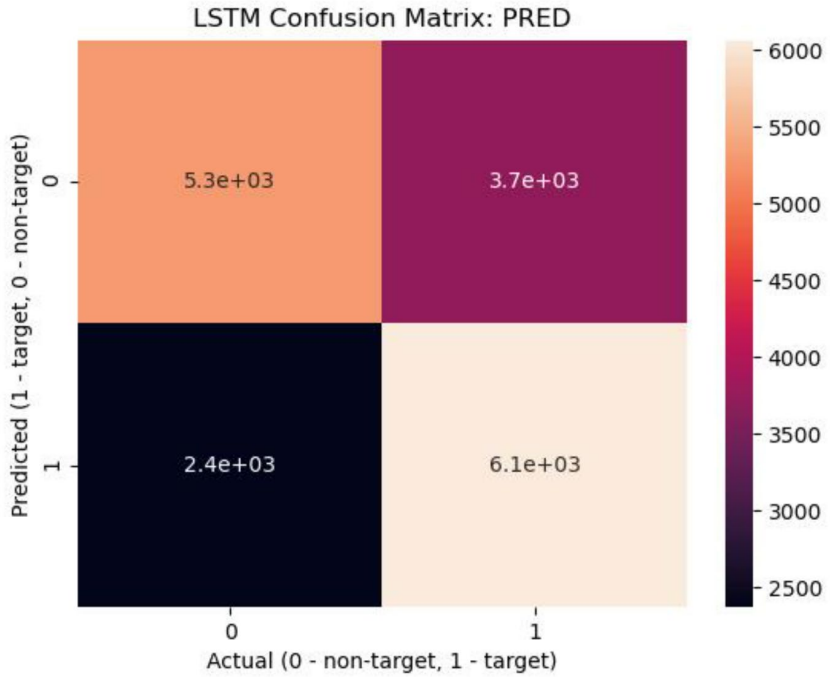
5 Million AED

Potential Loss every year for a single facility

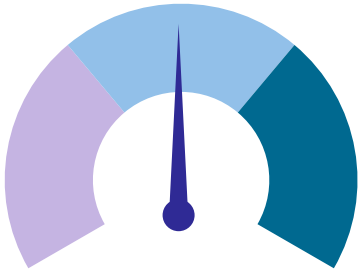
Clinic No Show Reductions

- **Objective:** To increase the quality of care and reduce waste of time, clinical resources and revenue.
- **Implementation:** Predicting the possibility of "no-show" when booking a new case to allow better management of resource time.

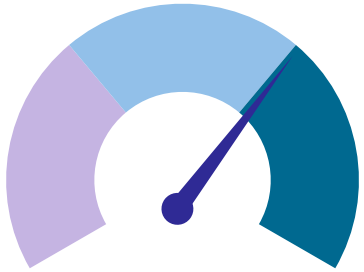




No Show Prediction

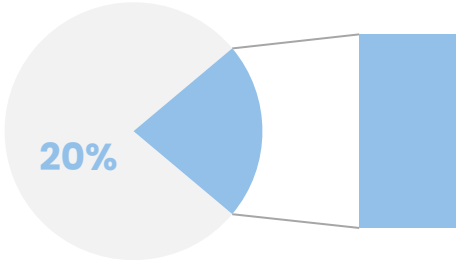


Current
50% (500/ Day)



ML Logic
65% (650 / day)

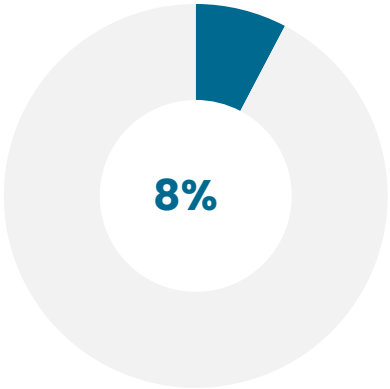
Reduction in No Show



Call center will call 150 patients

Estimated 30/150 patients showing up

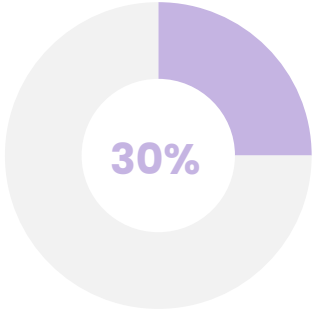
Overall Resource Utilization Improvement



Additional 80 appointments per day utilized

25 Man Hours / day saved

New Bookings



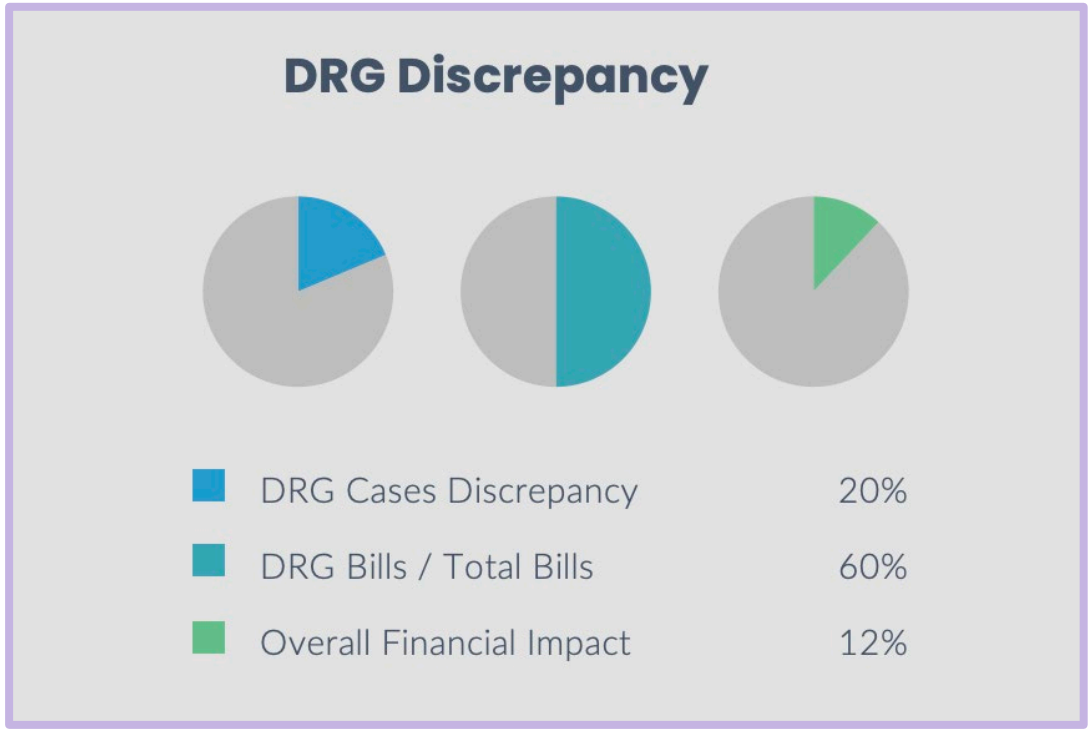
50 new appointments Added

1/3 of the potential improved predictions

Impact

DRG Discrepancy

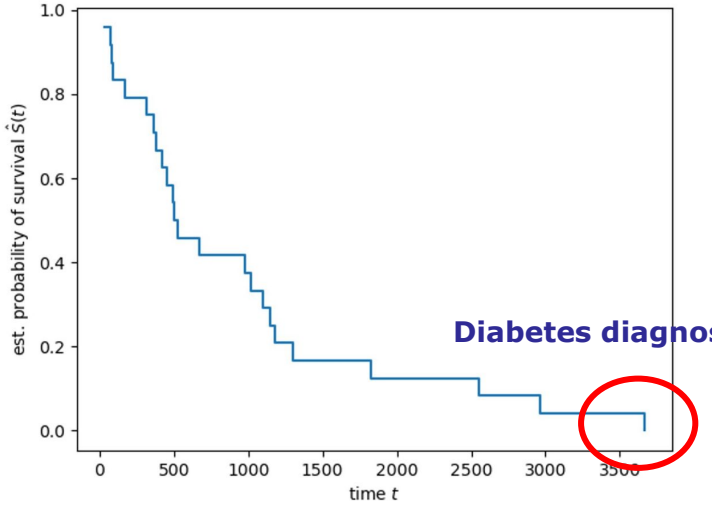
Hospitals and payors use DRG codes to quantify a fixed pay per service. These codes depend on Diagnosis, Procedure and Length of stay. In many cases some diagnosis and procedure coding is missed as well as an underestimate of the level of care given. The AI logic allows the coders before submitting a claim to identify such cases be able to review and adjust the DRG code if needed thus avoid potential revenue loss.



Diabetes Prediction

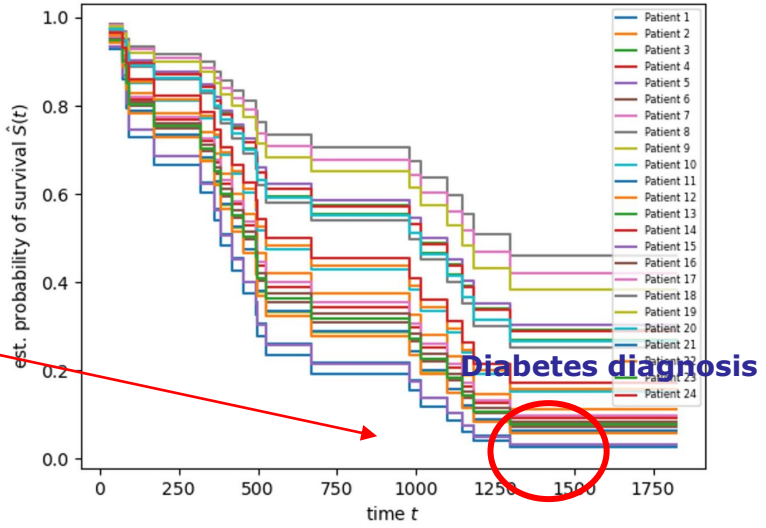
- **Objective:** Identify the probability that patients will develop a diabetes diagnosis in a specific time interval (survival time).
- **Implementation:** Survival Analysis -> analyzing the expected duration of time until the diabetes diagnosis occurs. Survival analysis involves the modelling of time-to-event data.
- **Solution**: an indication through an alert of when the patient will likely develop a diabetes diagnosis.

Survival Analysis by entire population



Diabetes diagnosis when the curve reaches 0 on y-axis.

Survival Analysis by single patient



Tabular AI Use cases

	Use-case	Description
Clinical	***Antibiotic Resistance***	Analyze the risk of developing antibiotic resistance based on the choice of antibiotics and the patient's history
	Chronic Disease Package Eligibility (Diabetes)	Identify the probability that patients will develop a diabetes diagnosis in a specific time interval (survival time) and be elligible to enroll in preventative care program
	Diabetes Risk Prediction	Identify the probablity of a diabetic patient to have an increased Risk score
	MI Prediction	Identify the probability that patients will develop a myocardial Infarction in a specific time interval (survival time)
	Osteoporosis Predication	Identify the probability that patients will develop a Osteoporosis in a specific time interval (survival time)
	COPD Exacerbation	Identify the probability that COPD patients will develop a COPD Exacerbation in a specific time interval (survival time)
	Asthma Attack Predication	Identify the probability that Asthmatic patients will develop a Asthma Exacerbation in a specific time interval (survival time)
	Chronic Disease Package Eligibility (Essential Hypertension)	Estimate the probability that a patient will develop a Essential Hypertension and thus be elligible for preventative care program enrolment
	Chronic Disease Package Eligibility (COPD)	Estimate the probability that a patient will develop a COPD and thus be elligible for preventative care program enrolment
	Chronic Disease Package Eligibility (Cardiac Myopathy)	Estimate the probability that a patient will develop a Cardiac Myopathy and thus be elligible for preventative care program enrolment
	Chronic Disease Package Eligibility (Hyperlipidemia)	Estimate the probability that a patient will develop a Hyperlipidemia and thus be elligible for preventative care program enrolment
	Early Microbiology pathogen detection	identify the high probability samples for positive microbiology cultures / antibiotic resistnce
	Early Sepsis Detection	Identify probablity of a patient to transition into septic shock and alert for early intervention
	Breast Cancer Prediction	Identify the probablity of a healthy patient to develop Breast Cancer

Tabular AI Use cases

	Use-case	Description
Admin	**Clinic No-Show Prediction**	Predicting the possibility of "no-show" when booking a new case to allow better management of resource time
	Prediction of Surgical Procedure Time	Predicting surgical procedure time at the time of booking new cases, based on procedure, care provider and patient data
	Prediction of Emergency Waiting Time	To predict the waiting time from admission until seen by doctor in the emergency room
	Predication of Lab Sample rejection	Predict the probablity of lab sample rejection at the time of collection
	Predict the resources needed	Identify the number of clinical staff needed for a particular location on a particular day
	Predict waiting list acceptance time	Identify time to action for a waiting list to help avoid agreed time breaches
	Predict OPD Pharmacy Waiting time	Identify the estimated waiting time in the OPD department for new prescriptions
	Inpatient Length of Stay Prediction	Prediction of medical inpatient length of stay. Length of stay (LOS) estimates are important for patients, doctors and hospital administrators.
RCM	**DRG Discrepancy**	Identification of the potential loss of revenue due to an incorrect DRG calculation
	Inpatient Readmission Prediction	Identify the probability that inpatients will be readmitted to the hospital within 30 days with a diagnosis linked to the original admission
	Predict Expensive stock utilisation	Identify the number of selected stock requirements within time frame to better manage stock at hand and avoid wasted Revenue
	Service approval / denial by insurance	Analyzing a pattern for approval rejection by insurance provider to predict probability of rejection ahead of time
	Claims Approvals/Denials	Analyzing a pattern for approval / denial of claims by insurance provider to predict probability of rejection ahead of time

Generative AI

- Mainly aiming to enhance user experience
- Aid in improved efficiency
- Allows eliminating redundancy
- It saves effort and time
- Clinical Documentation Improvement

Generative AI Use cases

	Use-case	Description
Generative AI	***Identify gaps in patient record***	Identify missing clinical / admin information in a medical record and suggest correct information
	Create claims report	Create medical justified claims report to support on the claim process and reduce rejection
	Generate handover lists and notes	Identify the correct pairing of cases to staff for faster handover along with Handover notes creation
	Create Operative reports	Use of video recording and structured data entry to create surgical reports
	Suggest evidence-based protocols	Identify suitable evidence based best practices and suggest to clinicians
	Utilise dictation tools to generate structured data	Identify text from dictation tool and convert into structed data like diagnosis, problems, medical history
	Enhance medication compliance	Monitor patient habits and data input to better predict medication compliance
	Identify best stock to utilize	Analyse stock at hand and identify the most suitable for utilisation based on price, insurance, user and clinical case
	Identify area of revenue growth	Analyse revenue data and identify potential services for increased growth and potential expansion
	Identify time for Hardware upgrade	Monitor hardware utilisation and identify the best time to upgrade
	Identify risk for security breach	Monitor system utilisation and early detect potential breaches
	Support Issue recording and identifying	Monitor system utilisation after upgrades and record steps followed at time of issue reporting

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AI in action

Live Demo

Thank you

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