**Algorithm: IoT-Based Data Retrieval using Arduino and RDS (Proposed Method)**

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| 1: | **Inputs:** | | | | | |  | **Note** |
| 2: |  | SensorData: [Temperature, Humidity] | | | | | |  |
| 3: |  | Timestamp: Date and Time of reading | | | | | |
| 4: |  | Δt: Time interval between readings (1 minute) | | | | | |
| 5: |  | T\_start: Start time for data retrieval | | | | | |
| 6: |  | T\_end: End time for data retrieval | | | | | |
| 7: | **Outputs:** | | | | | |  |
| 8: |  | RetrievedData: Parsed records between T\_start and T\_end | | | | | |
| 9: |  | ExportedFile: Excel file containing filtered data | | | | | |
| 10: | **Start:** | | | | | |  | DHT\_IoT\_AWS.ino |
| 11: |  | 1. [Sensor Layer]- Repeats every Δt (1 minute) | | | | | |
| 12: |  | | | a. Initialize sensors to measure Temperature and Humidity. | | | |
| 13: |  | | | b. Every Δt, read SensorData and current Timestamp. | | | |
| 14: |  | 2. [Field Gateway - Arduino] - Repeats every Δt (1 minute) | | | | | |
| 15: |  | | | a. Use Arduino IDE to send SensorData via MQTT to AWS IoT Core | | | |
| 16: |  | | | b. Create Payload = {"timestamp": "YYYY-MM-DD+HH:MM:SS",  "temperature": value,"humidity": value} | | | |
| 17: |  | 3. [AWS Cloud - Lambda Function] - Repeats every Δt (1 minute) | | | | | | Lambda\_handler.py |
| 18: |  | | | a. AWS IoT Core receives Payload and triggers a Lambda Function. | | | |
| 19: |  | | | b. Lambda function parses the payload: | | | |
| 20: |  | | | | - Split timestamp into Date and Time. | | |
| 21: |  | | | | - Extract temperature and humidity values. | | |
| 22: |  | | | c. Insert structured data into RDS table: | | | |
| 23: |  | | | | - Table: `dht\_rds\_instance\_table` | | |
| 24: |  | | | | - Columns: dht\_date, dht\_time, dht\_temperature, dht\_humidity | | |
| 25: |  | | 4. [Data Retrieval - Python Script] - (Run by user periodically or on-demand) | | | | | Data\_Retrieval\_RDS.py |
| 26: |  | | | a. User inputs T\_start and T\_end (as date + time). | | | |
| 27: |  | | | b. Connect to RDS using psycopg2. | | | |
| 28: |  | | | c. Run SQL query: | | | |
| 29: |  | | | | SELECT \* FROM dht\_rds\_instance\_table WHERE (dht\_date + dht\_time) BETWEEN T\_start AND T\_end | | |
| 30: |  | | | d. Store results in RetrievedData. | | | |
| 31: |  | | | e. Export RetrievedData to Excel (ExportedFile). | | | |
| 32: | **End** | | | | |  | |  |