Web Engineering Lab (B.Sc Engg Part-4, 2021)

Create an Employee Information System using the Laravel web framework. You can find the initial project in the following GitHub repository.

https://github.com/m-r-kushal/lab4222_23_g1.git

Objective 1

Clone the repository to your computer and place it in your webroot folder. Take necessary steps to make the initial application up and running. (E.g., create a MySQL database for the application, update environment variables in the .env file, install project dependencies). Finally, visit the web application's root URL and show the home page.

Solution: When you clone a Laravel project from GitHub, you'll need to set it up on your local environment before you can run it. Here's a step-by-step guide:

(Note: you must install Laragon, Composer, and npm first)

1. Clone the Repository
   git clone <project-url>

2. Navigate to the Project Folder
   cd <project-folder>

3. Install PHP Dependencies
   composer install

4. Install Node.js Dependencies
   npm install

5. Set Up Environment Configuration
   cp .env.example .env

   This copies the example environment file (.env.example) to a new .env file, which will store the project's environment-specific settings.

6. Generate Application Key
   php artisan key:generate

   This generates a unique application key and adds it to the .env file. The key is used for encryption and other security-related tasks in Laravel.

7. Start the Development Serve
   php artisan serve

   By default, the project should now be accessible at http://localhost:8000.

Objective 2

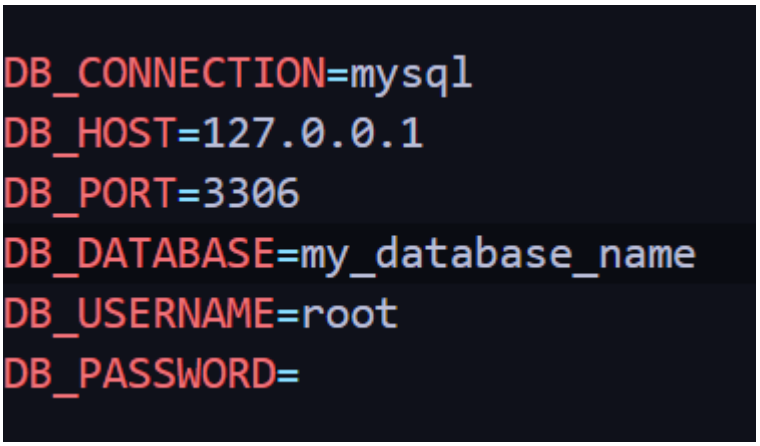
Create a new git branch named dev and generate migration and seeder classes to create a table for employee information following the Laravel naming convention and insert test data.

Table attributes:

- id (primary key)
- name (string:255)
- job_title (string:100)
- joining_date (date)
- salary (float)
- email (string:255, optional)
- mobile_no (string)
- address(text)

Solution: To generate migration and seeder classes, you should first create a database using phpmyadmin, HeidiSQL, or any other database client.

1. Put the database name, username, and password in the env folder like this:



2. Generate a Migration with model, controller, factory, and seeder. When you create these together, these are automatically connected.

   Note: If you create one by one then you need to connect the model, migration, and factory manually. (Not recommended)

   Single Command to Generate Everything You Need:
   php artisan make:model <ModelName> -mcrfs

   <ModelName>: Replace this with the name of your model, typically in singular form (example: Employee).
   -m: Generates a migration file along with the model. This file will be located in the database/migrations directory.
   -c: Creates a controller for the model. This will be placed in the app/Http/Controllers directory.

-r: Indicates that the controller should be a resource controller, which includes methods for handling typical CRUD operations (index, create, store, show, edit, update, destroy).
-f: Generates a factory for the model, placed in the database/factories directory. Factories are useful for generating test data.
-s: Creates a seeder for the model, found in the database/seeders directory. Seeders are used to insert data into the database.

3. Define the Table Structure
   - Open the generated migration file located in the database/migrations directory.
   - In the up() method, define the columns of the table:

```php
public function up()
{
    Schema::create('employees', function (Blueprint $table) {
        $table->id();
        $table->string('name', 255);
        $table->string('job_title', 100);
        $table->date('joinning_date');
        $table->double('salary');
        $table->string('email', 255)->unique()->nullable();
        $table->string('mobile_no')->unique();
        $table->text('address');
        $table->timestamps();
    });
}
```

4. Run the Migration
   php artisan migrate

   This command connects to your configured database server (as specified in the .env file) and updates the database by applying the changes defined in the migration files.

5. Go to the EmployeeFactory file from database/factories and update the file to generate test data

```php
public function definition()
{
    return [
        'name' => $this->faker->name,
        'job_title' => $this->faker->jobTitle,
        'joinning_date' => $this->faker->date,
        'salary' => $this->faker->randomFloat(2, 1000, 10000),
        'email' => $this->faker->unique()->safeEmail,
        'mobile_no' => $this->faker->unique()->phoneNumber,
        'address' => $this->faker->address,
    ];
}
```

6. Goto EmployeeSeeder file from database/seeders and update the file to run the factory in the seeder

```php
<?php

namespace Database\Seeders;

use App\Models\Employee;
use Illuminate\Database\Seeder;

class EmployeeSeeder extends Seeder
{
    /**
     * Run the database seeds.
     *
     * @return void
     */
    public function run()
    {
        Employee::factory(10)->create();
    }
}
```

(Note: Don't forget to add use App\Models\Employee;)

7. Run the Seeder
   php artisan db:seed --class=<seeder_name> (for Employee model seeder name will be EmployeeSeeder)

   Finally 10 test data will be added to the database.

Objective 3

Check Kushal Sir's online video

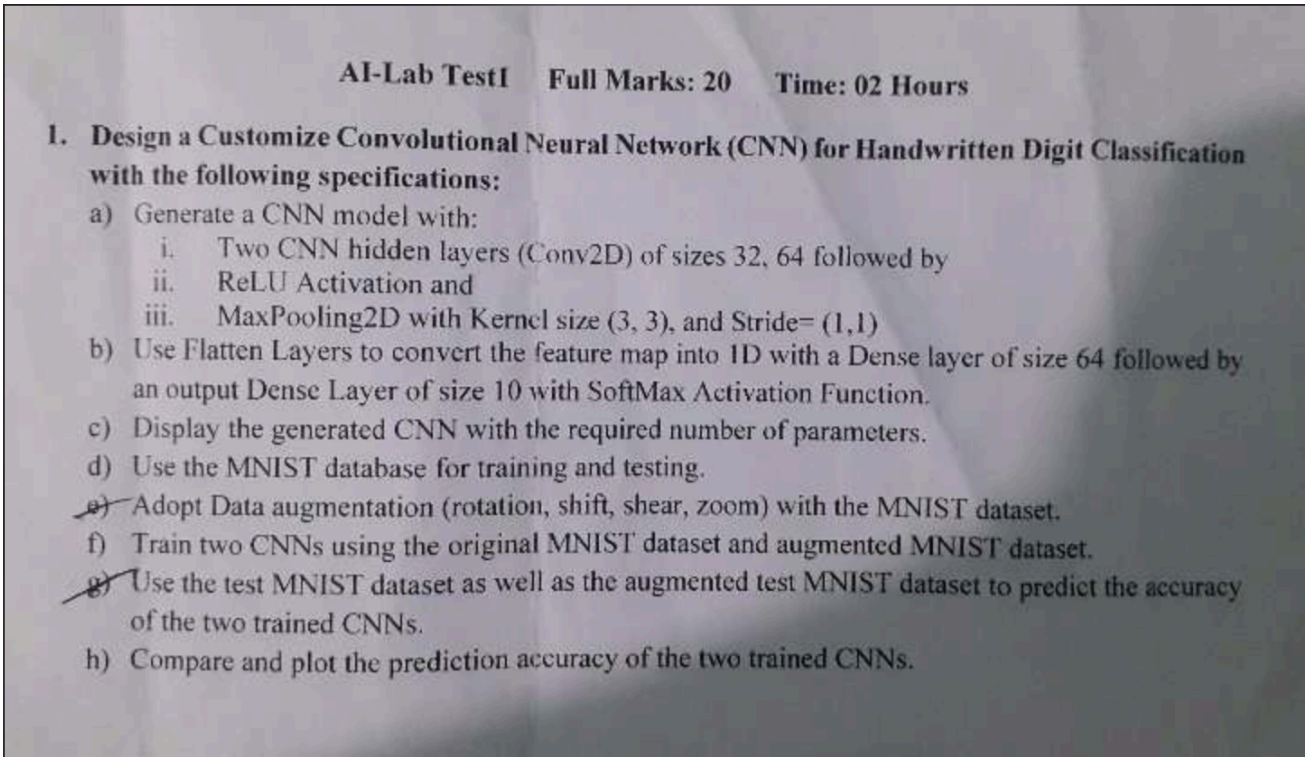
Video Resource by Kushal Sir

- Laravel 11 Class -Recorded on 24th June 2024

  https://youtu.be/zyiozjn7dkg

Artificial Intelligence Lab

We predicts - the final lab question will be similar to this class test question below:



AI-Lab Test1 Full Marks: 20 Time: 02 Hours

1. **Design a Customize Convolutional Neural Network (CNN) for Handwritten Digit Classification with the following specifications:**
   a) Generate a CNN model with:
      i. Two CNN hidden layers (Conv2D) of sizes 32, 64 followed by
      ii. ReLU Activation and
      iii. MaxPooling2D with Kernel size (3, 3), and Stride= (1,1)
   b) Use Flatten Layers to convert the feature map into 1D with a Dense layer of size 64 followed by an output Dense Layer of size 10 with SoftMax Activation Function.
   c) Display the generated CNN with the required number of parameters.
   d) Use the MNIST database for training and testing.
   e) Adopt Data augmentation (rotation, shift, shear, zoom) with the MNIST dataset.
   f) Train two CNNs using the original MNIST dataset and augmented MNIST dataset.
   g) Use the test MNIST dataset as well as the augmented test MNIST dataset to predict the accuracy of the two trained CNNs.
   h) Compare and plot the prediction accuracy of the two trained CNNs.

Solution Notebook

https://colab.research.google.com/drive/1ZM8PAWcfSYhPk3_4VZ8KJI79cvuBaD?usp=sharing

Distributed DBMS Lab

Installation

1. Download and Install Docker Desktop (Personal):

   https://www.docker.com/products/docker-desktop/

2. Run Docker Desktop
3. Create a new directory anywhere (eg: /home/user/hadoop or E:\hadoop)
4. Open terminal from within the newly created directory.
5. **Run the command below to download the container:**

   ```
   docker run -p 9870:9870 -p 8088:8088 -v .:/home/hadoop/data -it --name=hadoop macio232/hadoop-pseudo-distributed-mode
   ```

6. Done.

Work

1. Start the container:

   ```
   docker start hadoop
   ```

2. Get inside the container:

   ```
   docker exec -it hadoop /bin/bash
   ```

3. Done.

Note toTroubleshoot

- If the container exits early, then delete the container using docker desktop or docker cli and run the command in step 5 of installation again.
- The created directory is mapped to the container in /home/hadoop/data for handling data communication.
- The container is an Ubuntu 16.04 OS, so most linux commands will work.

Resources to Learn More

1. https://medium.com/geekculture/hdfs-commands-cheat-sheet-1cd7bf22e795 (for command)
2. https://www.youtube.com/watch?v=qgBu8Go1SyM (word count)
3. https://www.tutorialspoint.com/hive/index.htm (hive QL commands)

Cryptography Lab

https://github.com/Ankar-Kumar/cryptoLab