Project Name (TBD)

Requirements Specification

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Contents

1 Product Overview

Project Name (TBD) is a web-tool enabling its users to create, edit and manage machine learning models on different sensor data. Project Name (TBD) consists of two primary components:

1. A server application that handles model training and storage, and makes these models available through a REST API. Supports multiple models and multiple users.

2. Client applications to manage and interact with the model, e.g. adding new data points, identifying given data points and setting parameters for model training. A model can be utilized on different clients at the same time. Clients have different capabilites depending on the platform, mobile clients allow input of new data points in form of raw sensor data, while desktop clients allow management features.

Both components together allow for a streamlined and easy-to-use machine learning experience for both the tech illiterate *(a nicer synonym would be better)* and the expert.

2 Purpose

2.1 Core criteria

- The web pages are the graphical user interfaces (GUI) for users.
- The desktop client presents a QR code that when scanned by a mobile client connects it to the same workspace.
- The QR code contains the link to the workspace and the same link can be used to reaccess the workspace later.
- The desktop client allows management features.
- The mobile web client allows input of new data points in form of raw sensor data.
- The mobile web client allows for selecting the sensors the users wish to use. (e.g accelerometer)
- The mobile web client allows for labeling the recorded data.
- The mobile web client gives a real time feedback of sensor data to the user.
- The mobile web client sends the collected sensor data to the web server.
- The desktop web client displays the collected samples.
- The desktop web client allows preprocessing and filtering of the data.
- The features which were selected by the user are computed and stored in the database.
- The sent sensor data is stored in the central database in a unified format.
- Users can select a machine learning model they wish to use.
- Users can change the hyperparameters of the machine learning model.
- A model is trained and stored in the database.
- The link to the workspace with the trained model can be used to identify the sensor data on the mobile web client. The identification happens in real time.

2.2 Optional criteria

- Links for previously accessed workspaces can be stored on the browser to ease reaccess.
- Other data capturing devices are supported, e.g. Arduino.
- The workspaces can be protected with a password.
- The desktop web client displays a status sign if a data collecting device is currently connected to the workspace, e.g. a green sign if connected and a red sign otherwise.
- The mobile web client can define triggers if something is detected, e.g. play a sound.
- The desktop web client can show performance metrics to the user. (OPTIONAL ?)
- The user can train multiple models from the same data sample.
- A read-only link to each trained model in a workspace can be generated by the user.

2.3 Exclusion criteria

- TBD
- Auth (I honestly think it's outside of the scope of PSE, there are dozens of auth providers and every company already has it's own auth system in place (Shibboleth etc.) and we can't possibly support them all)
- –> any sort of security

3 Usage

TBD

3.1 Area of Application

TBD

3.2 Target Groups

TBD

3.3 Operating Conditions

TBD

4 Operating Environment

TBD

4.1 Software

TBD

4.2 Hardware

TBD

5 Functional Requirements

5.1 Main Functions

These functions must be implemented in order to fulfill the core criteria.

5.1.1 Web Client

The web client supports both desktop and mobile modes. The functionality that will be displayed is determined by the device information of the browser.

The web client

Desktop Web Client

/**F010**/ Show a welcome page

/**F020**/ Provide a QR code on the welcome page to create a workspace

/**F030**/ Show the management panel for a created workspace

/**F040**/ Display the collected data on the management panel

/**F050**/ Enumerate the collected data chronologically

/**F060**/ Allow naming of the model on the management panel

/**F070**/ Allow selecting the possible actions on the data on the management panel

/**F080**/ Request the processing of the data according to the selected options

Mobile Web Client

/**F090**/ Show a configuration page

/**F100**/ Allow creating new labels for the actions to be recorded

/**F110**/ Allow configuring the countdown duration until the recording starts

/**F120**/ Allow configuring the recording duration

/**F130**/ Allow selecting the amount of data samples to be recorded

/**F140**/ Allow configuring each sensor individually

/**F150**/ Show a button to initiate the recording

/**F160**/ Show a countdown page

/**F170**/ Display the configuration on the countdown page

/**F180**/ Show a recording page

/**F190**/ Display the sensor data in real-time as curve graphs

/**F200**/ Show a recording completed page

5.1.2 Server API

/**F210**/ Generate and serve a link for a new workspace

/**F220**/ Send a signal to the client that has previously requested a QR code when the QR code is scanned

/**F230**/ Serve workspace information

/**F240**/ Accept data from the mobile client

/**F250**/ Create a model in the workspace

/**F260**/ Rename a model

/**F270**/ Initiate the configured model training

5.1.3 Data Processing

/**F280**/ TBD

5.2 Extending Functions

/**F290**/ Show the previously visited workspaces on the welcome page

/**F300**/ Allow naming each data sample on the management panel

/**F310**/ Allow selecting existing data labels on the mobile client

/**F320**/ Delete an existing model in the workspace

6 Data

TBD

6.1 System Data

TBD

6.2 User Data

TBD

6.3 Database

TBD (Data-Warehouse data ?)

7 Nonfunctional Requirements

TBD

8 System Models

TBD

8.1 Scenarios

TBD

8.2 Use Cases

TBD

9 User Interface

TBD

9.1 Desktop

TBD

9.2 Mobile

TBD

10 ??Qualitatszielbestimmung??

11 Test Cases and Test Scenarios

TBD

11.1 Test Cases

TBD

11.2 Test Scenarios

TBD

12 Development Environment

TBD

12.1 Software

TBD

12.2 Hardware

TBD