RECOGNIZING DATA FROM IMAGES FOR HELTH INSURANCE USING AZURE AI

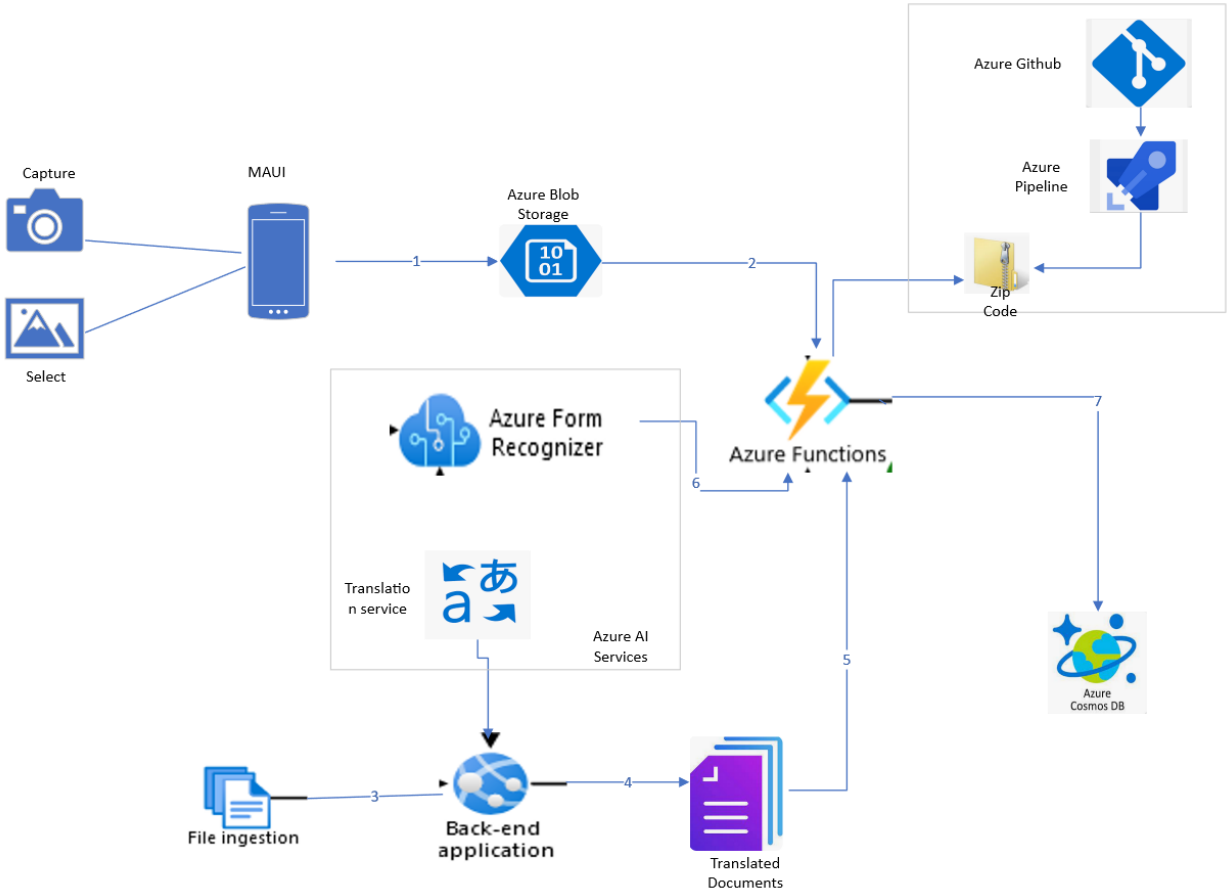
Contents

Problem Statement

Healthcare and insurance have more relevance in today's world, especially when unexpected events like pandemic outbreaks and increased lifestyle health issues occur.

For insurance companies, it's a very complicated task to go through all the hospital bills and calculate the amount spent on hospitalization. It's an important task in the reimbursement of medical insurance.

Solution/Architecture



In this solution,

- We are capturing the hospital bills using a **mobile app**, or we can select the existing image from Gallery.
- mobile app designed using the **MAUI framework**.

- Uploading these images into the **blob storage** account
- Meanwhile, we have the option of choosing the document in another language.
- using a **Translation AI service** to convert the document into the English language.
- Once the document is uploaded to the **storage account**, use the **function App** to extract the data from the images.
- Here, we are using a **form recognition AI service** to extract the data.
- This is the data we are inserting into the **Cosmos database**.
- We are maintaining the code base of the function app in the **Azure Git repository**.
- **Azure pipeline** used to build the solution
- Output of the function app is published into the **Azure resources**.

Data Extraction

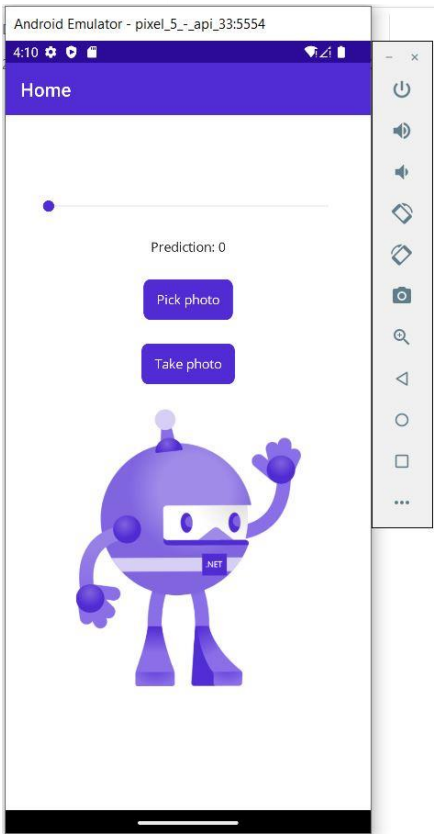
Service dates	Type of service	Amount billed	Discount
ADVENTHEALTH ORLANDO, Claim # 7682223693581			
07/29/22	DRUGS	751.12	482.97
07/29/22	DRUGS	250.86	161.30
07/29/22	DRUGS	59.04	37.96
07/29/22	DRUGS	52.73	33.91
07/29/22	LABORATORY	298.00	191.61
07/29/22	LABORATORY	210.00	135.03
07/29/22	LABORATORY	74.00	47.58
07/29/22	LABORATORY	296.59	190.71
07/29/22	LABORATORY	971.18	624.47
07/29/22	OPERATING ROOM	11,603.20	7,460.86
07/29/22	ANESTHESIA SUP.	3,383.00	2,175.27
07/29/22	DIAG SERVICE	2,445.00	1,572.13
07/29/22	DRUGS	92.49	59.47
07/29/22	DRUGS	72.23	46.44
07/29/22	DRUGS	55.30	35.56
07/29/22	DRUGS	293.13	188.48
07/29/22	DRUGS	62.79	40.37
07/29/22	DRUGS	77.44	49.79
07/29/22	DRUGS	34.66	22.29
07/29/22	DRUGS	185.34	119.17
07/29/22	DRUGS	75.18	48.34
07/29/22	RECOVERY ROOM	2,892.93	1,860.17
Total		**$24,236.21**	**$15,583.88**

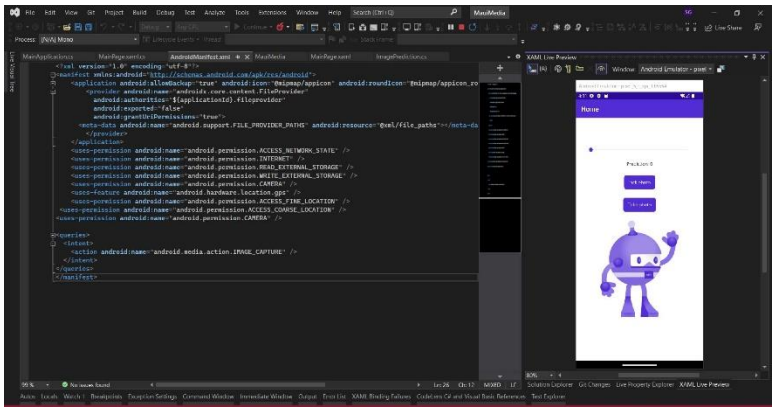
Technical Details and Implementation of solution

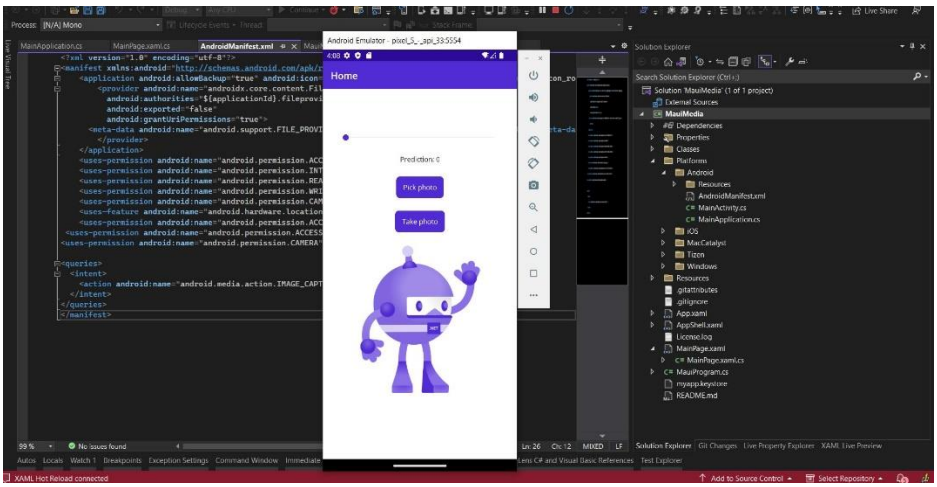
Mobile App (MAUI)

.NET Multi-platform App UI (.NET MAUI) is a cross-platform framework for creating native mobile and desktop apps with C# and XAML. Using .NET MAUI, you can develop apps that can run on Android, iOS, macOS, and Windows from a single shared code-base.

In this app, we are capturing and uploading the image into the storage account.







Translation AI Service

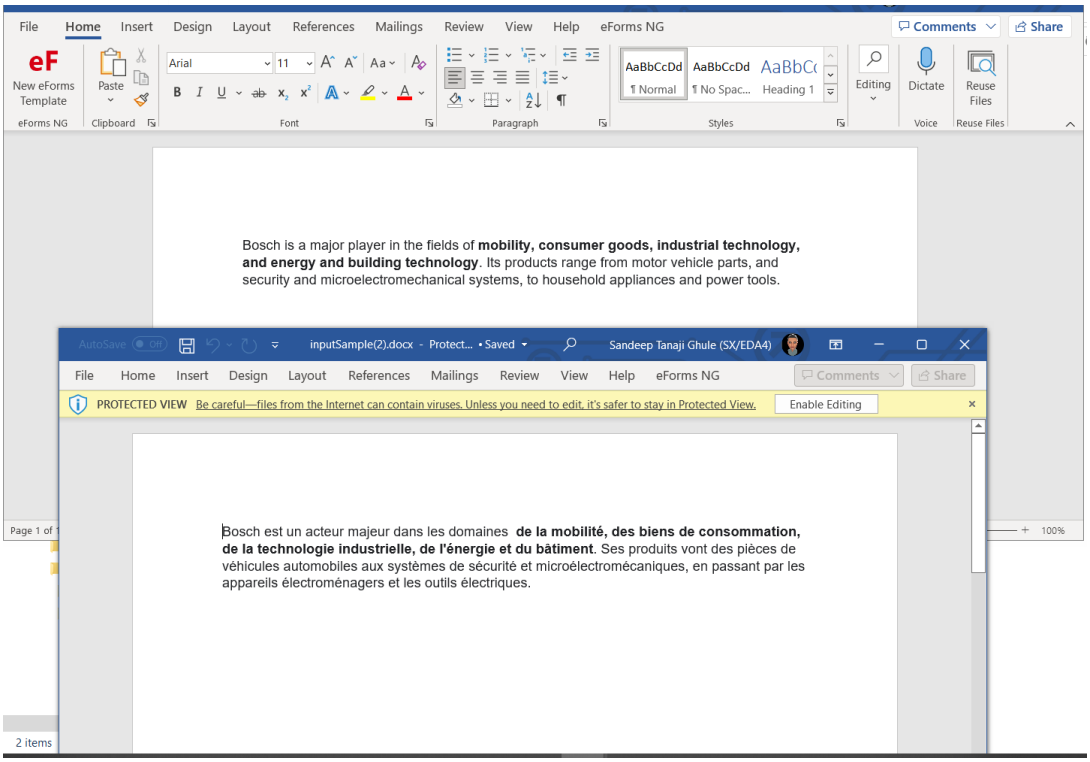
This service will get the document and convert into the English without changing the format and it will upload this document into the blob storage.

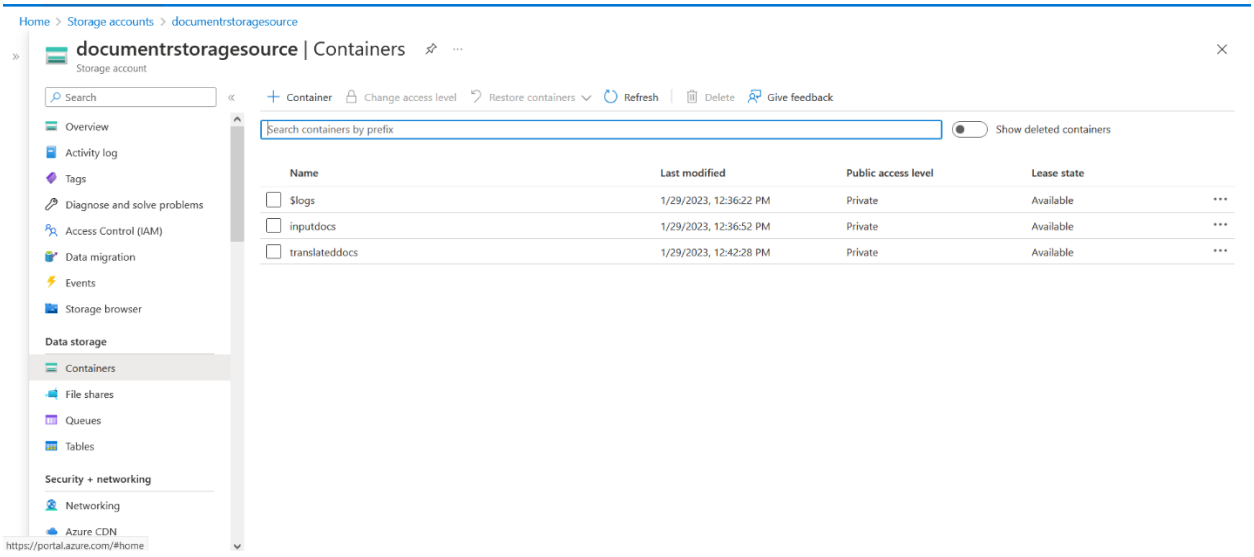
Code:

```
static readonly string json = ("" +
        "{\"inputs\": " +
```

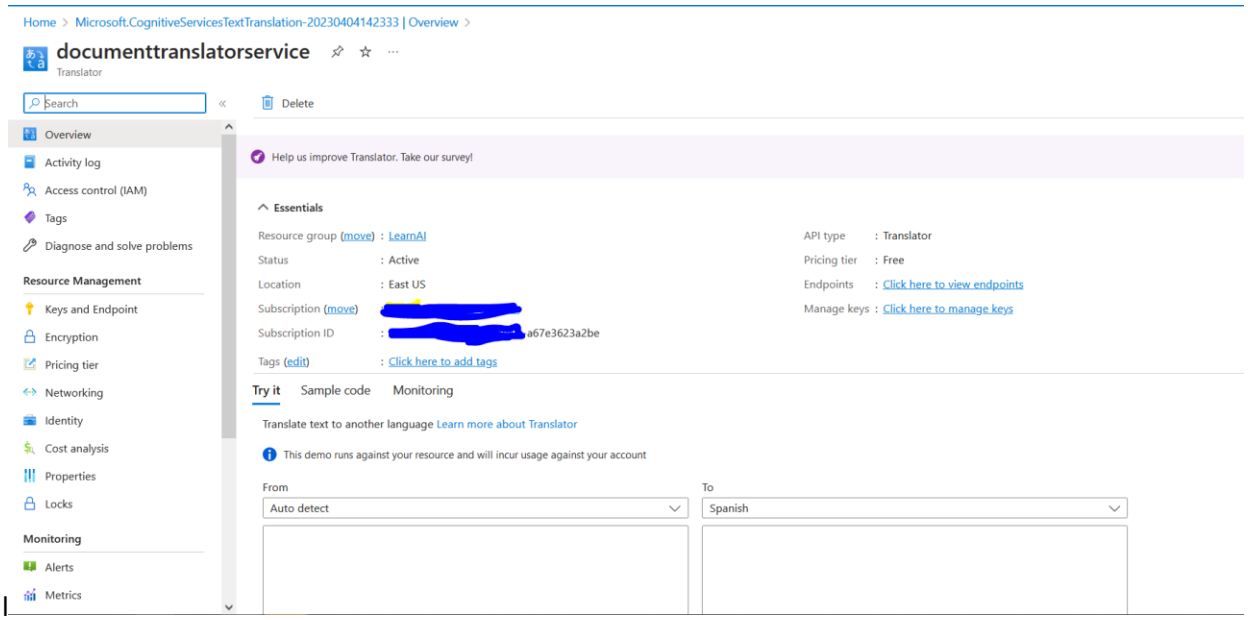
```
        "[{\"source\": " +
          "{\"sourceUrl\": \"<Sourcecontainer>" +
           "\"storageSource\": \"AzureBlob\"" +
        "}," +
    "\"targets\": " +
        "[{\"targetUrl\": \"<TargetContainer>" +
          "\"storageSource\": \"AzureBlob\"," +
           "\"language\": \"fr\"}]}]}");
static async Task Main(string[] args)
{
    HttpClient client = new HttpClient();
    HttpRequestMessage request = new HttpRequestMessage();
    {
        StringContent data = new StringContent(json, Encoding.UTF8, "application/json");

        request.Method = HttpMethod.Post;
        request.RequestUri = new Uri(endpoint + route);
        request.Headers.Add("Ocp-Apim-Subscription-Key", key);
        request.Content = data;

        HttpResponseMessage response = await client.SendAsync(request);
        string result = response.Content.ReadAsStringAsync().Result;
        if (response.IsSuccessStatusCode)
        {
            Console.WriteLine($"Operation successful with status code: {response.StatusCode}");
        }
        else
            Console.Write($"Error occurred. Status code: {response.StatusCode}");
    }
```

}


File Home Insert Design Layout References Mailings Review View Help eForms NG
Comments Share
New eForms Template
Paste
Editing
Dictate
Reuse Files
Bosch is a major player in the fields of **mobility, consumer goods, industrial technology, and energy and building technology**. Its products range from motor vehicle parts, and security and microelectromechanical systems, to household appliances and power tools.
inputSample(2).docx - Protect... • Saved
Sandeep Tanaji Ghule (SX/EDA4)
PROTECTED VIEW Be careful—files from the Internet can contain viruses. Unless you need to edit, it's safer to stay in Protected View.
Enable Editing
Bosch est un acteur majeur dans les domaines **de la mobilité, des biens de consommation, de la technologie industrielle, de l'énergie et du bâtiment**. Ses produits vont des pièces de véhicules automobiles aux systèmes de sécurité et microélectromécaniques, en passant par les appareils électroménagers et les outils électriques.
2 items


Home > Storage accounts > documentrstoragesource
documentrstoragesource | Containers
Storage account
Container
Change access level
Restore containers
Refresh
Delete
Give feedback
Search containers by prefix
Show deleted containers
Name
Last modified
Public access level
Lease state
$logs
1/29/2023, 12:36:22 PM
Private
Available
inputdocs
1/29/2023, 12:36:52 PM
Private
Available
translateddocs
1/29/2023, 12:42:28 PM
Private
Available
Overview
Activity log
Tags
Diagnose and solve problems
Access Control (IAM)
Data migration
Events
Storage browser
Data storage
Containers
File shares
Queues
Tables
Security + networking
Networking
Azure CDN
https://portal.azure.com/#home

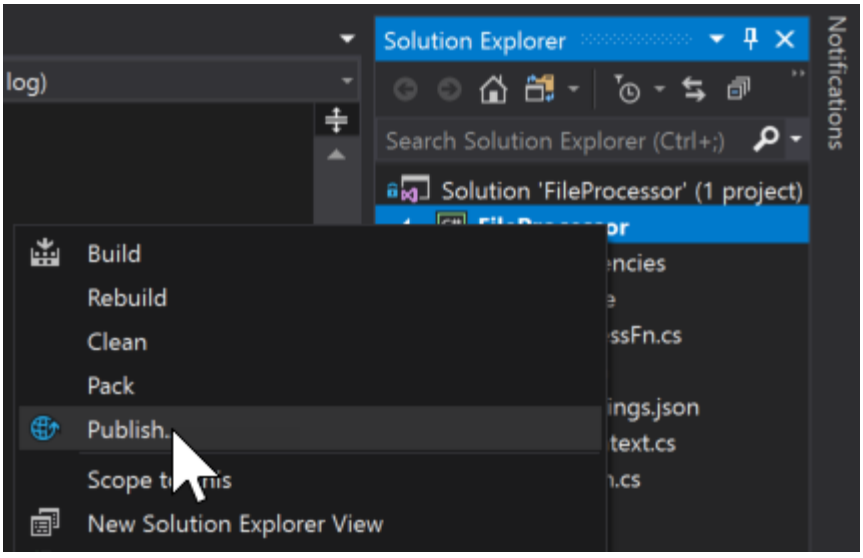
Translator



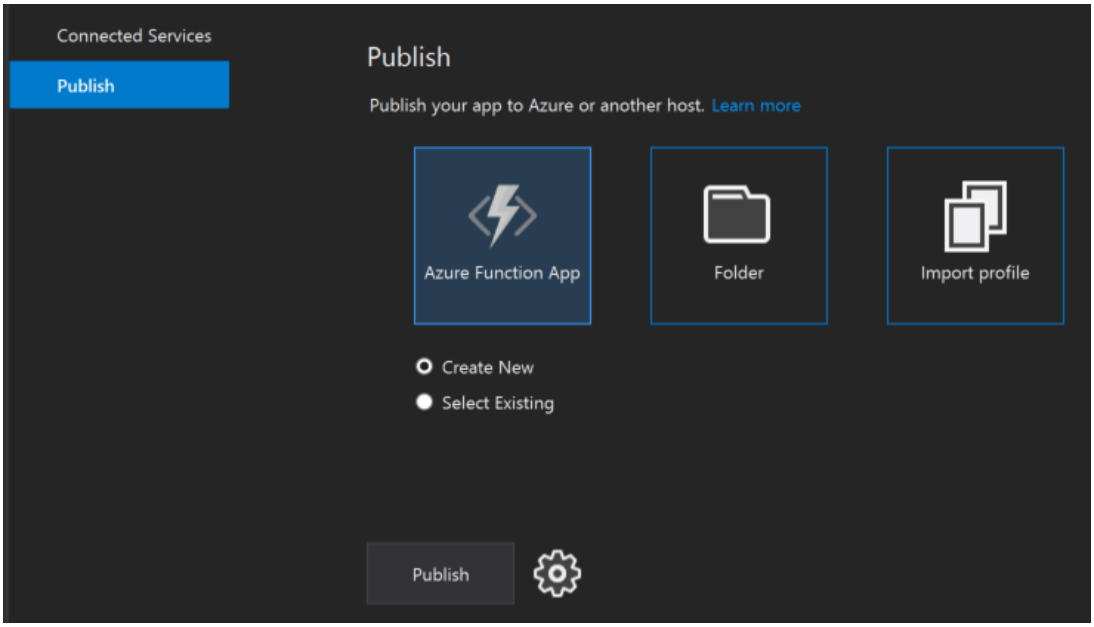
Function App

The function app is responsible to get the file from storage account and extract the data from the image. Also this app is responsible to communicate with the Form recognition AI service.

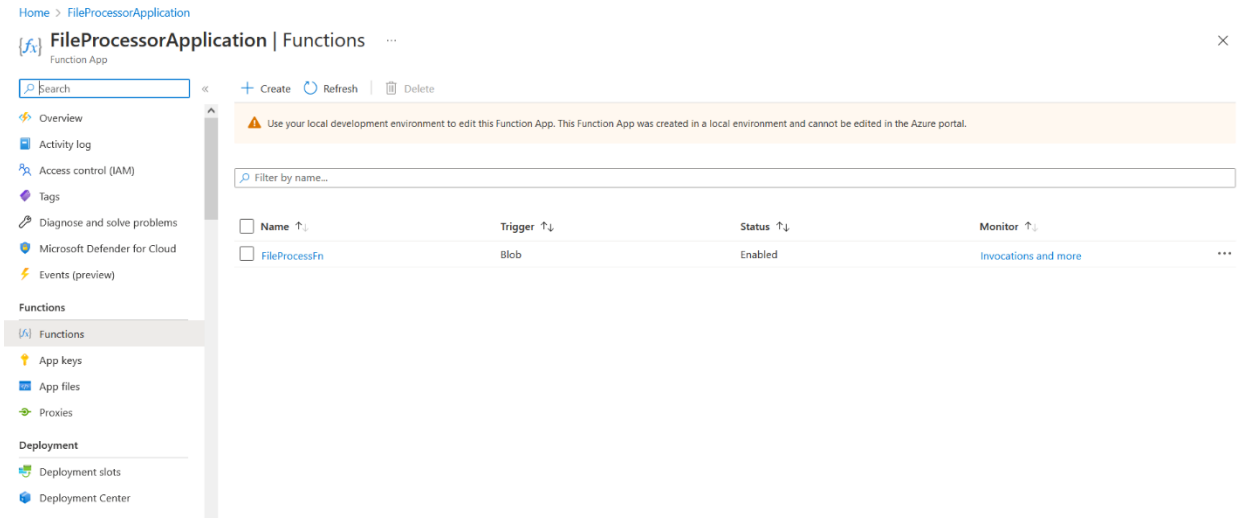
1. Inside Visual Studio, from the Solution Explorer right-click on the project name and choose `Publish...`



2. Choose `Azure Function App`, check `Create New`, and click `Publish`.

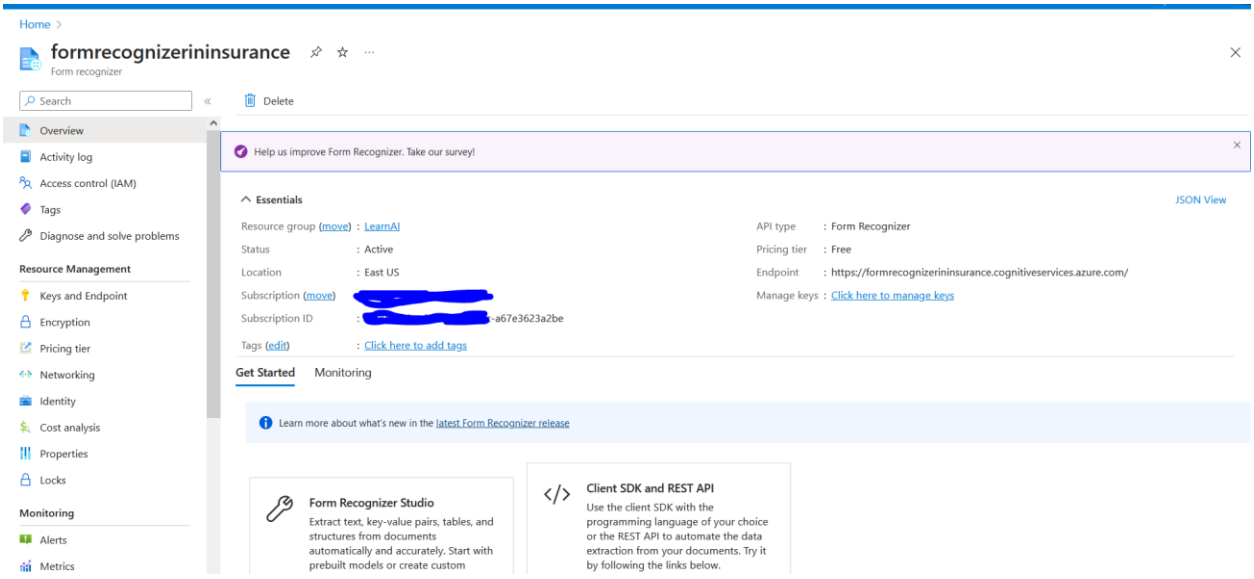


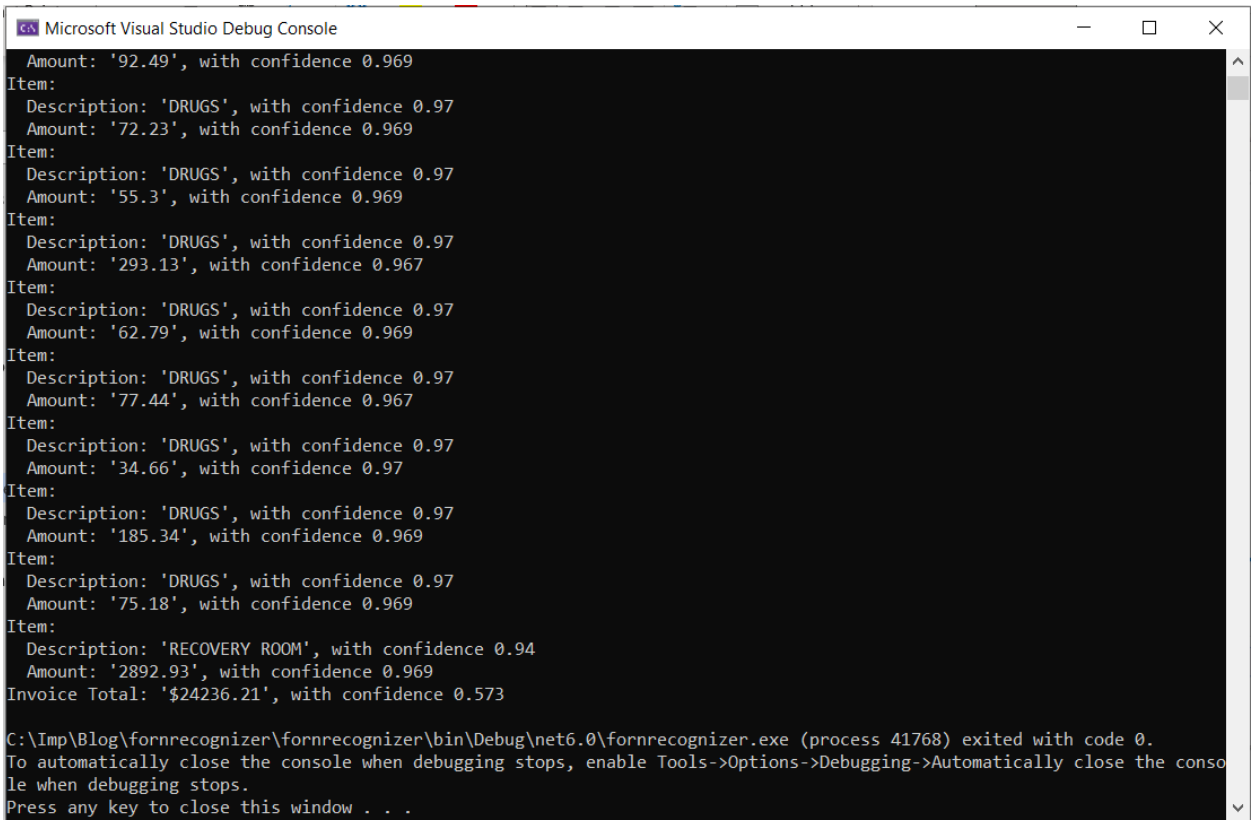
3. Give the app a unique name, choose your `Subscription`, and select the same `Resource Group`. For `App Service Plan` click `New...`.
4. Give the plan a unique name, choose the `Location`, and pick `Consumption` for the `Size`. Click `OK`.
5. Back in the `Create App Service` dialog, click `Create`.



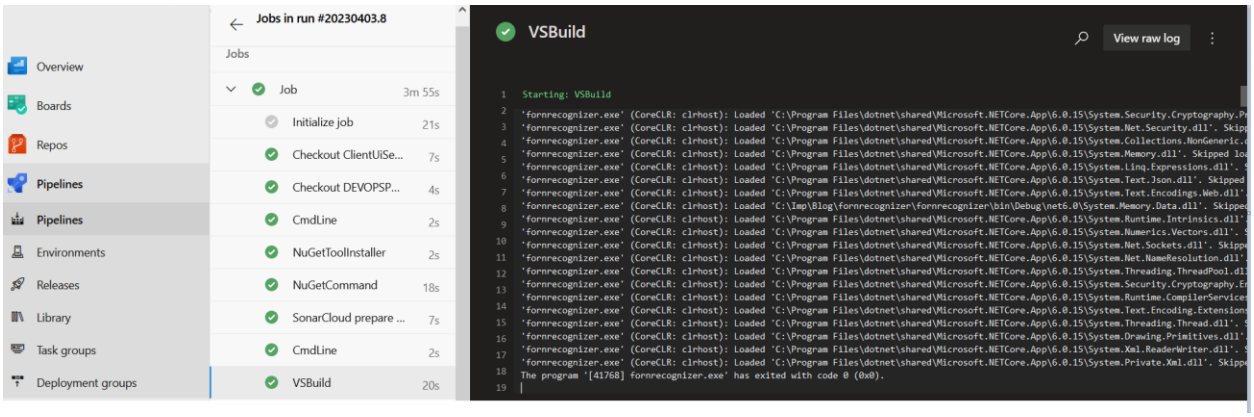
Form Recognition AI Service

This service is responsible to extract the data set from the image.





Azure Repository



GitHub Links

Translator AI service

https://github.com/KomalHonmane/AzureBlogathon/tree/main/DocumentTranslator

Form Recognition console app

https://github.com/KomalHonmane/AzureBlogathon/tree/main/fornrecognizer

Function App- Form Recognition

https://github.com/KomalHonmane/AzureBlogathon/tree/main/FunctionApp_FormRecognizer

MAUI – Mobile App

https://github.com/KomalHonmane/AzureBlogathon/tree/main/MobileApp_MAUI

Challenges in implementing the solution

- Creating mobile app with this new framework MAUI
- To implement the form recognition service
- Upload document in storage account

Business Benefit

Automate data extraction from various hospital bill formats so that healthcare and insurance companies can easily calculate the amount spent in hospitals and offer better insurance to their customers. Additional advantages include automated claim processing with reduced human efforts to benefit both payors and insurance providers.