Logistep Models

# Overview

This file documents the models required to satisfactorily represent Logistep data objects. The purpose of each model is to represent an in-memory instance of a database row that can be easily manipulated using the Django/Python web application infrastructure. Each model declaration abstracts a database table, and a row is represented by creating an instance of the model. This represents one key piece of the model-view-controller (MVC) architecture used by the Logisteps web application. Models are intended to be data structures with only essential fields and functions. Most functionality for manipulating data is performed at a different layer of the web application.

More information pertaining to models can be found in the [Django documentation](https://docs.djangoproject.com/en/2.1/topics/db/models/).

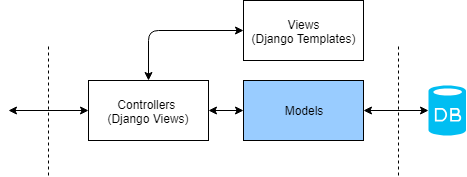


Figure - Models act as the interface between the database and controllers.

It is essential that each model declaration resembles the database table as close as possible in order to reduce conflicts in communication with the database, as well as to keep a clear separation of function.

# Model Design

## LogistepUser

logistepUser.py

### Purpose

The purpose of this model is to represent each unique user for the Logistep products. This model should contain fields related to a user’s physical attributes, assets, and authentication data.

### Fields

|  |  |  |  |
| --- | --- | --- | --- |
| Name | Type | Constraints | Description |
| user | Django Model | Unique | One-to-one field that references a user’s default Django user object. Represents a database foreign key. |
| ­­height | IntegerField | > 0 | Height of the user in centimeters. |
| weight | IntegerField | > 0 | Weight of the user in lbs. |
| step\_goal | IntegerField | > 0 | User’s step goal that they wish to achieve daily. |
| left\_shoe | Shoe Model | - | One-to-one field that references a user’s left show object. Represents a database foreign key. |
| right\_shoe | Shoe Model | - | One-to-one field that references a user’s right show object. Represents a database foreign key. |

### Functions

The following functions should expose additional functionality that may be leveraged to retrieve additional data and provide customized manipulation. This is required because only models should make reads and writes to the database.

#### \_\_str\_\_

* Purpose: Should stringify the Logisteps user for display purposes.
* Returns: String

#### user\_\_username

* Purpose: Exposes the username of the LogistepsUser. May be required for advanced queries.
* Returns: String

#### fullname

* Purpose: Returns a string representing the user’s full name.
* Returns: String

#### getHeight

* Purpose: height is stored an integer representing inches. This function converts height to feet and inches.
* Returns: Dictionary object with feet and inches keys.

#### delete

* Purpose: Override the default behavior for deleting object from database. Needs to handle proper deletion of one-to-one fields.
* Returns: void

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## Step

step.py

### Purpose

Represents a unique step taken by a user. Instances are frequently created by both database reads and web API posts.

### Fields

|  |  |  |  |
| --- | --- | --- | --- |
| Name | Type | Constraints | Description |
| datetime | datetime object |  | Python datetime object representing both the date and time that a step was taken. |
| sensor\_reading | SensorReading Model |  | One-to-one field that corresponds to the Django model object holding sensor data. |
| location | Location Model |  | One-to-one field that corresponds to the Django model object holding location data. |
| user | LogistepsUser Model |  | ForeignKey object that points to the user in which the step belongs to. Not required but assists in writing concise queries. |

### Functions

#### \_\_str\_\_

* Purpose: Creates a string representation of the step object for display purposes.
* Returns: String

#### delete

* Purpose: Override default deletion behavior. Need to delete associated one-to-one fields.
* Returns: void

#### getTime

* Convenience function for getting the time the step occurred.
* Returns: Dictionary object with hour, time, second, millisecond fields.

#### getDate

* Convenience function for getting the date in which the step occurred.
* Returns: Dictionary object with month, date, year.

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## Shoe

shoe.py

### Purpose

Represents a Logisteps designed insole that belongs to a user’s shoe. This should be a relatively small model, mainly used to differentiate steps between a user’s left and right foot.

### Fields

|  |  |  |  |
| --- | --- | --- | --- |
| Name | Type | Constraints | Description |
| FOOT\_CHOICES | List of tuples | Right or left | This is a list used by the Django templates and views that define available foot choices. The tuple should provide a mapping for decoding json. |
| size | DecimalField | max\_digits=3,  decimal\_places=1 | Represents the size of a user’s insole/foot. |
| foot | CharField | max\_length=1,  choices=FOOT\_CHOICES | A single character (“R” or “L”) that represents which foot the insole should be associated with. |

### Functions

#### \_\_str\_\_

* Purpose: Creates a string representation of the foot for display purposes.
* Returns: String

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## SensorReading

sensorReading.py

### Purpose

Simple data model to represent a single sensor reading. Includes the raw data read when recording the step. Sensor readings can take place on either the top or bottom of the insole. This piece of data is recorded in this data model.

### Fields

|  |  |  |  |
| --- | --- | --- | --- |
| Name | Type | Constraints | Description |
| LOCATION\_CHOICES | List of tuples | top or bottom | This is a list used by the Django templates and views that define available sensor locations. The tuple should provide a mapping for decoding json. |
| pressure | FloatField |  | Raw pressure reading associated with step. |
| location | CharField | “T” or “B” | Indicates which sensor in the insole recorded the step. |
| shoe | ForeignKey |  | Foreign key to the shoe model that the sensor belongs to. |

### Functions

#### \_\_str\_\_

* Purpose: Creates a string representation of the sensor reading for display purposes.
* Returns: String

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## Location

location.py

### Purpose

Represents a single location in which a step occurred.

### Fields

|  |  |  |  |
| --- | --- | --- | --- |
| Name | Type | Constraints | Description |
| latitude | FloatField | -180 <= latitude <= 180 | Latitude of user when step was taken. |
| longitude | FloatField | -180 <= longitude <= 180 | Longitude of user when step was taken |

### Functions

#### \_\_str\_\_

* Purpose: Creates a string representation of the location for display purposes.
* Returns: String