

Animal detection using Azure Analytic and Azure AI Service

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1 Overview

The Animal Counting Web Application will provide a digital solution for livestock owners to accurately count their goats, sheep and monitor their movements using Azure AI and Analytics Services. The web application will be accessible from any device with an internet connection, making it easy for livestock owners to track their livestock on the go. The application will provide valuable insights into the behavior of goats or Sheep allowing livestock owners to make more informed decisions about their livestock management.

2 Benefit of this in Real Life

It will benefit the Government and Animals sellers to stop theft and to have a real visibility of live stock and update about their current and sold stocks.

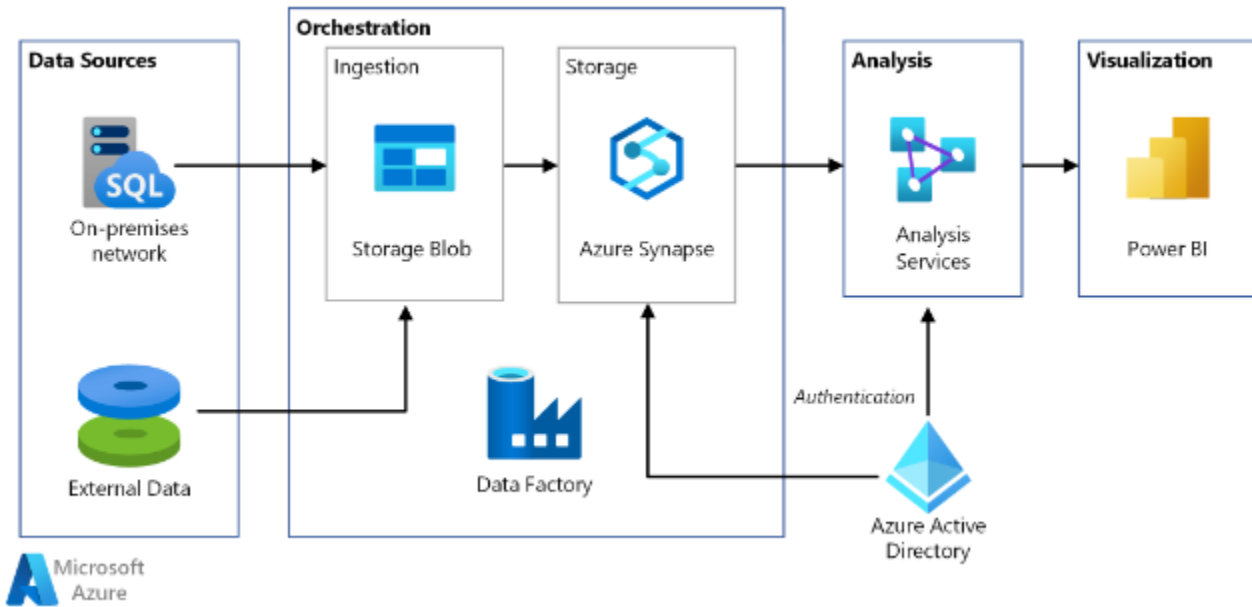
3 Goal and Objective

The main objective of this project is to create goats and sheep counting web application that accurately counts the entry and exit of goats in a specific area. The application will allow livestock owners to monitor their goats' movements and reduce manual counting chois and provide more accuracy in counting and preventing Animal theft and provide high security.

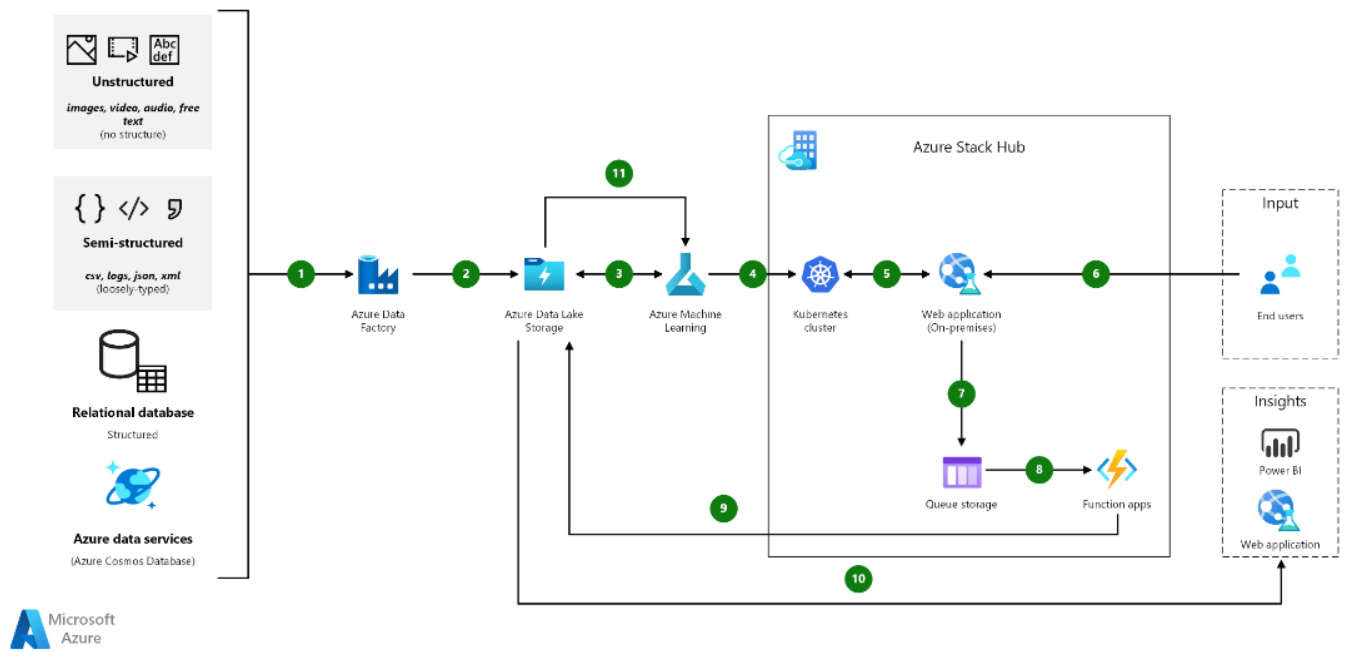
4 Prerequisite and Assumptions

- The web application Required Azure services subscription like Azure Synapse, Azure Datalake, Cosmo Db, Azure Analytic and Azure AI
- The data will be connected via SQL Server to Cosmo DB and Azure Blob Storage.
- The web Application Required a minimum of 16GB of Memory, 30Tb of storage in cloud Azure, Azure Resource and should be connected to Azure Storage to read the data of Jason Files and ML.
- The web application assumes that the area where the goats are being counted is well-defined and that there are no overlaps or gaps in the area.
- The web application assumes that the camera used to detect the goats' entry and exit is positioned in a suitable location to capture all goat movements accurately.
- The accuracy of the goat counting web application depends on the quality and reliability of the camera used to detect goat movements. Poor lighting or environmental conditions can affect the accuracy of the system.

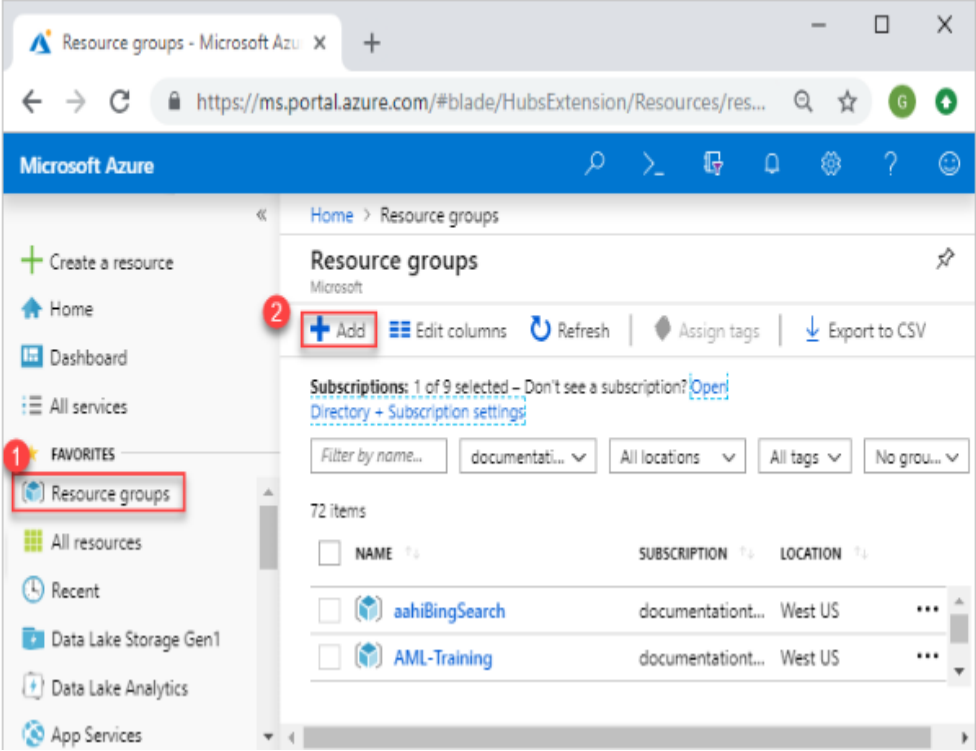
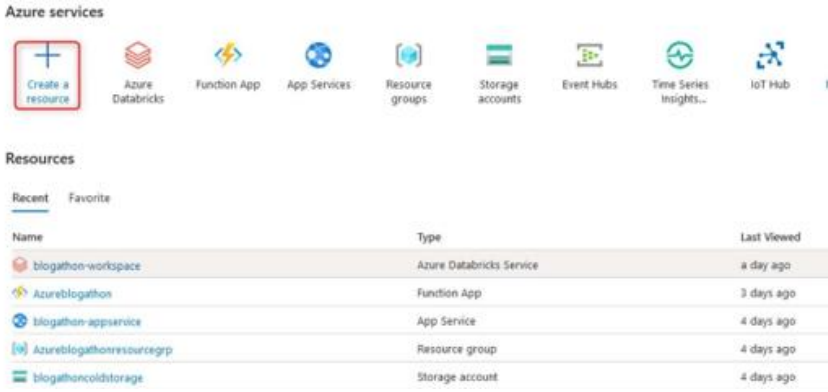
5 Architecture Diagram

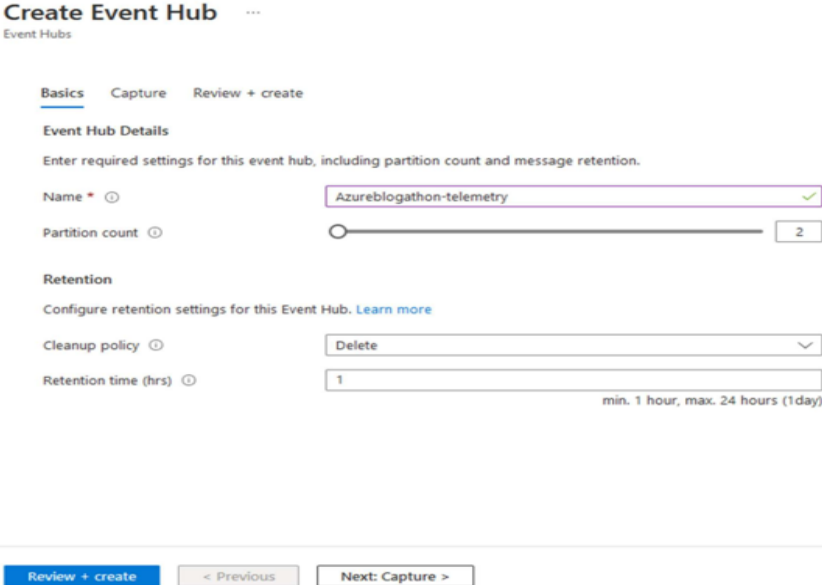


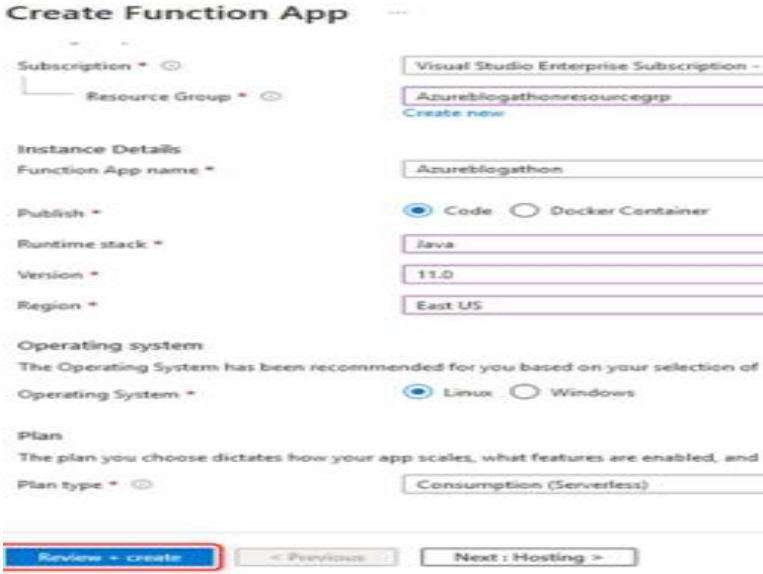
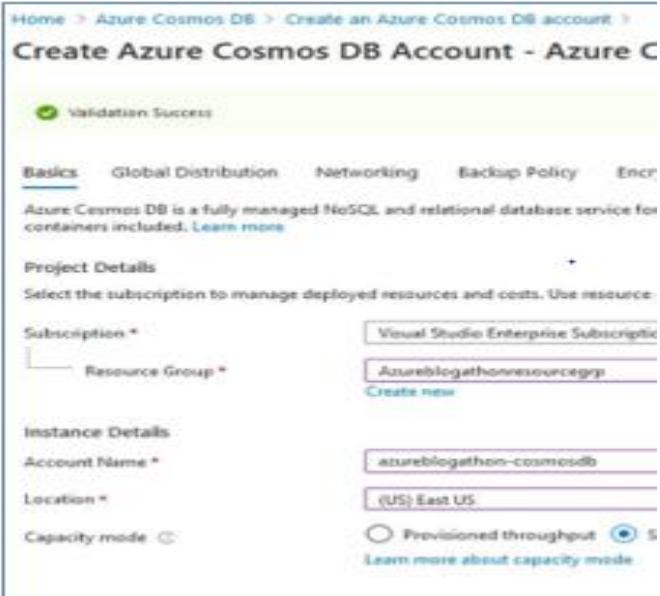
How Azure AI service Azure Data Lake service and Kubernetes Cluster and Relational Database is used for Machine Learning and Identify the Animals.

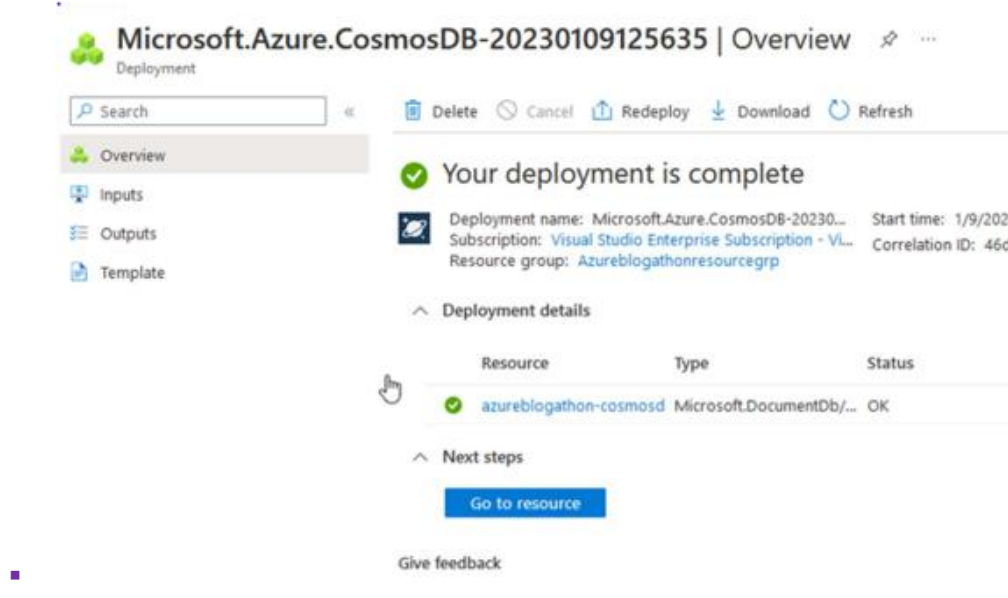
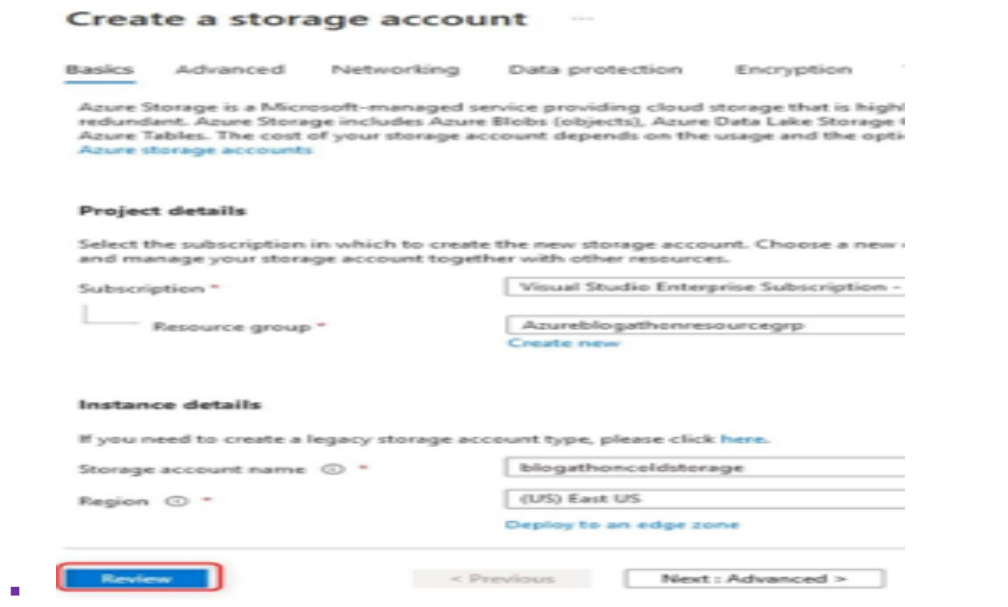


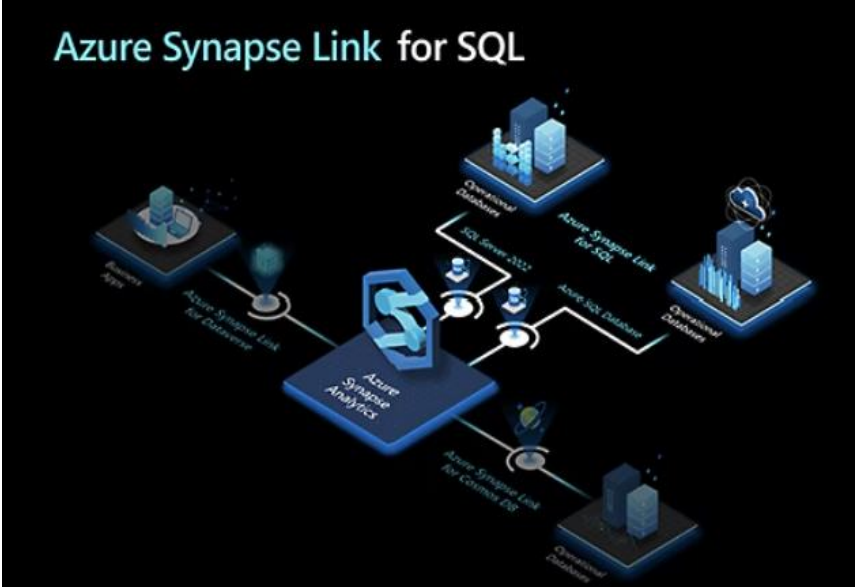
Description	Location	Tasks
preparation of environment		
Preparation of Environment	On Azure Cloud	<ul style="list-style-type: none"> • Azure Subscription is required on Cloud with a Minimum Space of 30Tb or pay as you go module • Connecting SQL Db with Azure Cloud and Using Azure Active Sync and Azure Replication Service to connect Azure Blob Storage with SQL data base and ML using IoT Hub to Machine Learn Analyze and read the data
Reference Link & Service Used	Microsoft Azure Cloud	<ul style="list-style-type: none"> ▪ Ref link: https://learn.microsoft.com/en-us/azure/analysis-services/tutorials/analysis-services-tutorial-roles ▪ Link: https://learn.microsoft.com/en-us/azure/azure-resource-manager/management/manage-resource-groups-portal ▪ https://azure.microsoft.com/en-in/solutions/ai/ ▪ https://azure.microsoft.com/en-in/products/category/analytics <p>Services Used</p> <ul style="list-style-type: none"> ▪ Azure Analytic Services and Azure AI Services. ▪ Azure Resource ▪ Azure function ▪ Azure Synapse ▪ Azure CosmoDb ▪ Azure Blob Storage
Stage 2 – Configuration of Azure Services		
Creating Resource Group	Azure Cloud	<p>Create resource groups</p> <ul style="list-style-type: none"> ▪ Sign in to the Azure portal. ▪ Select Resource groups. ▪ Select Add. ▪ Enter the following values: ▪ Select Review + Create. ▪ Select Create. ▪ Select Refresh from the top menu to refresh the resource group list, and then select the newly ▪ created resource group to open it. <p>Reference Link: https://learn.microsoft.com/en-us/azure/azure-resource-manager/management/manage-resource-groups-portal</p>

<p>Resource Group Configuration</p>	<p>Azure Cloud</p>	
<p>IoT Hub Creation</p>		<ul style="list-style-type: none"> ▪ On the Azure homepage, select the + Create a resource button. On the Basics tab, complete the fields as follows: ▪ Subscription: Select the subscription to use for your hub. ▪ Resource group: Select a resource group or create a new one. ▪ IoT hub name: Enter a name for your hub. ▪ Region: Select the region, closest to you. ▪ Tier: Select the tier that you want to use for your hub.
<p>Example</p>	<p>Azure Cloud Subscription Required</p>	

		<ul style="list-style-type: none"> On the Azure homepage, select the + Create a resource button. On the Basics tab, complete the fields as follows: Subscription: Select the subscription to use for your hub. Resource group: Select a resource group or create a new one. Namespace name: Enter a name for your Namespace. Location: Select the region, closest to you. Pricing tier: Select a pricing tier Throughput units: Select number of throughput units (Ex: - 1)
Creating of Event Hub	Azure Event Hub	
Function App Creation	Azure Cloud	<ul style="list-style-type: none"> On the Azure homepage, select the + Create a resource button. On the Basics tab, complete the fields as follows: Subscription: Select the subscription to use for your hub. Resource group: Select a resource group or create a new one. FunctionApp name: Enter a name for your FunctionApp Publish: Option to publish code files or a Docker container Runtime stack: Choose a runtime that supports your favorite function programming language (Ex: - Java).

		
Creation of Cosmo Db		<ul style="list-style-type: none"> ▪ On the Azure homepage, select the + Create a resource button. On the Basics tab, complete the fields as follows: ▪ Subscription: Select the subscription to use for your hub ▪ Account Name: Enter a name for your Cosmos DB ▪ Region: Select the region, closest to you. ▪ Capacity Mode: Choose a capacity mode.
IoT Hub Creation		

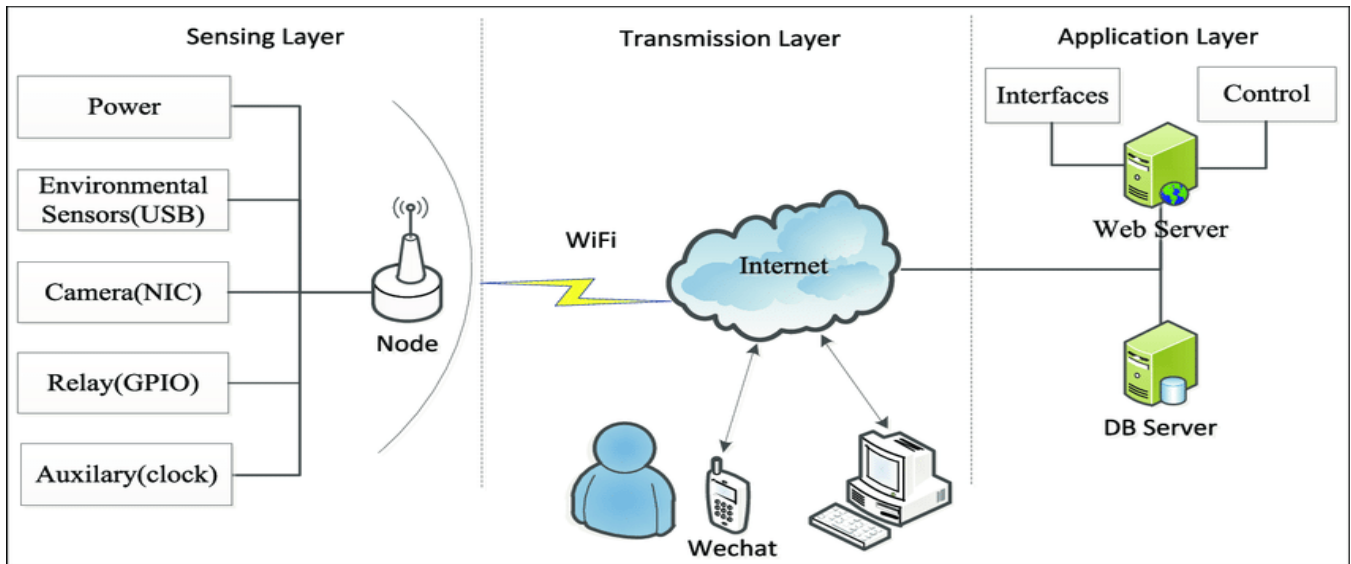
		 <p>Microsoft.Azure.CosmosDB-20230109125635 Overview</p> <p>Deployment</p> <p>Search</p> <p>Overview</p> <p>Inputs</p> <p>Outputs</p> <p>Template</p> <p>Your deployment is complete</p> <p>Deployment name: Microsoft.Azure.CosmosDB-20230... Start time: 1/9/2023 Subscription: Visual Studio Enterprise Subscription - VL... Correlation ID: 46d... Resource group: Azureblogathonresourcegrp</p> <p>Deployment details</p> <table border="1"> <thead> <tr> <th>Resource</th> <th>Type</th> <th>Status</th> </tr> </thead> <tbody> <tr> <td>azureblogathon-cosmosd</td> <td>Microsoft.DocumentDb/...</td> <td>OK</td> </tr> </tbody> </table> <p>Next steps</p> <p>Go to resource</p> <p>Give feedback</p>	Resource	Type	Status	azureblogathon-cosmosd	Microsoft.DocumentDb/...	OK
Resource	Type	Status						
azureblogathon-cosmosd	Microsoft.DocumentDb/...	OK						
Creation of Storage Account	Azure Cloud	<ul style="list-style-type: none"> On the Azure homepage, select the + Create a resource button. On the Basics tab, complete the fields as follows: Subscription: Select the subscription to use for your hub (Ex: - Visual studio enterprise subscription). Resource group: Select a resource group or create a new one (Ex: - Azureblogathonresourcegrp). Storage account name: Enter a name for your Storage account (Ex:- blogathoncoldstorage) Region: Select the region, closest to you (Ex: - East US). On the Advanced tab, complete the fields as follows: Data Lake Gen2: Choose the option to Enable Hierarchical namespace. 						
	Azure Cloud Storage	 <p>Create a storage account</p> <p>Basics Advanced Networking Data protection Encryption</p> <p>Azure Storage is a Microsoft-managed service providing cloud storage that is high redundant. Azure Storage includes Azure Blobs (objects), Azure Data Lake Storage Azure Tables. The cost of your storage account depends on the usage and the opti Azure storage accounts.</p> <p>Project details</p> <p>Select the subscription in which to create the new storage account. Choose a new and manage your storage account together with other resources.</p> <p>Subscription * Visual Studio Enterprise Subscription -</p> <p>Resource group * Azureblogathonresourcegrp</p> <p>Instance details</p> <p>If you need to create a legacy storage account type, please click here.</p> <p>Storage account name * blogathoncoldstorage</p> <p>Region * (US) East US</p> <p>Deploy to an edge zone</p> <p>Review Previous Next: Advanced</p>						

Azure Analytic Service configuration	Azure Cloud	<ul style="list-style-type: none"> ▪ An Azure Active Directory in your subscription. ▪ Created an Azure Analysis Services server in your subscription. ▪ Have server administrator permissions. ▪ Add the adventure works sample model to your server. ▪ Install the latest version of SQL Server Management Studio. <p>Ref link: https://learn.microsoft.com/en-us/azure/analysis-services/tutorials/analysis-services-tutorial-roles</p>
Azure Synapse	Azure Cloud	 <ul style="list-style-type: none"> ▪ https://azure.microsoft.com/en-in/solutions/ai/
Creation of Azure AI Service	Azure Cloud	<ul style="list-style-type: none"> ▪ https://azure.microsoft.com/en-in/solutions/ai/

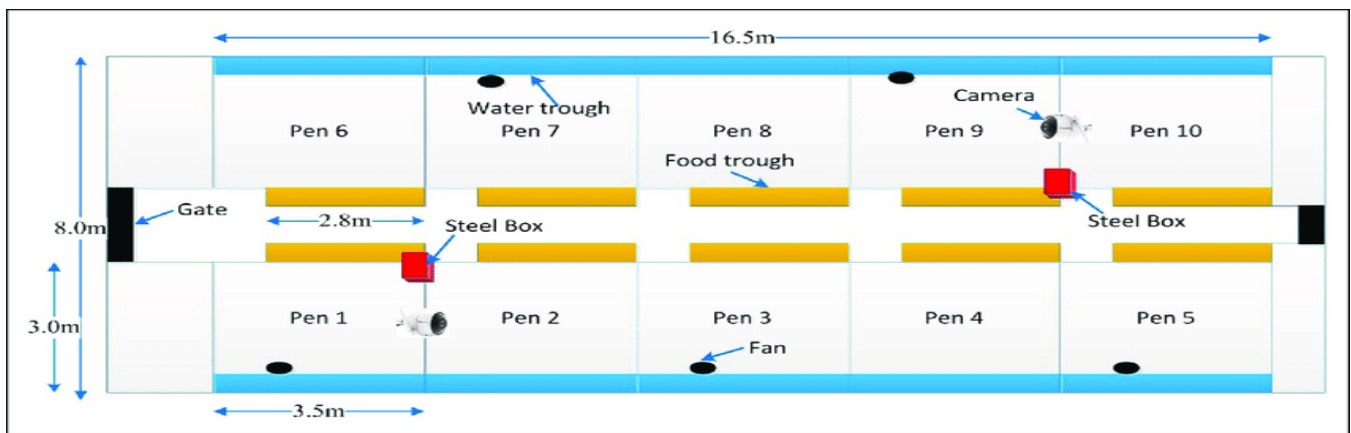
6 Out of Scope

- NW bandwidth and connectivity
- Hardware for Application installation
- On-prem devices and endpoints managed by customer
- VPN/FW configuration on-prem to be handled by customer

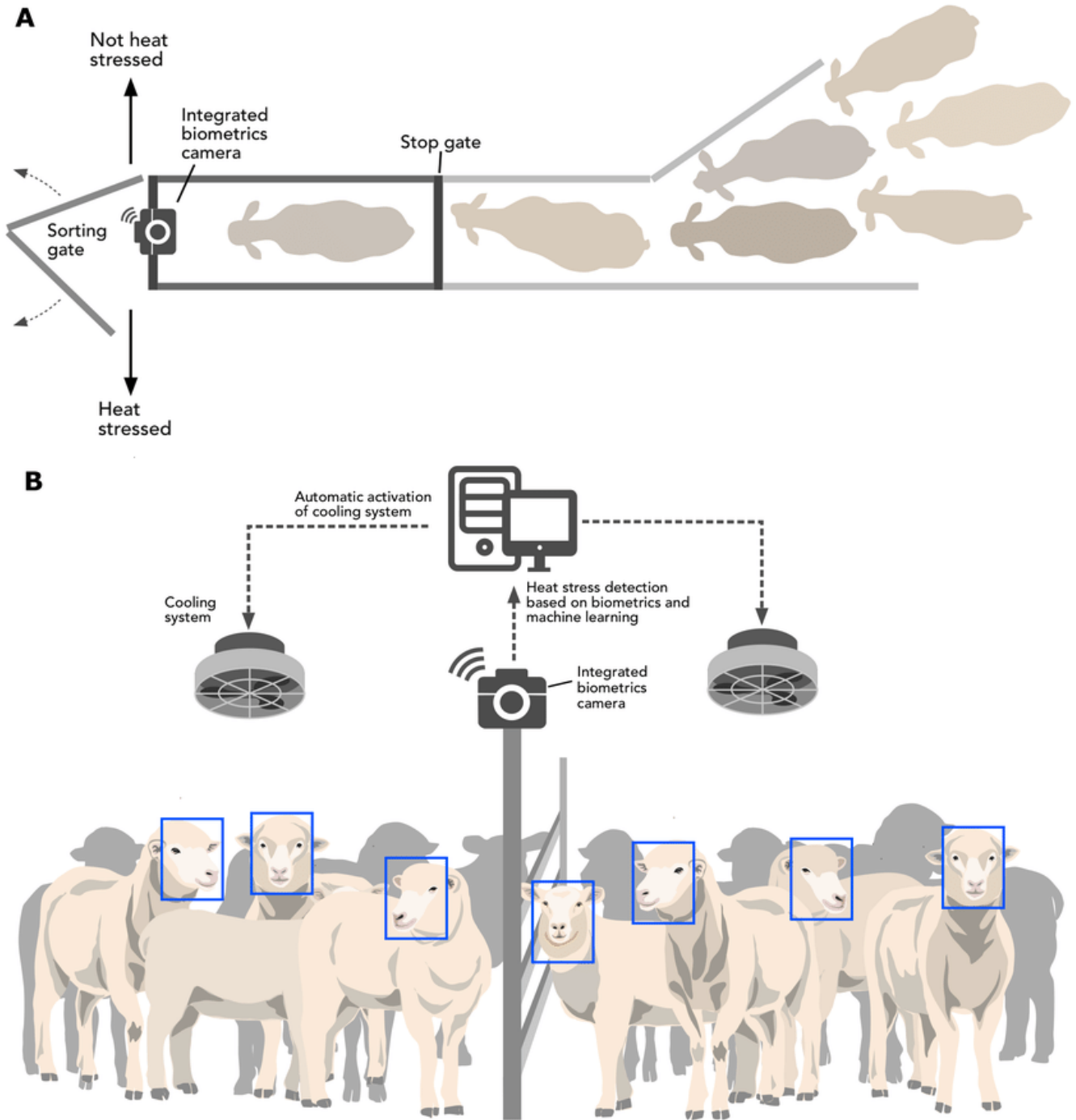
7 Architecture Diagram



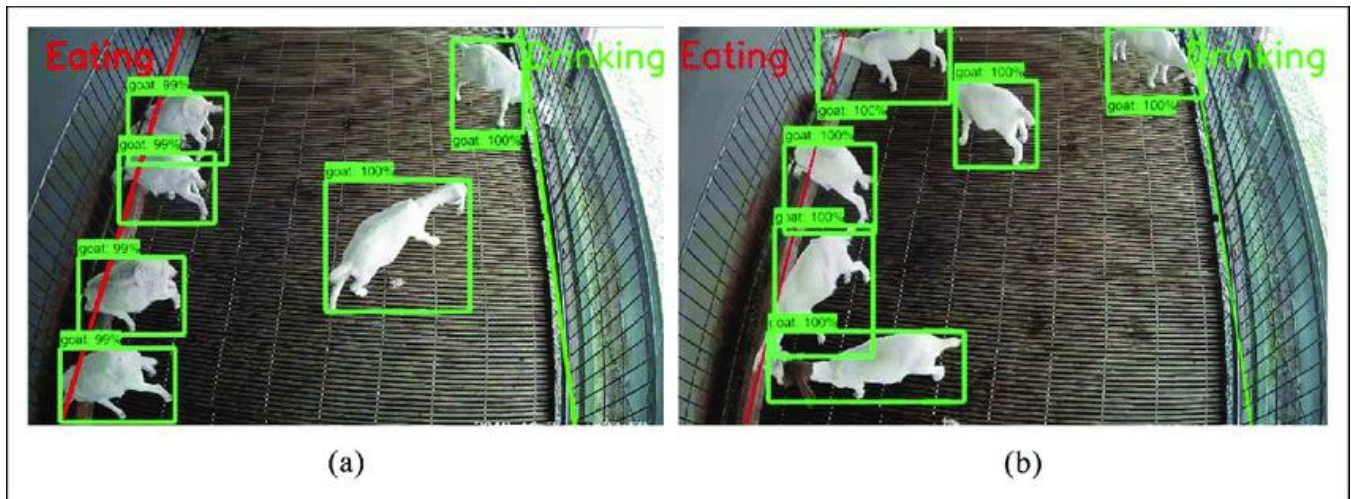
8 Top View of Camera and Exit Gate



9 Real Time detection of Goats on Entry and Exit Gate



10 Two Scenario of Analyzing the Goats behavior.



11 Conclusion.

Detect and count the goat and Sheep, have a proper accuracy using Azure Analytics service and Azure AI services.