IT314-Software Engineering

G-22 Weather Prediction System

LAB03 Use Case Modeling
And Product Backlog(Task-3)

Team Members:

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Sprints & Function point estimation

Complexity Factor:

Complexity factor	value
Heavy Use Configuration	3
Data Communication	3
Distributed Processing Function	2
Performance	4
End user Efficiency	4
Online Data Entry	4
Transaction Rate	3
Operation Ease	1
Complexity of UI	3
Complexity of processing	4
Reusability	2
Installation	3
Supportability	2
Training required	4
$\sum F_i$	42

Complexity Factor = $0.65 + 0.01\sum F_i$

Complexity Factor(CF) = 0.65 + 0.01*42 = 0.65 + 0.42 = 1.07

Function Type	Low	Average	High
EI	x 3	x 4	x 6
EO	x 4	x 5	x 7
EQ	x 3	x 4	x 6
ILF	x 7	x 10	x 15
EIF	x 5	x 7	x 10

Sprint 1: Data Gathering, Cleaning, Frontend, and Backend (Login Page)

1. Data Gathering & Cleaning:

- Task 1.1: Identify and collect relevant data sources.
- Task 1.2: Extract and transform data.
- Task 1.3: Clean and preprocess data.
- Task 1.4: Store cleaned data in a database.

2. Frontend Development (Login Page UI):

- Task 2.1: Design the login page UI.
- Task 2.2: Implement the login page using HTML/CSS/JavaScript.
- Task 2.3: Test the login page on different screen sizes.

3. Backend Development (Login Page Functionality):

- Task 3.1: Set up the backend environment.
- Task 3.2: Create login authentication system.
- Task 3.3: Connect the login system to the database.
- Task 3.4: Test and debug the login functionality.

UFP Breakdown:

1. **External Inputs (EI):**
    - **Login page form**: Low complexity
        - Function Points (FP): 3
2. **External Outputs (EO):**
    - No external outputs for this sprint.
        - FP: 0
3. **External Interface Files (EIF):**
    - **Data sources for collection**: Average complexity (interacting with external systems for data gathering).
        - FP: 7
4. **Internal Logical Files (ILF):**
    - **User data (login system)**: Average complexity (storing user information in a database).
        - FP: 7
    - **Cleaned data (data storage after preprocessing)**: Average complexity.
        - FP: 7

5. **External Inquiries (EQ):**
    - **Login verification query**: Low complexity (checking user credentials).
        - FP: 3

Total UFP1 = 3 + 0 + 7 + 7 + 7 + 3 = 27 UFP

Sprint 2: Model Training, Frontend Completion, and Backend Linking

1. Model Training:

- Task 1.1: Train the machine learning model.
- Task 1.2: Validate and fine-tune the model.

2. Frontend Development (Ongoing to Completion):

- Task 2.1: Complete the frontend development.
- Task 2.2: Implement additional UI/UX elements.
- Task 2.3: Final testing for cross-browser compatibility.

3. Backend Linking:

- Task 3.1: Link frontend to backend functionality (APIs, login system, etc.).
- Task 3.2: Test the integration between frontend and backend.

UFP Breakdown:

1. **External Inputs (EI):**
    - **Model input features**: Low complexity (input data for model training).
        - FP: 3
2. **External Outputs (EO):**
    - **Model training results**: Average complexity (outputs from model training, evaluation metrics).
        - FP: 5
3. **External Interface Files (EIF):**
    - **Data used for model training**: Average complexity (datasets from external sources).
        - FP: 7
4. **Internal Logical Files (ILF):**
    - **Trained model data**: Average complexity (storing model parameters after training).
        - FP: 7
    - **Frontend components**: Low complexity (storing completed UI elements).
        - FP: 5
5. **External Inquiries (EQ):**
    - **Integration testing queries**: Low complexity (requests made during linking between frontend and backend).
        - FP: 3

Total UFP2 = 3 + 5 + 7 + 7 + 5 + 3 = 30 UFP

Sprint 3: Model Linking with Frontend and Backend

1. Model Integration:

- Task 1.1: Link the trained machine learning model with the backend.
- Task 1.2: Connect the model's output with the frontend UI.

2. Frontend & Backend Linking:

- Task 2.1: Implement API endpoints for model interaction.
- Task 2.2: Connect frontend forms to the model for user input.
- Task 2.3: Finalize the integration and perform testing.

UFP Breakdown:

1. **External Inputs (EI):**
    - **User inputs through the frontend**: Low complexity (user input sent to the model).
        - FP: 3
2. **External Outputs (EO):**
    - **Model output displayed in frontend**: Low complexity (results from the model shown to users).
        - FP: 4
3. **External Interface Files (EIF):**
    - **API calls for model interaction**: Average complexity (model integration with backend through APIs).
        - FP: 7
4. **Internal Logical Files (ILF):**
    - **Processed model data**: Average complexity (storing model output results).
        - FP: 7
5. **External Inquiries (EQ):**
    - **Data retrieval from the model**: Low complexity (querying the model for output).
        - FP: 3

Total UFP3 = 3 + 4 + 7 + 7 + 3 = 24 UFP

Sprint 4: Start Testing and Deployment

1. Testing:

- Task 1.1: Perform unit testing (frontend, backend, and model).
- Task 1.2: Conduct integration testing (model, frontend, and backend).
- Task 1.3: Carry out user acceptance testing (UAT).

2. Deployment:

- Task 2.1: Set up the deployment environment (servers, cloud, etc.).
- Task 2.2: Deploy the application (frontend, backend, and model).
- Task 2.3: Monitor deployment and resolve any issues.

UFP Breakdown:

1. **External Inputs (EI):**
    - **Test case inputs**: Low complexity (inputs for unit and integration testing).
        - FP: 3
2. **External Outputs (EO):**
    - **Testing reports**: Average complexity (test results, bug reports).
        - FP: 5
3. **External Interface Files (EIF):**
    - **Deployment environment configuration**: Average complexity (configuration files, cloud setup).
        - FP: 7
4. **Internal Logical Files (ILF):**
    - **Test data and logs**: Average complexity (storing test data, results, and logs).
        - FP: 7
5. **External Inquiries (EQ):**
    - **Testing queries**: Low complexity (queries for validation during tests).
        - FP: 3

Total UFP4 = 3 + 5 + 7 + 7 + 3 = 25 UFP

Total UFP Calculation for All Four Sprints:

Let's sum up the UFPs from each sprint:

- Sprint 1 (Data Gathering, Frontend, Backend**:** Login Page): 27 UFP
- Sprint 2 (Model Training, Frontend Completion, Backend Linking): 30 UFP
- Sprint 3 (Model Linking with Frontend and Backend): 24 UFP
- Sprint 4 (Testing and Deployment): 25 UFP

Total UFP for the Project = 27 + 30 + 24 + 25 = **106 UFP**

Adjusted FP = UAFP * CF = 106 * 1.07 = **113.42**

1FP = 8 Hours (Assumption)

Sprint-Wise Estimated Hours:

1. Sprint 1 (27 UFP):
    - Estimated hours = (27 UFP * CF) × 8 hours = **232 hours** or **10 days**
2. Sprint 2 (30 UFP):
    - Estimated hours = (30 UFP * CF) × 8 hours = **257 hours** or **11 days**
3. Sprint 3 (24 UFP):
    - Estimated hours = (24 UFP * CF) × 8 hours = **206 hours** or **9 days**
4. Sprint 4 (25 UFP):
    - Estimated hours = (25 UFP * CF) × 8 hours = **214 hours** or **9 days**

- Total time estimated = 232 + 257 + 206 + 214 = **909 hours** or **38 days.**

Project Development Teams :

1)Data Gathering and Cleaning team:

Lead: Vraj
Members: Krushang, Sumit, Karnik, Bhavya

2)Frontend Development team:

Lead: Shreshtha
Members: Karnik, Bhavya, Krushang, Vraj

3)Backend Development team:

Lead: Madhav
Members: Shravan, Sumit

4)Model Development And training team:

Lead: Sharvil
Members: Nisharg

5)Testing and Deployment team:

Lead: Nisharg
Members: Shreshtha