Case 1: Smart Attendance system

Organizations are looking for a smart attendance system that utilizes new technologies to clock in & out from anywhere. With COVID-19 pandemic the usage of biometrics devices was ceased, and employees were asked to use other ways to record attendance such as card and manual signing document. However, these approaches are subject to breaches and misuse to ensure the right employee is at the right place to work. Organizations are looking for other possible approaches that utilize different media to record employee in/out. The approach must be secure and controlled so less misuse or breaches can occur, (2) it must be safe and not exposing people health and safety (3) easy for enrollment so it does not require collecting more data about employee (4) cost-effective and does not require investment or production of access media for all individuals such as RFID cards, so no need to worry about fake or buddy clocking.

Additional Resources

The links below provide some additional resources around the different components that can be used as a reference in your solution.

- Azure Architecture Center Architecture diagrams, reference architectures, example scenarios, and solutions for common workloads on Azure.
- Azure IoT Edge intelligent devices recognize and respond to sensor input by using onboard processing. These devices can respond rapidly, or even offline. Intelligent Edge devices limit costs by preprocessing and sending only necessary data to the cloud.
- Azure IoT Hub connects virtually any IoT device with Azure cloud services. IoT Hub enables highly secure and reliable bi-directional communication, management, and provisioning for IoT Edge devices.
- Device provisioning For registering and connecting large sets of devices, we recommend using the IoT Hub Device Provisioning Service (DPS). DPS lets you assign and register devices to specific Azure IoT Hub endpoints at scale.
- Azure Stream Analytics (ASA) provides real-time serverless stream processing with built-in machine learning (ML) models to perform anomaly detection directly in streaming jobs.
- Azure Data Lake Storage is a data lake storage solution for big data analytics, combining Azure Blob Storage capabilities with a high-performance file system.
- Azure Databricks is a fast, easy, and collaborative Apache Spark-based analytics service that can read and analyze data lake data.
- Azure Cognitive Services are artificial intelligence (AI) services and cognitive APIs that help build intelligent apps. For example, Computer Vision helps count and monitor people density and movements. Speech to Text, Text to Speech, and Language Understanding help provide verbal responses and interactions.
- Azure Kubernetes Service (AKS) is a managed, serverless Kubernetes platform for microservices apps. Kubernetes is open-source orchestration software for deploying, managing and scaling containerized apps.
- Azure API Management deploys Azure, third-party, and external APIs side by side to optimize traffic flow, provide unified control and visibility, and ensure security and compliance.
- Microsoft Power BI visualizations enable well-informed and data-driven reporting and decision making.

Case 1: Intelligent Minutes of Meetings

With COVID-19 pandemic spreading, many traditional meeting transfers into virtual/online meeting. The frequency of meetings has increased dramatically and required a smart tool for managing these meetings. Organizations are seeking for a tool that has (1) note-taking capabilities where it listens and records notes using NLP natural language processing techniques (2) voice recognition so it identifies people while talking (3) NLP must be able to identify actions and build an action plan with an assignment to the right people (4) smart tool then will draft a minute of meetings where it records attendance, absence, actions to be taken, and circulate them to all invitees, (5) an added value feature will be enabling the tool to track and follow up actions with people, and update the action plan accordingly, plan the agenda for next meetings, and schedule the time and date by accessing invitee timetable to find out the most appropriate time.

Additional Resources

The links below provide some additional resources around the different components that can be used as a reference in your solution.

- Azure Architecture Center Architecture diagrams, reference architectures, example scenarios, and solutions for common workloads on Azure.
- Open DataSets Curated open data made easily accessible on Azure
- Azure Cognitive Services are artificial intelligence (AI) services and cognitive APIs that help build intelligent apps. For example, Computer Vision helps count and monitor people density and movements. Speech to Text, Text to Speech, and Language Understanding help provide verbal responses and interactions.
- Azure Cognitive Search AI-powered cloud search service for mobile and web app development
- Microsoft Bot Framework A comprehensive framework for building enterprise-grade conversational AI experiences.
- Cosmos DB stores shared session state for every conversation, allowing the web application to scale out in a stateless architecture.
- Azure Machine Learning Workbench The Workbench is used for data cleaning and transformation, and it serves as the primary interface to the Experimentation and Model Management services.
- Azure Machine Learning Experimentation Service The Experimentation Service is used for model training, including hyperparameter tuning.
- Azure Machine Learning Model Management Service The Model Management service is used for deployment of the final model, including scaling out to a Kubernetes-managed Azure cluster.
- Azure Kubernetes Service (AKS): Deployment for this solution uses Azure Kubernetes Service running a Kubernetes-managed cluster. The containers are deployed from images stored in Azure Container Registry.

Case 3: Addressing customers concerns in real-time

Today it has become common practice for people to be it Twitter, Instagram, Facebook or personal blogs, to share their day-to-day experiences. Traffic jams, bad service at the passport office, slow-to-respond government websites, however mundane it might seem, people feel compelled to share this information with the world. But where many see this content as being banal, it can be priceless to a well-organized government, looking to improve public services. Organizations are looking for semantic analytics capabilities to cluster data by the underlying semantic meaning. Data that was about traffic jams could all be grouped automatically. Data about long waits at an organization department or a poor customer

service experience could also be grouped, providing business decision-makers with a very precise picture of which areas require focus. Priorities can be set more quickly, resources can be allocated more efficiently, and better solutions can be delivered more rapidly. With historical data and semantic clustering, the final stage in the organization analytics is predictive analytics. By extracting several features from the historical data as well as the semantic and sentiment analysis, it might be possible to create predictive models to anticipate bottlenecks in various services. If organizations could predict when a particular service might be overwhelmed by demand and deploy sufficient resources in anticipation of such an event, then the organization's customers might not experience any downtime of services and maintain a more positive view of their organizations.

Additional Resources

The links below provide some additional resources around the different components that can be used as a reference in your solution.

- Azure Architecture Center Architecture diagrams, reference architectures, example scenarios, and solutions for common workloads on Azure.
- Open DataSets Curated open data made easily accessible on Azure
- Azure Event Hubs Simple, secure, and scalable real-time data ingestion
- Azure Stream Analytics (ASA) provides real-time serverless stream processing with built-in machine learning (ML) models to perform anomaly detection directly in streaming jobs.
- Azure Machine Learning Workbench The Workbench is used for data cleaning and transformation, and it serves as the primary interface to the Experimentation and Model Management services.
- Azure Machine Learning Experimentation Service The Experimentation Service is used for model training, including hyperparameter tuning.
- Azure Machine Learning Model Management Service The Model Management service is used for deployment of the final model, including scaling out to a Kubernetes-managed Azure cluster.
- Azure Data Factory A fully managed, serverless data integration solution for ingesting, preparing, and transforming all your data at scale.
- Microsoft Power BI visualizations enable well-informed and data-driven reporting and decision making.

Case 4: Waste Management

Waste management in the modern world has appeared as a serious issue. Waste management is a daily task in urban areas, which requires a large number of labour resources and affects natural, budgetary, efficiency, and social aspects. Many approaches have been proposed to optimize waste management, but the results are still too vague and cannot be applied in real systems, such as in universities or cities. Recently, there has been a trend of combining optimal waste management strategies with low-cost IoT architectures. Organizations are looking for a novel method that vigorously and efficiently achieves waste management by predicting the probability of the waste level in trash bins. By using machine learning and IoT, the system can optimize the collection of waste with the shortest path. The system must save time by finding the best route in the management of waste collection and avoid the empty trash bins and build the right route, and an optimized schedule for collection to save time, cost and effort.

Additional Resources

The links below provide some additional resources around the different components that can be used as a reference in your solution.

- Azure Architecture Center Architecture diagrams, reference architectures, example scenarios, and solutions for common workloads on Azure.
- Open DataSets Curated open data made easily accessible on Azure
- Azure IoT Central IoT Central is a fully managed SaaS (software-as-a-service) solution. It abstracts the technical choices and lets you focus on your solution exclusively. This simplicity comes with a tradeoff in being less customizable than a PaaS-based solution.
- Azure IoT Edge intelligent devices recognize and respond to sensor input by using onboard processing. These devices can respond rapidly, or even offline. Intelligent Edge devices limit costs by preprocessing and sending only necessary data to the cloud.
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Case 5: Build Smart, Safe & healthy Countries

Governments have seen a rapid surge of urbanization in the past two decades. This rapid increase in the urbanization has posed the need to augment and/or optimize the utilization of infrastructure and public sector administration to mitigate the challenges related to congestion, pollution, safety, living standards etc. Governments are in pursuit of exploring potential initiatives that contribute to the development of their country of future-making life safer and healthy for its citizens, residents and tourists. Towards this objective, participants of the hackathon are invited to build a working model through the application of AI technologies in the following suggested areas:

- Participation in decision making
- Enable transparent Governance and improve public finance management

- Build Innovative spirit & culture of entrepreneurship
- Facilitate trade and commerce
- Crowd management
- Smart parks and public facilities
- Detect fraud and corruption
- Improve crime reporting
- Reduce pollution and facilitate environmental protection
- Soil health monitoring & restoration
- Enable sustainable resource management
- Facilitate cultural facilities
- Improve health care facilities and health conditions of constituents
- Improve Housing quality
- Enhance education facilities and quality of education
- Attract tourists and augment tourism
- Enable sustainable, innovative & safe transport systems
- Assist vulnerable citizens

Additional Resources

The links below provide some additional resources around the different components that can be used as a reference in your solution.

- Azure Architecture Center Architecture diagrams, reference architectures, example scenarios, and solutions for common workloads on Azure.
- Open DataSets Curated open data made easily accessible on Azure
- Azure FarmBeats Enables building data-driven digital agriculture solutions
- Azure IoT Central IoT Central is a fully managed SaaS (software-as-a-service) solution. It abstracts the technical choices and lets you focus on your solution exclusively. This simplicity comes with a tradeoff in being less customizable than a PaaS-based solution.
- Azure IoT Edge intelligent devices recognize and respond to sensor input by using onboard processing. These devices can respond rapidly, or even offline. Intelligent Edge devices limit costs by preprocessing and sending only necessary data to the cloud.
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- Azure Cognitive Search AI-powered cloud search service for mobile and web app development
- Microsoft Bot Framework A comprehensive framework for building enterprise-grade conversational AI experiences.
- Azure Machine Learning Workbench The Workbench is used for data cleaning and transformation, and it serves as the primary interface to the Experimentation and Model Management services.

- Azure Machine Learning Experimentation Service The Experimentation Service is used for model training, including hyperparameter tuning.
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