

CodeClan 16-Week Software Development Course

Final Project – Brief

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THE CLIENT

Auraventi (Av) is the client for this project.

About

Av is a commercial project which uses machine learning & artificial intelligence technology to provide very accurate local weather forecasts.

“We specialise in the renewable energy sector, and have developed APIs for clients that provide localised hourly future forecasts (typically up to two days ahead) for weather variables...” (source: <https://auraventi.com/about/>)

“Auraventi delivers data-driven intelligent information and control solutions that help its clients optimize their ‘weather-bound’ and ‘behaviour-bound’ processes and systems. In other words, if weather affects your planning, we give you better plans.” (source: <https://auraventi.com/what-we-do/>)

Use Case

Forecasting wind and/or solar generation

“Whether you have a single small turbine, or an extensive solar farm, we will quickly deliver an API that supports highly accurate generation forecasts for your specific site. Typically, your developers will build calls to our API into your control systems, but if required we will of course provide our forecasts via an accessible graphic interface.” (source: <https://auraventi.com/what-we-do/>)

MINIMUM VIABLE PRODUCT (MVP)

Goal 1: Persist weather data to a relational database (DB).

Current status:

- The output is being written to text files which get overwritten every hour
 - i.e. no persistence

Potential benefits:

- Existing API can read from the DB instead
- Data can be retained
- Scalability and efficiency

Tasks:

- Produce an Entity Relationship Diagram (ERD) to capture DB structure
- Spin up a new Amazon Web Services (AWS) instance then install DB on it
- Design the schema
- Create tables
- Write Java programme to read from Av API and write to the DB
- Schedule Java programme to be run every hour using Cron

Goal 2: Build a basic front-end Business Intelligence (BI) dashboard with scope for extension and featuring charts which update every 30 mins.

Current status:

- Chart.js & Thymeleaf are used to produce very basic charts which are not intended to be shown to clients
- As such, the charts are not being updated (unless you refresh the browser)

Potential benefits:

- BI dashboard will be built with appropriate technology for the job
- It will feature an extensible design
- An auto-refresh facility will be incorporated
- Taken together, the above will mean that the new BI Dashboard can be shown to clients

Tasks:

Server-side:

- Set up Sinatra with an index route
- Add Ruby code to respond with JSON for that route

Client-side:

- Display JSON as charts using a charting library (e.g. Highcharts) for the following weather measures:
 - Cloud cover
 - Humidity
 - Precipitation intensity
 - Precipitation probability
 - Temperature
 - Wind speed

EXTENSIONS (beyond MVP)

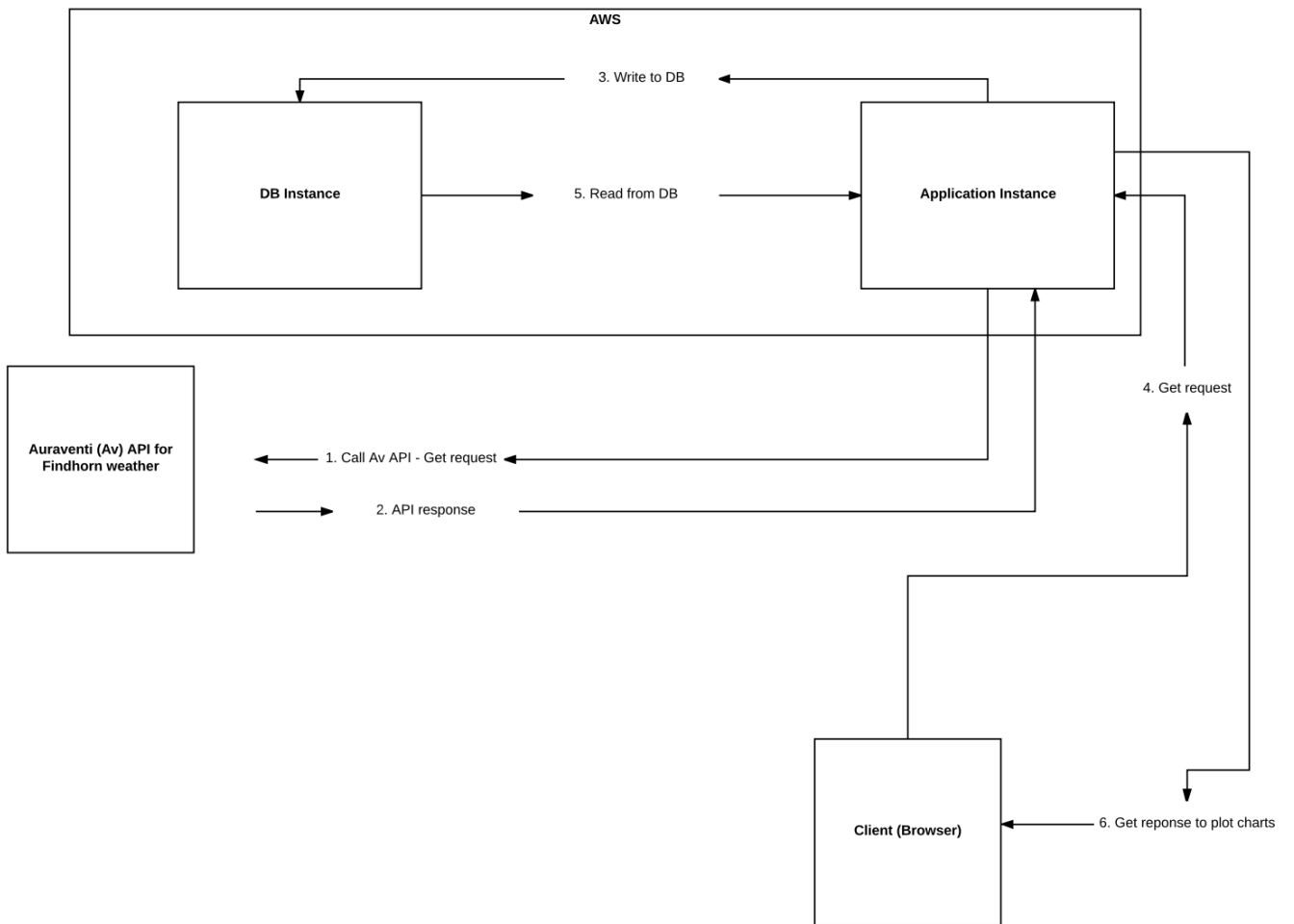
Goal 2

- Ability to switch from imperial to metric units
- Charts to include confidence intervals
- A time slider for all charts
- An Error report of Auraventi forecast
- A basic demo of Auraventi's performance against DarkSky
- Include renewable energy generation charts (where appropriate)

MAIN TARGET ACHIEVEMENTS

1. Liaise with an external client to establish MVP
2. Maintain ongoing communication with client with regard to progress, issues, MVP status etc.
3. Communicate with CodeClan instructors with regard to client needs (MVP)
4. Meet MVP; in doing so, help client improve current system and create scope for future extensions
5. Improve understanding of working with a real-world client
6. Learn new technology/gain new skills – e.g. AWS

SYSTEM DIAGRAM



FURTHER INFORMATION

Av JSON response example:

```
▼ {  
  ▼ "forecasts": [  
    ▼ {  
      "timeStamp": 1504125000,  
      "timeGMT": "8:30 PM 8/30/17",  
      "forecast": 54.96  
    },  
    ▼ {  
      "timeStamp": 1504126800,  
      "timeGMT": "9:00 PM 8/30/17",  
      "forecast": 54.43  
    },  
    ▼ {  
      "timeStamp": 1504128600,  
      "timeGMT": "9:30 PM 8/30/17",  
      "forecast": 54  
    }  
  ],  
  "predictionType": "temperature",  
  "location": "findhorn"  
}
```

Av existing minimal dashboard example: findhorn

Map



Note: if any of the charts is empty that forecast probably does not exist!

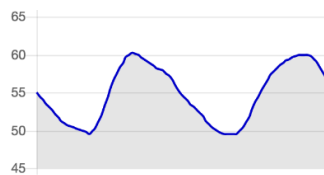
cloud cover



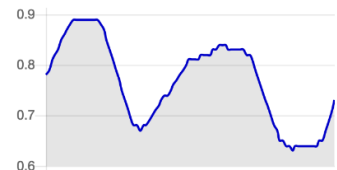
precipitation intensity



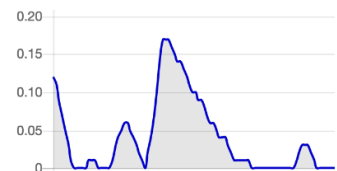
temperature



humidity



precipitation probability



wind speed

