



# User Guide

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# 1 Entrance

## 1.1 Insurix AI Platform

Insurix is empowering insurance companies with data-driven forecasts using machine learning technology and designed to forecast fraud detection, premiums, possible customer claims and repair cost.

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## 1.2 Key features

- ✚ Fraud Detection: Predict suspicious claims using anomaly detection algorithms to minimize financial losses.
- ✚ Dynamic Premiums: Calculate optimized premiums based on historical data and risk assessment.
- ✚ Customer Claims Forecasting: Provide a reliable estimation of likely claims based on trends and individual policy details.
- ✚ Cost Prediction: Forecast mending/repair costs to streamline resource allocation and planning.

## 1.4 Challenges faced in the insurance sector

- Increasing fraud cases.
- Difficulty in optimizing premium calculations
- Uncertainty in predicting customer claims and repair costs.

Insurix is a powerful product to these issues using advanced machine learning.

## 1.5 How it works

Data Input: Historical customer data, claim records, repair costs, fraud cases, etc.

Feature Extraction: Key features like demographics, claim history, payment patterns, and inspection records.

Model Training: Use ML.NET models to analyze patterns and predict outcomes;

- Fraud detection (classification models).
- Premium calculations (regression models).
- Claim predictions (time-series forecasting).
- Repair cost estimates (regression models).

## 1.6 Benefits

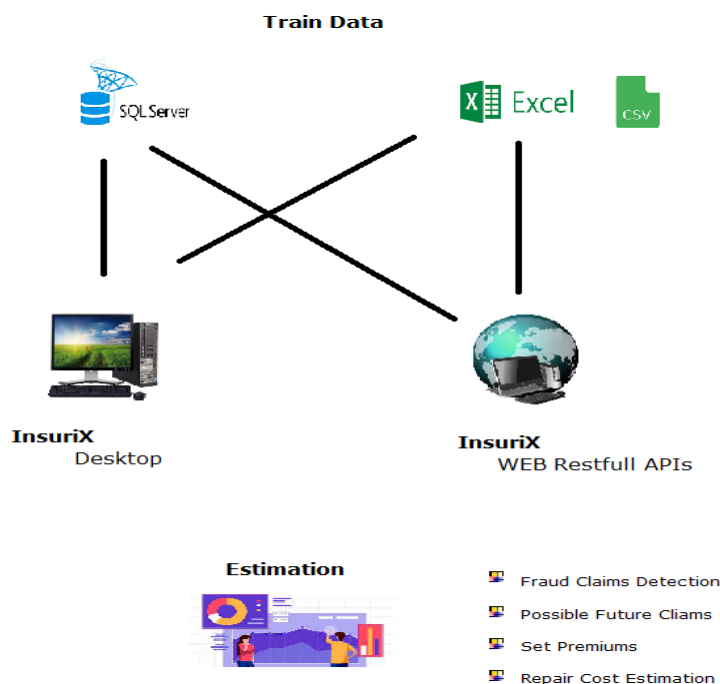
- Reducing financial losses due to fraud.
- Increasing profitability through data-driven premium optimization
- Enhancing customer satisfaction with accurate claim forecasting.
- Streamlining operations with mending cost predictions.
- Increased customer acquisition by 15%.
- Reduced unplanned payouts by 20%.
- Improved resource allocation efficiency by 25%.

## 1.7 Technical Overview

Algorithm Used: Decision trees for fraud detection, linear regression for premium calculations, and forecasting models for claims.

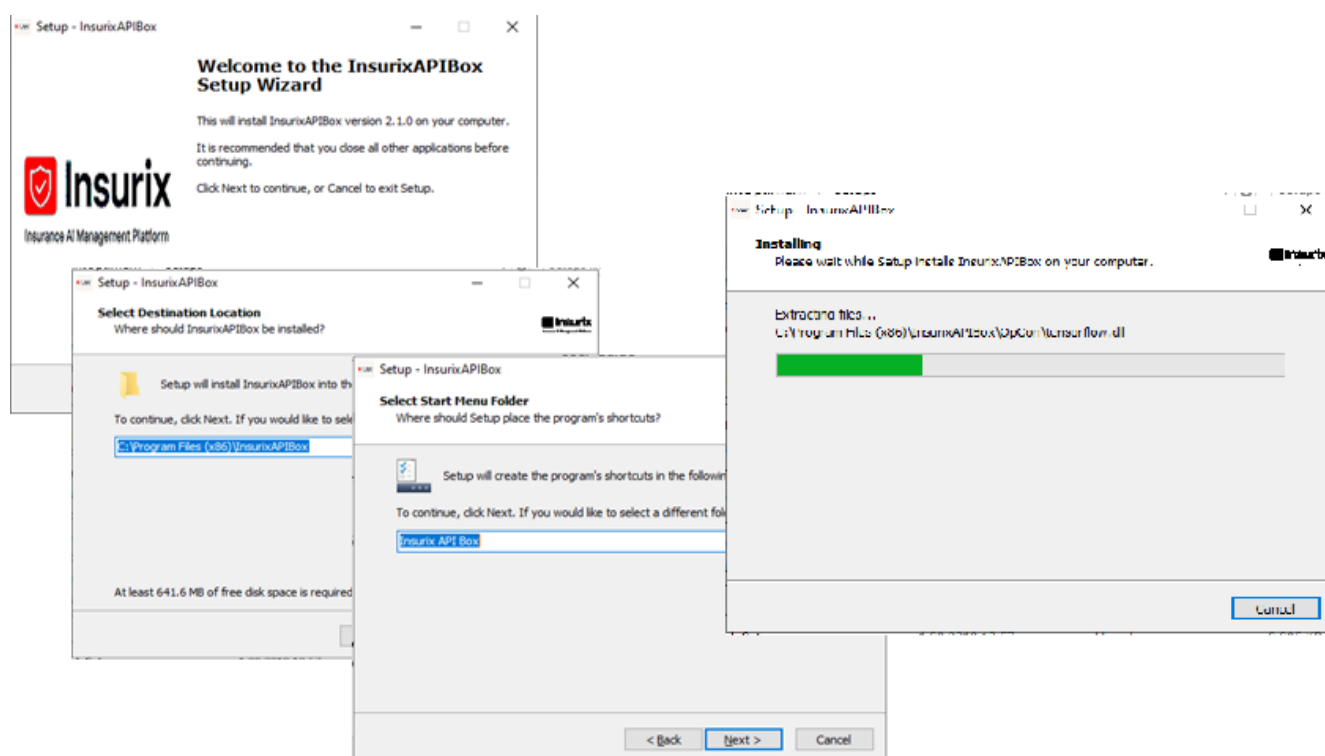
Evaluation Metrics: MAE, RMSE for numerical predictions, and Precision, recall, F1 Score, accuracy for fraud detection.

Integration : Insurix Framework for desktop applications and Restfull API Platform for web application integration.



## 2. Setup

Run Insurix.Setup.exe;

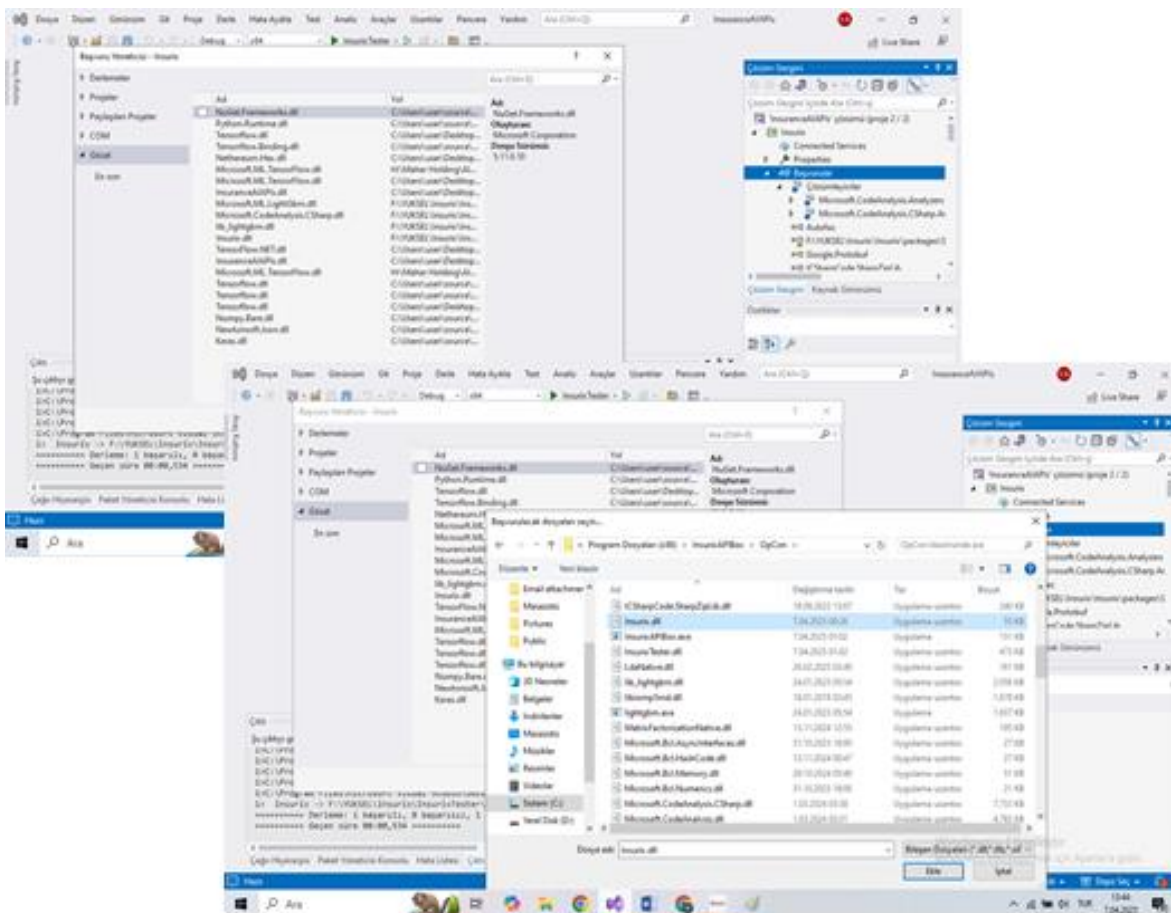


Insurix Platform setup will deliver executables (API platform (insurix.dll) for desktop and web integration), shortcuts (Insurix API Box for testing, removing setup..etc) for start menu, sample excel files and MS SQL Database.

## 3. Platform Integration & Example Usage

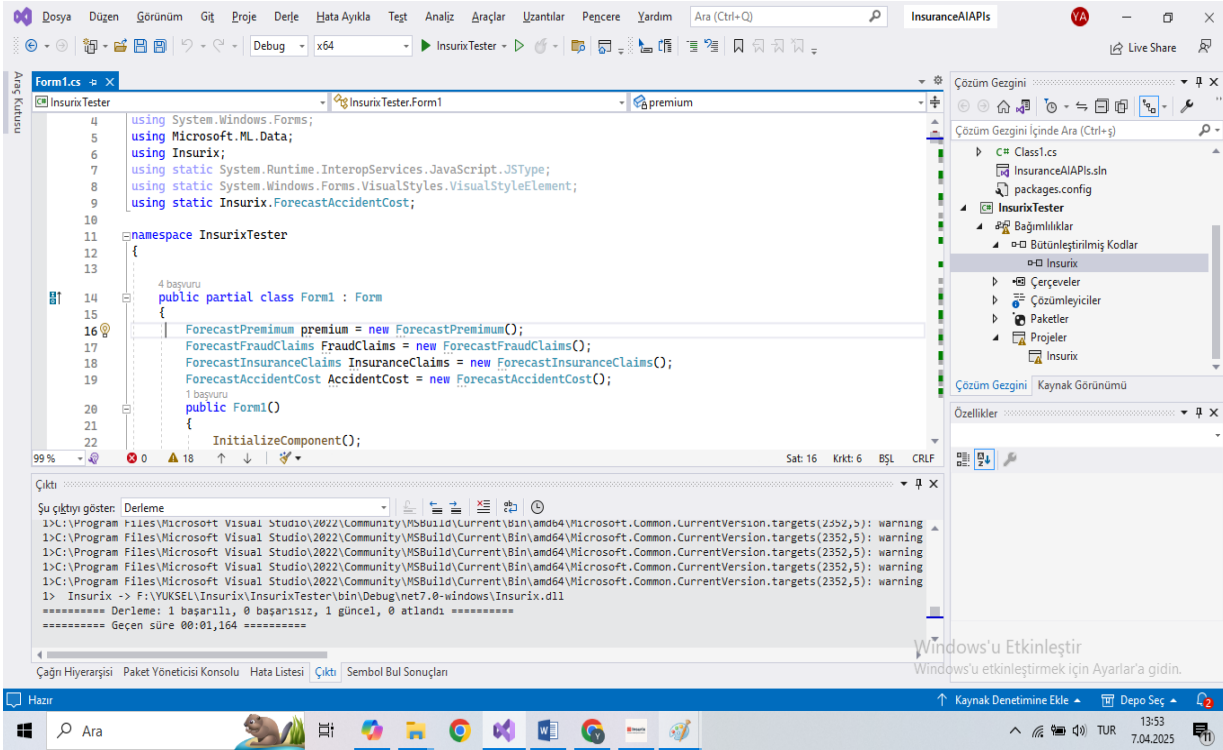
### 3.1 Integration

Run Visual Studio 20XX and create a project(Forms..etc) then click add a reference for the project.



Select insurix.dll from your setup directory under installation path.

Add “using insurix;” line into .cs file in which you will use API methods.



Each API function contains methods below;

1. LoadandTrainModel– training data and making test validations, returns performance metrics (MulticlassClassificationMetrics, RegressionMetrics, BinaryClassificationMetrics) about training.
2. MakeSinglePrediction – Sending single a prediction request and get response as labels and score in ModelPrediction structure.
3. InsertData – feed historical, accident Images..etc to Database.

### 3.2 Example Usage

Loading and training data set, model is updated.

[illegible]

Validation with trained model.

The screenshot shows the Insurix API Box interface. At the top, there are tabs for 'Forecast Premium', 'Forecast Fraud Claim', 'Forecast Future Claims', and 'Forecast Mending Cost'. Below these tabs, there are two buttons: 'Train Model' and 'Validate Selection'. The 'Train Model' button is highlighted. Below the buttons, there are two tables: 'Train Set' and 'Validation Results'.

**Train Set**

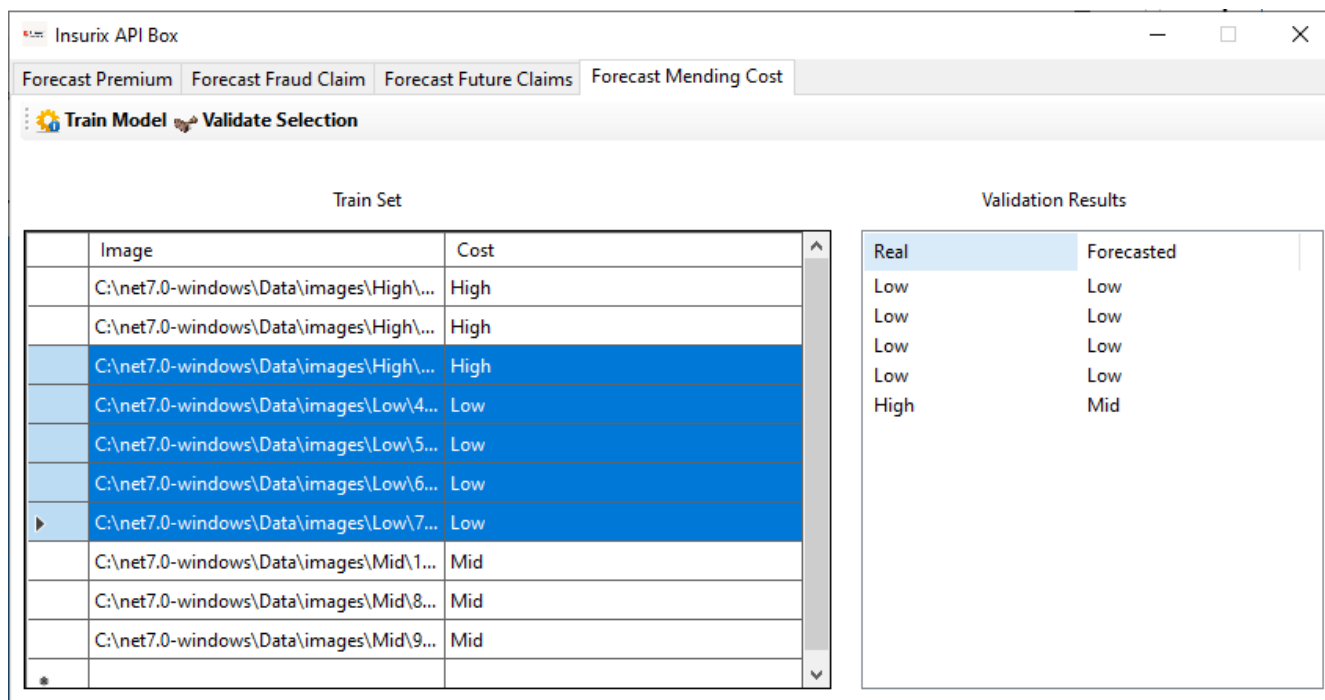
	age	gender	bmi	children	smoker
	60	male	4275	5	no
	53	male	221	4	no
	41	male	366	5	yes
	19	male	2371	2	yes
	21	female	2516	1	no
	63	male	1947	3	no
	25	male	3754	5	yes
	48	female	395	5	yes
	65	female	2519	5	no
	56	female	3088	1	no
	28	male	4582	3	yes
	53	female	326	2	no
	47	female	4742	2	no

**Validation Results**

Real	Forecasted
18097,091723463150	13012,356
18819,212123507320	12233,446
22264,444078544635	12525,366
16215,235946589955	12136,385
8662,814262047352	12064,676
20472,692868545077	12530,37
20176,851135206223	11867,66
14879,760119666555	11774,44
16237,361373222066	11203,349
24582,494408275237	11083,109
17338,851504518527	12201,165
15229,126729050620	11717,283
25009,693199064604	12846,688
21664,000466689693	12877,215
15034,833417313150	12040,386
21653,099327383938	13092,42
21786,807185049880	11832,873
26010,04520352110	12236,054



Multi Class Image Classification for repairing cost estimation.

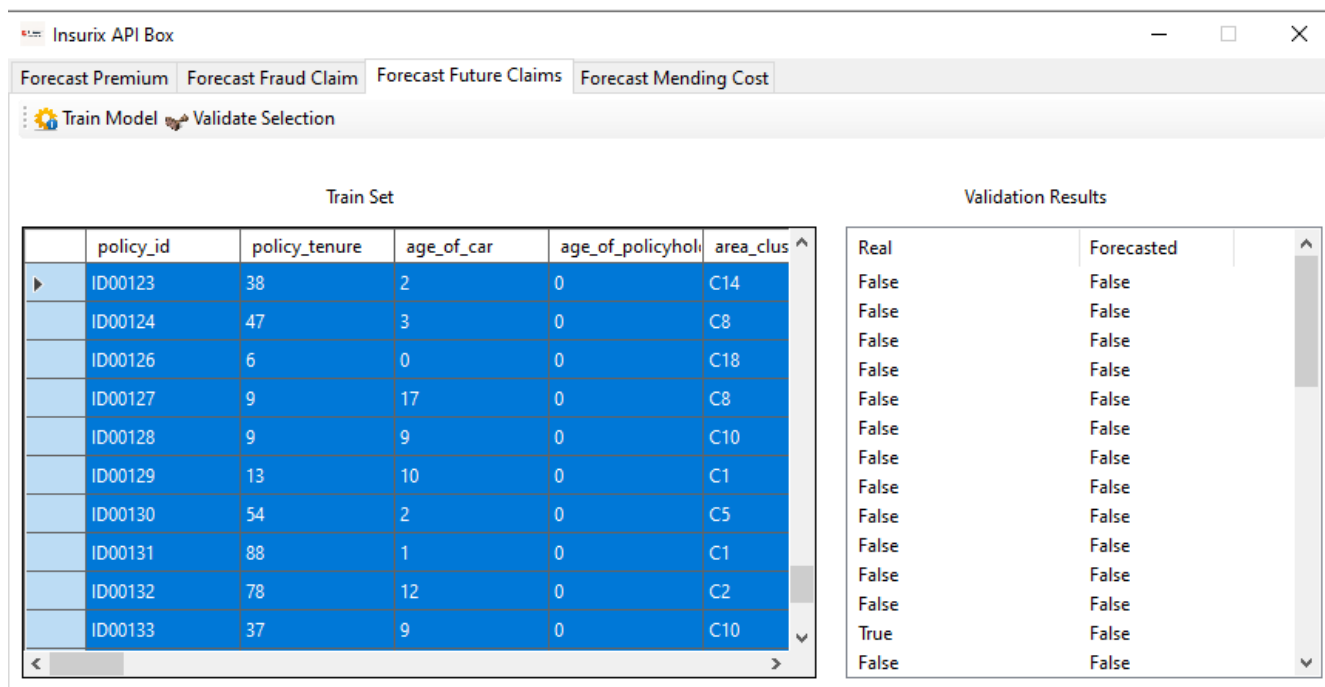


The screenshot shows the Insurix API Box interface with the 'Forecast Mending Cost' tab selected. The 'Train Model' button is highlighted. The 'Train Set' table displays image paths and their corresponding repair costs. The 'Validation Results' table shows the model's predictions for the same images.

Train Set	
Image	Cost
C:\net7.0-windows\Data\images\High\...	High
C:\net7.0-windows\Data\images\High\...	High
C:\net7.0-windows\Data\images\High\...	High
C:\net7.0-windows\Data\images\Low\4...	Low
C:\net7.0-windows\Data\images\Low\5...	Low
C:\net7.0-windows\Data\images\Low\6...	Low
C:\net7.0-windows\Data\images\Low\7...	Low
C:\net7.0-windows\Data\images\Mid\1...	Mid
C:\net7.0-windows\Data\images\Mid\8...	Mid
C:\net7.0-windows\Data\images\Mid\9...	Mid

Validation Results	
Real	Forecasted
Low	Low
Low	Low
Low	Low
Low	Low
Low	Low
High	Mid

Detecting potential future claims.



The screenshot shows the Insurix API Box interface with the 'Forecast Future Claims' tab selected. The 'Train Model' button is highlighted. The 'Train Set' table displays policy details and area clusters. The 'Validation Results' table shows the model's predictions for the same policies.

Train Set					
	policy_id	policy_tenure	age_of_car	age_of_policyholder	area_clus
▶	ID00123	38	2	0	C14
	ID00124	47	3	0	C8
	ID00126	6	0	0	C18
	ID00127	9	17	0	C8
	ID00128	9	9	0	C10
	ID00129	13	10	0	C1
	ID00130	54	2	0	C5
	ID00131	88	1	0	C1
	ID00132	78	12	0	C2
	ID00133	37	9	0	C10

Validation Results	
Real	Forecasted
False	False
False	False
False	False
False	False
False	False
False	False
False	False
False	False
False	False
False	False
False	False
False	False
True	False
False	False