COVID 19 detection using lungs x-ray images

Domain/Category
AI/Web

Introduction
The COVID-19 pandemic has highlighted the necessity for the development of innovative computer-assisted diagnostic technologies in order to provide quick and affordable screening in all those locations where mass testing using conventional methods is not practical. In addition to being utilized as a backup method for diagnosing COVID-19 in patients, the computer-assisted lung ultrasonography image processing model has demonstrated significant promise in the identification of pulmonary conditions.

The aim of this project is to develop a software system for COVID-19 detection using lungs x-ray images. It will use deep learning to accurately identify COVID-19 as negative or positive from a single image. The system will employ deep learning techniques to accomplish COVID-19 detection using lungs x-ray images.

Project Components:

1. **Data Collection:** Gather a diverse dataset of images with labeled lungs x-ray images.
2. **Data Preprocessing:** Prepare and clean the dataset by resizing images, normalizing pixel values, and organizing the data for training and testing.
3. **Datasets:**
   https://www.kaggle.com/praveengovi/coronahack-chest-xraydataset
   https://github.com/ieee8023/covid-chestxray-dataset
4. **Model Selection:** Choose a deep learning model for COVID-19 detection using lungs x-ray images. Popular choice is the Convolutional Neural Networks (CNNs).
5. **Model Training:** Train the selected model using the preprocessed dataset. Fine-tuning on a pre-trained model can significantly improve accuracy.
6. **Model Evaluation:** Evaluate the model's performance using metrics such as accuracy and precision. Fine-tune the model to achieve the desired level of accuracy.
7. **Webapp development:** develop a webapp using Flask.
8. **User Interface:** Create a user-friendly interface that include that provide option for image upload and display the result as COVID-19 positive or negative with probability value like 1 or .999 among others.
9. **Deployment:** Deploying the model to a webapp.
10. **Testing and Validation:** Conduct thorough testing on various datasets and in real-world scenarios to ensure the system's accuracy and reliability.

Technologies and Tools:

- Python, Tensorflow, Keras, Flask, Jupyter Notebook, google colab, opencv, os, scikit-learn, matplotlib among others

Note:

1. Supervisor or University are not liable to provide any paid resource required for project development.
2. Python skills and prior knowledge of image processing and deep learning is required. Please thoroughly study the proposal and then opt for the project.

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AI Based Automated Service Hunting Tool

Project Domain / Category
AI/ Web technology

Abstract / Introduction
The project involves building a user-friendly application for students to explore in-demand services and understand how to list their own services for potential hiring opportunities. Using the app, students can input specific keywords, seller types, and countries to search a service provider website. The app then collects data on listings, such as titles, descriptions, sales, and ratings, and analyzes them to identify popular services and keywords. Visualizations are provided to help students grasp trends and make informed decisions about offering their own services.

The project will progress through five stages, starting with user interface development using Flask framework to create a user-friendly form for inputting search parameters. The subsequent stage involves implementing web scraping to extract data from the service provider website, including title, description, sales, rating, and more. Data analysis follows, where algorithms, including NLP techniques, are developed to analyze extracted data, perform keyword analysis, and calculate aggregate statistics. Visualizations are then created using libraries like Matplotlib to present analysis results such as focus keywords and total sales. Finally, thorough testing and debugging are conducted to ensure the application's reliability and performance, including unit testing and user acceptance testing to address any issues and optimize functionality.

Functional Requirements:
User Registration and Authentication:
- Users can register for an account.
- Users can log in securely.
- Authentication mechanisms ensure account security.
  Input Form for Search Parameters:
- Users can input search parameters including keywords, seller types, and seller countries.
- Input form validates user input for completeness and accuracy.
  Web Scraping and Data Extraction:
- Application extracts data from the service provider website based on user-defined search parameters.
- Relevant information is collected from listing pages, including title, description, sales, rating, industry, platform, last delivery, and seller rank.
  Data Analysis and Insights:
- Algorithms analyze extracted data to derive insights.
- Keyword analysis identifies focus keywords, unique keywords, and other patterns within listing titles and descriptions.
- Aggregate statistics such as total sales and average rating are calculated for the collected listings.

Customized Analysis and Filtering:
- Users can apply filters and conditions for customized analysis of listing data.
- Filtering options include criteria such as listing start date, sales volume, or seller rating.

Visualization and Presentation:
- Visualizations present analysis results, including focus keywords, unique keywords, total sales, and other relevant metrics.
- Visualizations are responsive and compatible across different devices and screen sizes.

User Interaction and Feedback:
- Intuitive navigation and interface design facilitate user interaction.
- Users can provide feedback on search results and analysis insights.

Tools:
- Python programming language (latest version).
- Flask web development framework.
- Web scraping libraries such as BeautifulSoup or Scrapy.
- Database management system (e.g., SQLite, MySQL).
- IDEs or text editors for coding (e.g., Visual Studio Code, PyCharm).
- Libraries for data analysis and visualization (e.g., Pandas, Matplotlib, Plotly).
- For Natural Language Processing (NLP) in Python, you can use libraries such as NLTK, spaCy, Gensim, Transformers, TextBlob, and StanfordNLP.

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AI Lip-syncing Web Application

Project Domain / Category

AI Web Application

Abstract / Introduction

In the era of digital content creation, the demand for high-quality videos has never been greater. One key aspect of video production is ensuring that the audio is perfectly synchronized with the lip movements of the characters on screen. However, manual lip syncing can be a time-consuming and labor-intensive process.

The objective of this project is to develop a web-based AI lip-sync application that revolutionizes the way videos are created and edited. This application will take a video (which needs lip syncing) and an audio/speech file as input. It will then use advanced deep learning techniques to analyze the audio and generate precise lip movements that match the audio's content and timing. By seamlessly syncing the audio with the video's lip movements, the application will significantly improve the overall quality and realism of the video content.

Functional Requirements:

1. User Authentication: Users should be able to create accounts and log in to the application.
2. Upload Video and Audio: Users should be able to upload video files that require lip-syncing and audio/speech files that will be lip-synced with the video.
3. Lip Sync Processing: The application should use deep learning algorithms to analyze the audio and generate corresponding lip movements for the video.
4. Preview and Edit: Users should be able to preview the lip-synced video and adjust, if necessary, before finalizing.
5. Download Output: Users should be able to download the final lip-synced video for use in their projects.
6. User Feedback: Provide a way for users to provide feedback on the lip-syncing results to improve the application's performance.
7. Error Handling: The application should handle errors gracefully and provide meaningful error messages to users.
8. Security: Ensure that user data is stored securely, and that the application is protected against unauthorized access.

Tools:

Development Environments / IDEs:

1. Backend Development: Python programming language will be used for the backend development. IDEs such as PyCharm or Visual Studio Code can be used for coding and debugging.

2. Frontend Development: HTML, CSS, and JavaScript will be used for the frontend development. IDEs such as Visual Studio Code or Sublime Text can be used for coding and debugging.

Tools and Libraries:

1. Deep Learning Framework: TensorFlow or PyTorch can be used for implementing the deep learning algorithms for lip-sync processing.

2. Web Framework: Flask or Django can be used for developing the web application.

3. Video Processing: OpenCV can be used for processing and manipulating videos.

4. Audio Processing: Libraries like Librosa can be used for audio processing.

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Bird Voice Classifier

Project Domain / Category
Software Engineering/Machine Learning/ Research

Abstract / Introduction
With the rise of Artificial Intelligence techniques, new aspects of life are being identified for its applications. Machine learning plays a pivotal role in artificial intelligence applications. In this project, student will apply machine learning techniques to software engineering. Student will develop a machine-learning model for the classification of bird voices. Students will collect the famous bird voices and label them. The machine learning model will be trained on this built dataset and used in a software application called bird identification. The application will ask us to upload the bird voice and show the bird picture after correctly identifying it.

Functional Requirements:
1. Dataset Development

1.1. Students will download the bird voices from the source in the tools section. The bird voices will be processed using digital signal processing techniques, and students will calculate the specific voice parameters in the frequency domain, time domain, center frequency, pitch, and volume. These parameters are few to mention. Students will search the literature for more acoustic parameters that can help differentiate the voices. Student will use the state-of-the-art tools available in Python, such as https://scikit-maad.github.io/.

1.2. Once the analysis is complete, student will build a CSV dataset containing the label, recording time, quality, and other parameters.

2. BV Model Development

2.1. Students will learn about classification and regression techniques and start of the art models. And choose a suitable model to train it with your previously developed dataset.

2.2. Students will evaluate the model's performance in terms of start-of-the-art classification metrics. Student can refer to the link https://towardsdatascience.com/metrics-to-evaluate-your-machine-learning-algorithm-f10ba6e38234 for more information about classification evaluation.

2.3. Students will build web apps using frameworks and languages such as Python Flask, PHP, or Django, allowing users to log in, upload bird voices, and then detect the correct bird and show its picture. Students will annotate each picture with specific acoustic parameters used in 1.

2.4. Each bird identification instance needs to be saved in a database, and a report of the correct and incorrect bird detections needs to be shown.

Tools:
- Students can use any operating system, such as Windows Linux, and any language of choice, preferably Python. It will be your choice for the ML classification model selection. Models using deep learning architecture will be preferred.

- For web apps, students may use Native Python Flask, PHP, or Python Django framework.

- Indian Bird Voices: https://indianbirdsong.org/

  Note: Students who choose to select this project will be required to showcase the project in a suitable event arranged by the university.

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Classification of Fresh and Rotten Fruits using Computer Vision

Project Domain / Category

Deep Learning / Computer Vision

Abstract / Introduction

The objective of this project is to create an automated detection system that leverages computer vision techniques and deep learning algorithms, specifically Convolutional Neural Networks (CNNs), to accurately identify and classify various fruits(fresh and rotten). You can see the reference paper for better understanding (link is given below). Early detection and diagnosis of fresh and rotten fruits are crucial for farmers to maintain agricultural productivity. You can use the fresh and rotten fruits dataset, which is available on the following links:

https://www.kaggle.com/datasets/sriramr/fruits-fresh-and-rotten-for-classification

Reference paper link:

https://www.hindawi.com/journals/cin/2019/9142753/

This dataset contains labeled images of fresh and rotten fruits, suitable for training and testing your model.

Functional Requirements:

Admin (Student) will perform all these (Functional Requirements) tasks.

- Image preprocessing:

  The system should be able to crop and resize input images for optimal processing and compatibility.

- Disease detection:

  The system must be capable of implementing any CNN model to identify and classify the crop diseases.

- User interface:

  The system must have a user-friendly (desktop-based or android based) interface for uploading the test images and displaying the results ((fresh/rotten) fruit name) after classification.

- Performance evaluation:

  The performance evaluation of this application will be based on assessing the effectiveness of your Automated fresh and rotten fruit classification System. You should submit the results based on the accuracy, precision, recall, and F1-score of your model.

  Tools:

- Python programming language
- TensorFlow or PyTorch for deep learning
- OpenCV for image processing
- Tkinter or PyQt for desktop application / Android Application

Supervisor:

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Android Application for Grocery management

Project Domain / Category
Android Application

Abstract / Introduction
Busy schedule and with increased responsibilities of daily life, it become difficult for people to remember and keep track of quantity of grocery items available. If grocery management is not handling in perfect way its lead to the problem of not having enough grocery items available when required. With increased number of working women, it is difficult to remember every minor items of kitchen and home accessories. Mostly people are away from their home while busy in their jobs, smart grocery management system help them to keep track the availability of kitchen items at home. This app will design to help people to overcome above mentioned problems. Android application will help to keep track availability of grocery items when help of mobile devices. This application will design for 2 major option first one is home and other for restaurants. One more interesting feature of the application is to add different recipes which will help people to make different food items with food available on inventory. The system will help the user while going grocery shopping. A simple scan application will let you know about available quantity of item in their kitchen. After complete the grocery shopping, users can add/update the items quantity by simple scanning the product barcode.

Functional Requirements:
1. The user shall able to register the application
2. The user shall able to login the application with their credential
3. If user forget the password, application able to send existing password to the registered email.
4. The user will able to add, update and view existing items in the inventory.
5. System will able to alert if any item's quantity is low or empty by giving notification.
6. The system/application will able to suggest different recipes according to availability of food items.
7. The system shall able to open any grocery app to order the finished items online.
8. The system will show how much quantity of items required and how much ingredients are available.
9. User will able to see list of added recipes.
10. User can add new recipes and also can delete the existing one.
11. The system shall able to scan the barcode of grocery items.
12. The system shall able to show available quantity of items by scanning bar code.
13. The system shall able to update all items with their quantity by scanning barcode.
14. The system can also auto create shopping list by checking availability of items in inventory.

Tools:
IDE→ android studio.
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Autism Support Companion (MobileAPP)

Project Domain / Category

Mobile Application

Abstract / Introduction

The Autism Support Companion App aims to provide a supportive digital tool tailored for individuals on the autism spectrum, their caregivers, and therapists. This app intends to offer features and functionalities that assist in managing daily tasks, communication, emotional regulation, and social skills development. The primary goal is to create a user-friendly and personalized platform that enhances the quality of life for individuals with autism.

Functional Requirements:

The functional requirements for the Autism Support Companion App project are outlined as follows:

Feature	Description
User Registration	- Users can create an account by providing essential information (name, email, password, Picture) Consider the user did not register itself parent or gradian register on user behalf
User Login	- Registered users can log in securely using their credentials. Click on picture, icon etc.
User Profiles	- Users can create and update their profiles with relevant personal details. - Profile data should include preferences, sensitivities, and communication needs.
Sensory Support	- Provide tools and resources to assist with sensory regulation, such as calming exercises and sensory-friendly content.
Communication Tools	- Include features for augmentative and alternative communication (AAC) methods. - Offer customizable communication boards and visual supports.
Task Management	- Implement task scheduling and reminders to aid in daily routines and time management.
Social Skills Training	- Offer interactive modules and activities for practicing social skills and emotional understanding. - Provide virtual scenarios for social interaction practice.
Emotional Regulation	- Include techniques and exercises for managing emotions and stress.
Accessibility	- Design the app with accessibility features for users with diverse needs. - Provide options for font size adjustment, color contrast, and text-to-speech capabilities.

Tools/Technical Details:

- **Platform:** Android
- **Development Tools:** Android Studio
- **Languages:** Flutter / You can use no code/Low code tool like Flutter Flow
- **Database:** A cloud database for storing recipes and user data, possibly an API for retrieving nutritional information.

Reference material

For Requirement gathering and understating follow the resource.

https://www.hopebridge.com/what-is-autism/
https://www.linkedin.com/advice/0/how-do-you-create-inclusive-mobile-apps-skills-computer-literacy
https://www.hopebridge.com/blog/best-apps-for-autism/
https://www.autismspeaks.org/
https://www.autism-society.org/
https://www.youtube.com/watch?v=SPZTPy0Qj1Q
https://www.youtube.com/watch?v=iyMnmUdNQHI
https://youtu.be/SCmoDGCSt-k
https://www.youtube.com/watch?v=F_8b7PgnNQQ

Android development Learning resource
https://flutterflow.io/
https://flutterflow.io/student-pricing
https://community.flutterflow.io/get-started/post/flutterflow-university-8isRQ27MRGwGsLv
https://www.youtube.com/playlist?list=PLsUp7t2vRqx-xMe6gucpfjeDgIj0tJRIm

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Detector predicting Classroom activities through Machine Learning

Project Domain / Category
Machine Learning and Web application

Abstract/Introduction
In this project, students will have to develop a Detector that predicts which student is on task by utilizing machine learning approaches. The data set will be provided and relevant material, so that the features have already been coded. To evaluate the model, you can use any measurement algorithms for the agreement between a human and non-human coder, or more simply put whether the machine prediction aligns with the way the human observed and coded as students being on task. Students will have to develop the classifier by utilizing any ML approaches.

Functional Requirements:

The following steps should be taken while developing project functionality.

1. The application should have an interface that imports and exports data sets from any device or remotely.

2. The application should have classifier functionality and hyperparameters on the entire data set that predict which student is on task behaviour.
3. The application is expected to add a new training and testing data set to train and test the system.
4. The application should have evaluation criteria that should be developed through machine learning.
5. Result analysis should be developed and executed to determine efficiency and relevant metrics.

Note: Skype sessions must be attended to communicate with the supervisor about discussion otherwise the project will not be accepted.

Tools/language: Python programming language,

Prerequisite: For project problem concepts, students will be expected to cover a short course relevant to the machine learning concepts listed in addition to SRS and initial design documentation. In addition, course links will be provided during Skype sessions.

Supervisor:
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Project Domain / Category
Data Science / Machine Learning

Introduction:
We aim to utilize Python and machine learning techniques to classify flowers into different species based on their characteristics. The Iris dataset is a popular benchmark dataset in machine learning and data science. It consists of measurements of iris flowers, including their sepal and petal lengths and widths, along with the species label.

Functional Requirements for Web Application:

1. **Getting User Input:**
Develop a user interface where users can upload or input an image.
Utilize HTML forms or a file upload widget to allow users to submit the image data.

2. Classify the Image:
Use the deployed machine learning model to predict the class of the uploaded image. Preprocess the uploaded image to ensure it matches the format expected by the model. Pass the preprocessed image through the deployed model for inference. These steps are to be followed carefully:

i.   **Data Pre-processing:**

Check for any missing values in the dataset and handle them appropriately.
Normalize the numerical features to ensure uniformity in scale. Split the dataset into training and testing sets for model evaluation.

ii. **iv. Algorithm Selection:**

Choose appropriate classification algorithms suitable for the Iris dataset, such as Logistic Regression, Decision Trees, Random Forest, or Support Vector Machines (SVM). Experiment with different algorithms to determine the most effective one for this particular classification task.

iii. **Feature Extraction:**

Since the Iris dataset already contains relevant features, feature extraction is not required in this context. Learn about it even if it is not used in this project

iv. **Confusion Matrix:**

Create confusion matrices to evaluate the performance of classification models. Analyze the confusion matrices to assess the accuracy, precision, recall, and F1-score of the models.

v.   **Model Implementation:**

Implement selected classification algorithms using scikit-learn. Train the models on the training dataset and evaluate their performance using the testing dataset.

vi. Accuracy Evaluation:

Calculate the accuracy of each model on the testing dataset. Compare the accuracy of different models to identify the best-performing one.

3. Show the Class Name:
Once the model predicts the class of the uploaded image, display the corresponding class name. This can be done by mapping the predicted class label to a human-readable class name (e.g., "setosa", "versicolor", "virginica" for the Iris dataset).

4. Show the Accuracy:
Calculate the accuracy of the model's prediction. Compare the predicted class with the ground truth class if available (e.g., in the case of labeled test images). Display the accuracy metric to the user, indicating the reliability of the model's prediction.

Dataset:
Obtain the Iris dataset from the given links or get it from sklearn datasets.

Link 1: https://www.kaggle.com/datasets/uciml/iris
Link 2: https://archive.ics.uci.edu/dataset/53/iris

General Instruction(after project selection):

1.   Use only VU email ID(bc123456789@vu.edu.pk) for communication.
2.   Skype name format should be like: bc123456789 Ali Raza
3.   Use the name as it is on your ID card or student card

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Instructor Dashboard for E-Learning Systems using Machine Learning

Project Domain / Category

Software Application

Abstract / Introduction

The application will empower instructors to track students' performance by utilizing data encompassing student engagement, historical records, and demographic information. Employing machine learning algorithms within the Python framework, this application will predict student performance, providing valuable insights to instructors.

Functional Requirements:

The project will comprise of the following functional requirements: -

1. Data pre-processing.
2. Model training and testing.
3. Model tuning.
4. Build instructor web app dashboard.
5. Model deployment in real time environments (AZURE, AWS etc)

Tools:

Python, Scikit-learn, Pycaret, Colab, VS Code, Azure, AWS, Github and streamlit.

Features:

1. Exploring the dataset (Open University Learning Analytics dataset).
2. Plotting Heatmap to see dependency of Dependent value on Independent features.
3. Predict student performance (Fail, Pass, Distinction).
4. Visualization of actual v/s predictive performance.
5. Plotting Graph for all Models to compare performance.
6. Preparing model for deployment.
7. Deployed model using streamlit.

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<u>**Object Detection and Recognition**</u>

Project Domain / Category
Desktop Based Application

Abstract / Introduction
We propose a Desktop based Object Detection software system. It will use deep learning to accurately identify objects from a single image. The project aims to develop a computer vision-based system that can detect the objects like human, vehicles, animals mainly from images. OpenCV, a popular open-source computer vision library, will be used to process and analyze the images. The system will employ deep learning techniques to accomplish object detection.

Project Components:
1. **Data Collection:** Gather a diverse dataset of images having humans, animals, vehicles. Images should have multiple objects in it. Split the dataset for training, testing and validation purpose.
2. **Data Preprocessing:** Prepare and clean the dataset by resizing images, normalizing pixel values, and organizing the data for training and testing.
    You are not allowed to use pertained dataset.
3. **Model Selection:** Choose a suitable deep learning architecture for object detection and recognition tasks based on your parameters.
4. **Model Training:** Fine-tune a pre-trained model on your annotated dataset using transfer learning.
5. **Model Evaluation:** Evaluate the trained model on the validation set using appropriate evaluation metrics for object detection tasks (e.g., mean Average Precision, Intersection over Union).
6. **Real-time Detection:** Implement a real-time detection pipeline using OpenCV to upload an image from and apply the trained model for object detection.
7. **User Interface:** Create a user-friendly interface.
8. **Testing and Validation:** Conduct thorough testing on validation set.
    Technologies and Tools:
- Python
- OpenCV
- Tensorflow, Keras

Note:
1. Supervisor or University are not liable to provide any paid resource required for project development.
2. Python skills and prior knowledge of image processing and deep learning is required. Please thoroughly study the proposal and then opt for the project.

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AutoSum-Research Article Summary Generator using NLP

Project Domain / Category
Machine Learning (ML)/Natural Language Processing (NLP)

Abstract / Introduction
This project aims to address the increasing demand for efficient methods of summarizing vast amounts of scholarly literature, ultimately contributing to the accessibility and dissemination of knowledge within the academic community. AutoSum is a Natural Language Processing (NLP) system designed to automatically generate concise summaries of research articles based solely on their abstracts. Leveraging advancements in machine learning and NLP techniques, AutoSum aims to provide academics, researchers, and students with a tool to quickly grasp the essence of research papers without needing to delve into the full text. This proposal outlines the objectives, scope, methodology, required resources, evaluation criteria, and functional requirements for the development and implementation of AutoSum.

Functional Requirements:

Admin (Student) will perform all these (Functional Requirements) tasks.

- **Data Collection:** Tools for gathering a dataset of research articles and their abstracts from various fields.
- **Preprocessing:** Tools for cleaning and preparing the data for training, including tokenization and normalization.
- **Model Training:** Tools for exploring and training machine learning models, such as LSTM networks or transformer-based models like BERT, for the summarization task.
- **Application Development:** Tools for creating a user interface (UI) where users can input abstracts and receive summaries.
- **Evaluation:** Tools for comparing the generated summaries with human-written summaries to assess accuracy and coherence.

Helping material:

NLP:
https://www.analyticsvidhya.com/blog/2021/03/language-detection-using-natural-language-processing/
https://www.sciencedirect.com/science/article/pii/S1319157821001804

Python
https://www.python.org/
https://www.w3schools.com/python/
https://www.tutorialspoint.com/python/index.htm

Feature Extraction Method:
https://towardsdatascience.com/feature-extraction-techniques-d619b56e31be
https://www.analyticsvidhya.com/blog/2021/04/guide-for-feature-extraction-techniques/
https://towardsdatascience.com/tf-idf-for-document-ranking-from-scratch-in-python-on-real-world-dataset-796d339a4089
https://www.analyticsvidhya.com/blog/2021/07/feature-extraction-and-embeddings-in-nlp-a-beginners-guide-to-understand-natural-language-processing/
http://uc-r.github.io/creating-text-features

Machine Learning Techniques:
https://towardsdatascience.com/machine-learning-an-introduction-23b84d51e6d0
https://towardsdatascience.com/top-10-algorithms-for-machine-learning-beginners-149374935f3c
https://towardsdatascience.com/10-machine-learning-methods-that-every-data-scientist-should-know-3cc96e0eeee9
https://towardsdatascience.com/machine-learning-classifiers-a5cc4e1b0623
https://www.youtube.com/watch?v=fG4e4TUrJ3E
https://www.youtube.com/watch?v=7eh4d6sabA0

Tools:
Java, JavaScript, Python, Anaconda, Tenser Flow, mysql

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Toxic Comments Detection using Machine Learning for Roman Urdu

Project Domain / Category
Data Science/Machine Learning

Abstract / Introduction
Online platforms often face the issue of toxic comments, which can be abusive, or hateful in nature. These toxic comments not only create a negative atmosphere but also pose significant challenges for content moderation. However, toxic comments classification in languages other than English, especially in non-Latin scripts, poses unique challenges.

This project aims to develop a machine learning model for classifying toxic comments written in Roman Urdu. Secondly, the project aims to gather and prepare a varied dataset of Roman Urdu comments, making sure it's good enough for training the model. By carefully designing features and picking the best model, we want to make sure our system can tell toxic comments apart from non-toxic ones really well.

Functional Requirements:
Admin (Student) will perform all these (Functional Requirements) tasks.

1. **Data-Collection**
- For this project, student will collect data from any social media platform (such as YouTube, Facebook, Twitter, or Instagram) to detect toxic comments. Dataset must contain at least 5000 comments. The data set is shared in the link below for the idea.

2. **Pre-processing**
- As most of the data in the real world are incomplete containing noisy and missing values. Therefore, student have to apply pre-processing on data. In pre-processing, student will *normalize* the data set, handle *stop words, missing values*, and *noise & outliers,* and remove *duplicate values.*

3. **Feature Extraction**
- After the pre-processing step, student will apply the feature extraction method. Student can use Term Frequency - Inverse Document Frequency (TF-IDF), Uni-Gram (1-Gram), Bi-Grams (2-Grams), Tri-Grams (3-Grams), or N-Grams feature extraction method.

4. **Train & Test Data**
- Split data into 70% training and 30% testing data sets.

5. **Machine learning Techniques**
- Student must use at least three *classifiers/models* (e.g. Naïve Bayes, Naïve Bayes Multinomial, Poly Kernel, RBF Kernel, Decision Tree, Random Tree or Random Forest Tree etc.) of three different *machine learning techniques/algorithms*.

6. **Confusion Matrix**
- Create a *confusion matrix* table to describe the performance of a classification model.

7. **Accuracy Evaluation**
- Find the accuracy of all techniques and compare their accuracy.
- This project will also tell us which machine learning technique is better to detect Toxic comments.

Tools/Techniques:

- Anaconda (Python distribution platform)
- Jupiter Notebook (Open-source web application)
- Python (programming language)
- Machine Learning (Technique)

Prerequisite:
Artificial Intelligence, Machine Learning, and Natural Language Processing Concepts,
"Students will cover a short course relevant to the mentioned concepts besides SRS and Design initial documentation or see the links below."

Helping Material:
Python:
https://www.python.org/
https://www.w3schools.com/python/
https://www.tutorialspoint.com/python/index.htm

Feature Extraction Method:
https://towardsdatascience.com/feature-extraction-techniques-d619b56e31be
https://www.analyticsvidhya.com/blog/2021/04/guide-for-feature-extraction-techniques/
https://towardsdatascience.com/tf-idf-for-document-ranking-from-scratch-in-python-on-real-world-dataset-796d339a4089
https://www.analyticsvidhya.com/blog/2021/07/feature-extraction-and-embeddings-in-nlp-a-beginners-guide-to-understand-natural-language-processing/
http://uc-r.github.io/creating-text-features

Machine Learning Techniques:
https://towardsdatascience.com/machine-learning-an-introduction-23b84d51e6d0
https://towardsdatascience.com/top-10-algorithms-for-machine-learning-beginners-149374935f3c
https://towardsdatascience.com/10-machine-learning-methods-that-every-data-scientist-should-know-3cc96e0eeee9
https://towardsdatascience.com/machine-learning-classifiers-a5cc4e1b0623
https://www.youtube.com/watch?v=fG4e4TUrJ3E
https://www.youtube.com/watch?v=7eh4d6sabA0

Dataset:
https://drive.google.com/file/d/1Jq62ErAQiMpWfEz9_DwSkjmyYdmwWWu6/view

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<u>**Spare Parts Management System**</u>

Project Domain / Category
Desktop Application

Abstract/Introduction
Spare Parts management system is specially designed for the purpose of adding Spare Parts item's detail. The system elaborates the basic concept for storing and generating Spare Parts item's detail. These items will be distributed in different categories for example there is different type of Tyres in the Spare Parts i.e. Service Tyre and Panther Tyres, so we can search it easily under the appropriate label and inform the customer about their price, and other Specification, if needed. In this system, staff can sign up as a system admin, He/she can have full access to the system for maintaining daily records. It will be a windows-based application which has been developed to make all the operations fast and easy.

The design of Spare Parts Management system is easy to use for every type of users because a lot of shops have salespersons which are not very qualified. In this application we also add images in front of each Item for identification purpose. Whereas, in our application there is a facility of report generation which gives detail information about Spare Parts item's sell and purchase and make staff possible to get hard copy of related reports.

Functional Requirements:
1.   a new user.
- New user can login and logout.

2. Spare Parts Item's
- Admin add, delete or modify the details of the Item's.

3. Search
- User can search for the required Spare Parts Item's based on name, id etc.

4.   Sell Spare Parts Item's
- Item's need to be deducted from the available stock

5. Purchase Spare Parts Item's
- The purchased Spare Parts Item's need to be added to the available stock

6. Report generation
- Depending upon the Spare Parts needs following reports can be generated
- There can be daily reports
- Weekly reports
- Yearly reports

These reports will be of total available stock, how many Spare Parts Items are sold out / purchase on daily, monthly and yearly basis.
The system should be able to **generate** a report of profit on daily, monthly and yearly basis.

Hint: Use the **calendar python** module, it is an in-built module in Python that handles operations related to calendars. The output of the module is displayed as a calendar. By default, the first day of the week for the Gregorian calendars is Monday, and the last day is Sunday.

Tools:

Python is mandatory.

We will use **Tkinter (Tkinter** is one of the most popular programming frameworks for Desktop apps and GUIs. It is a combination of the Tk and Python GUI frameworks**),** to render our application's menu and its buttons, as well as Tkinter is a lightweight module and can be used to create cross-platform applications.

Note:

This Application will be fully automatic, Students are required to enter the required data once which will then be shared between all components of the application automatically. The data flow must be achieved by the students through automation rather then repeated data entry at each form.It is the responsibility of your application that the required data will be available for each form if it is once entered and there is no need of any updating.

There is some functionalities like Profit Calculation where we required different prices so it will be provided automatically by the application, cannot be entered by Staff. So the profit will be calculated fully automatically because all fields required data will be provided automatically.

Templates (Flask template or any other template and Drag and Drops) are not allowed to use in this application you need to use python libraries.

For this project you need to visit any Spare Parts Shop and get more functional and non-functional requirements from the Manager and if you have any ambiguity contact at my Skype id mentioned at the end.

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IoT – Arduino based Fingerprint Attendance System

Project Domain / Category
Digital Logic Design

Abstract / Introduction
In educational institutions, managing class attendance manually is time-consuming and prone to errors. To address this issue, we propose the development of an IoT-based Class Attendance System using Arduino and a fingerprint attendance mechanism. This system will automate the attendance process, ensuring accuracy and efficiency. Additionally, it will feature a database managed locally and remotely for easy access and monitoring.

Objectives
- Develop a reliable and efficient attendance system using IoT technology.
- Implement a fingerprint attendance mechanism for secure and accurate identification of students.
- Create a local database to store attendance records for immediate access and monitoring.
- Establish remote database management capabilities for administrators and faculty members.
- Design a user-friendly interface for administrators and faculty members to manage attendance records.

Methodology
- Hardware Setup: Utilize Arduino microcontrollers and fingerprint sensors to capture attendance data.
- Software Development: Develop Arduino firmware to interface with the fingerprint sensor and transmit data to the database. Create database management software for local and remote access using suitable technologies (e.g., MySQL, Firebase).
- Integration: Integrate hardware components with the software system to ensure seamless operation.
- Testing and Validation: Conduct thorough testing to ensure the system's reliability, accuracy, and security. Validate the system's performance in real-world classroom environments.

Components
- Arduino Microcontroller: Responsible for interfacing with the fingerprint sensor and transmitting data to the database.
- Fingerprint Sensor: Used for biometric identification of students during attendance marking.
- Database: Consists of local and remote databases for storing attendance records.
- User Interface: Provides administrators and faculty members with access to attendance data and management functionalities.

Following will be the salient features and functional requirements of the proposed system:
- Biometric Identification: Utilize fingerprint or facial recognition technology for accurate identification.
- Web Interface: Develop a responsive and intuitive web interface accessible from desktop and mobile devices.

- Real-time Monitoring: Enable employees and administrators to monitor attendance records in real-time.
- Report Generation: Implement functionality to generate customized reports based on specified parameters.
- Security: Ensure robust security measures to protect sensitive attendance data.
- Integration: Seamlessly integrate the biometric attendance system with the web interface for unified access and management.

Tools:

It is an open project. You can use any Mobile Application Development platform. You can use any controller/any Single-Board Microcontroller kit and any platform for web applications.

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Alzheimer Disease Detection and Stages Classification

Project Domain / Category
Image Processing / Artificial Intelligence / Web App

Abstract / Introduction
Alzheimer's disease is a brain disorder that affects memory, thinking, and behavior. It is the most common cause of dementia, which is a decline in cognitive function severe enough to interfere with daily life. Alzheimer's gradually worsens over time, and it eventually becomes difficult for affected individuals to carry out simple tasks. Alzheimer's disease typically progresses through stages, starting with mild memory loss and confusion, then advancing to severe memory impairment, personality changes, and difficulties with basic tasks like dressing or eating. In the later stages, individuals may require a caretaker all the time. Alzheimer's disease has six different stages which are as follows: (i) control normal (CN) is the first stage where no symptoms of the disease are shown. (ii) Significant memory concern (SMC) is the next stage, which is characterized by minor memory related issues that are difficult to detect and are like normal age-related problems. (iii) Early mild cognitive impairment (EMCI) stage causes difficulty in arranging items and planning new things. (iv) The distinguishable symptoms of the disease become visible in the fourth stage called mild cognitive impairment (MCI) stage. Here, the patient is having trouble solving simple math-related problems or managing financial tasks. (v) In the late mild cognitive impairment (LMCI) stage, the person experiences problems remembering details. They need help from their guardians to manage their daily tasks. The patients feel difficulty in their surroundings. (vi) In the last stage of Alzheimer's disease (AD), the person becomes unable to interact with his environment. The last stage often results in a patient's death. The conversion from one stage of AD to another depends on the patient's condition. The project includes detecting Alzheimer disease from a patient MRI scan and classifying it into one of the mentioned stages. You are required to develop a web app in which the patient will enter his/her MRI scan and check his/her status.

Functional Requirements:
- **Dataset Collection:** Collect MRI or FMRI related dataset from available free repositories or any other online source.
- **Pre-Processing**: The collected dataset contains MRI or FMRI scans. Convert these into images using python and use different image processing techniques to create a uniform, normalized image dataset. You may need to perform data augmentation in this step.
- **Model Selection**: Analyze different deep learning-based CNN models and select a suitable one for Alzheimer disease classification.
- **Dataset Splitting:** Split the dataset into training and testing set for model evaluation.
- **Model Training:** Train the selected model using training dataset.
- **Validation and Hyperparameter Tuning:** Validate the model's performance using the validation set and fine-tune hyperparameters like learning rate, batch size, and network architecture to achieve the best results.
- **Model Evaluation:** Check the performance of the model used using testing dataset and different evaluation metrics.
- **Real-time Detection:** Implement a real-time AD detection pipeline using OpenCV to upload an image from and apply the trained model for AD stage detection.

- **User-Interface:** Develop a user-friendly interface in which the patient can easily upload his/her MRI / FMRI scan and get to know about his/her AD stage.

Prerequisites:
- Have a good understanding of Python.
- Having knowledge of basic deep learning concepts and models.
- Understanding of basic image processing techniques (preferable but not mandatory).
- Basic idea of working with image related datasets.

Tools:
- **Language:** Only Python
- **IDE:** JupyterNotebook, Pycharm, Spyder, Visual Studio Code, etc.
  Better to use Google colab environment or google cloud.
- OpenCV
  ### Note:
- VU will not provide any kind of paid resources needed for the project.
- A student must find the dataset by himself / herself.
- Use of any other language is strictly prohibited.
- Kindly read the given instructions properly and choose a project only if you have developed a clear understanding of the project.
- A student who wished to select this project must commit to spend 2 hours daily for FYP project. This may include learning through tutorials or getting help from any reading material.
- In case of any query, feel free to contact and discuss with me.

Important links and Tutorials:
- **Python**
- https://www.w3schools.com/python/
- https://www.tutorialspoint.com/python/index.htm
- https://www.programiz.com/python-programming
- **Deep Learning**
- https://www.simplilearn.com/tutorials/deep-learning-tutorial/guide-to-building-powerful-keras-image-classification-models
- https://www.analyticsvidhya.com/blog/2020/02/learn-image-classification-cnn-convolutional-neural-networks-3-datasets/
- **Image Processing**
- https://builtin.com/software-engineering-perspectives/image-processing-python
- https://neptune.ai/blog/image-processing-python
- https://www.geeksforgeeks.org/image-processing-in-python/
- https://www.tensorflow.org/tutorials/load_data/images

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Handwritten Image Text Extraction using Optical Character Recognition (OCR)

Project Domain / Category
Machine Learning/Image Processing

Abstract / Introduction

Handwritten Image Text Extraction using OCR has emerged as critical field in document digitization. For a long time, it's been challenging to turn handwritten stuff into digital files because everyone's handwriting is different. But now, thanks to new technology called Optical Character Recognition (OCR) things are changing. OCR systems, which learn from computers can understand and change handwritten words into digital text very well. This makes it much easier to turn paper documents in to digital files and analyze them quickly. In this project, we will use the OCR technology to extract text from handwritten images, enabling efficient data processing and analysis. We are training our system using lots of different handwritten images. Our goal is to make sure our OCR system is really good at getting the text right. This project will make a lot of things easier. It helps us ger valuable information from these images. We are helping researchers and data experts get insight they need by turning handwritten images text into digital text.

Original text   Normal text
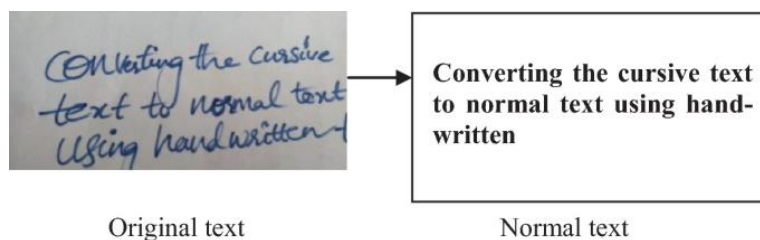
Objectives

1. **System Development:** Develop a system that is capable of accurately extracting the text from images of handwritten text utilizing OCR technology.
2. **Training:** Train the OCR model using a diverse dataset of handwritten samples to ensure accurate text extraction.
3. **Feature Extraction:** Explore the feature extraction methods to identify the key characteristics of handwritten text for improved recognition.
4. **Machine Learning Algorithm:** Explore and utilize the machine learning algorithm to optimize text recognition accuracy and efficiency.
5. **Performance:** Evaluate the performance of system, through rigorous testing and validation procedures.
6. **User-Friendly Interface:** Create a user-friendly interface to enable non-technical users to apply these algorithms to their images easily.
7. **Efficiency and Speed:** Ensure that the algorithm is computationally efficient and capable of processing large volumes of images quickly. This is particularly important for applications with extensive image archives.

Methodology

1. **Data Collection:**
*   Generate a diverse collection of handwritten images featuring a range of different handwriting styles in English language text exclusively.
*   Ensure the dataset includes sufficient samples to represent different handwriting variation and challenges.
    Note: You are not allowed to use any dataset available on the internet. You have to create dataset containing images that have handwritten texts. You have to make sure that your dataset has different styles of handwriting. It should comprise over 100 images We are only focusing on English text for now.

2. **Data Pre-processing:**
*   In this step, you have to clean and prepare the data for analysis.
*   Dataset can be pre-processed by removing duplicates, Resizing, Binarization (converting images to black and white), discarding images containing language other than English, and noise reduction if necessary.

3. **Feature Extraction/Pattern Recognition:**
*   Investigate the feature extraction and pattern recognition techniques and their methods.
*   In this step, you have to extract the relevant features or pattern from the pre-processed images to represent handwritten text effectively.
    Note: This is your choice to use feature extraction or pattern recognition for your system but you must have knowledge about these techniques and their methods.

4. **Post-Processing:**
*   Perform post processing on the extracted text to improve readability and correctness. This may involve spell checking, text cleaning, and formatting.
5. **Output:**
*   You have to output the text in a graphical user interface.
    Note: You are not allowed to save the extracted text in file or output the text on console.
6. **Model Training:**
*   Train the model using machine learning algorithm on the pre-processed and feature/pattern extracted data.
*   Fine-tune the model to improve accuracy and generalization.
    Note: You have the flexibility to use any algorithm for your system.
7. **Evaluation:**
*   Evaluate the performance of your OCR model using following metrics:
*   Character recognition accuracy
*   Word recognition accuracy
*   Processing speed
8. **User Interface (UI) Design (if applicable):**
*   Develop a user-friendly interface to interact with OCR system.
*   This can include features like image selection and real time text extraction.

9. **Select Tools and Libraries:**
- Choose the appropriate image processing tools and libraries.
- Programming Language: Python
- OCR Library: Your choice
- Image Processing Library: Your choice

Helping Material:
https://www.coursera.org/projects/image-processing-with-python
https://www.classcentral.com/course/youtube-image-processing-with-python-54897
https://www.youtube.com/@PyLessons
https://moov.ai/en/blog/optical-character-recognition-ocr

Note: Kindly read the following guidelines before choosing the project.
1. Kindly read the proposal carefully and decide if you have completely understood the project requirements before selecting the project.
2. You have to implement the requirements mentioned in project proposal completely. You are not allowed to add irrelevant and un-necessary requirements.
3. You have to implement the project in mentioned tools and technology.
4. Kindly do not request to use php or html for image processing project.
5. Do not ask to share dataset because it is your task to find the appropriate dataset.
6. Student must have knowledge of image processing techniques.
7. Please feel free to discuss any project- related questions before selecting it.

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Military Targets Classification in MSTAR Dataset Using MATLAB

Project Domain/Category:
Image Processing

Abstract / Introduction:
The project proposal aims to address the challenge of target classification within the Moving and Stationary Target Acquisition and Recognition (MSTAR) dataset using MATLAB. The MSTAR dataset offers a complex array of radar images, presenting a challenging yet valuable dataset for exploring various classification methods. In this project, students will have the flexibility to choose among three methods: Convolutional Neural Networks (CNN), Support Vector Machines (SVM), or Template Matching, based on their interest and expertise.

The primary objective is to develop a robust classification system capable of accurately identifying different targets in the MSTAR dataset. The chosen method will be implemented and evaluated to assess its effectiveness in handling the classification task.

Functional Requirements:

1. Dataset Acquisition:
Acquire the MSTAR dataset, ensuring it covers a diverse range of moving and stationary targets in different scenarios.

2. Preprocessing:
Preprocess the radar images to enhance quality, remove noise, and normalize for consistent analysis using MATLAB's image processing capabilities.

3. Method Selection:
Choose among CNN, SVM, or Template Matching for target classification.

4. Implementation:
Implement the chosen method in MATLAB, ensuring efficient processing and optimization for the MSTAR dataset.

5. Evaluation: Evaluate the performance of the classification system using appropriate metrics such as accuracy, precision, and recall.

6. User Interface:
Develop a user-friendly interface in MATLAB for users to interact with the system, visualize radar images, and analyze classification results.

7. Documentation:
Prepare detailed documentation covering the methodology, algorithm implementation, experimental setup, and evaluation results.

Tools & Technologies:
 Preferred tool and technology: MATLAB (Any latest version of MATLAB)

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<p align="center">**<u>NeuroScan: Advanced Brain Tumor Detection System</u>**</p>

<u>Project Domain / Category</u>
Image Processing/Deep Learning

<u>Abstract / Introduction</u>

NeuroScan is an innovative project aimed at enhancing the efficiency and accuracy of brain tumor detection using advanced machine learning and medical imaging techniques. With the increasing incidence of brain tumors worldwide, early and accurate diagnosis is crucial for timely intervention and treatment planning. NeuroScan seeks to address this challenge by developing a robust and reliable system for automated brain tumor detection.

The admin (student) will develop a system (NeuroScan) utilizing deep learning algorithms trained on large datasets of medical images, including MRI (Magnetic Resonance Imaging) scans and CT (Computed Tomography) scans. The designed system (NeuroScan) will recognize patterns and anomalies indicative of brain tumors with high precision and sensitivity.

<u>Functional Requirements:</u>

Admin (Student) will perform all the following tasks.

1. **Image Input:** NeuroScan should support the input of medical images from MRI and CT scans. The system should be capable of handling various resolutions and image qualities to accommodate different imaging devices.
2. **Preprocessing:** NeuroScan must preprocess input images to remove noise, artifacts, and irrelevant structures that could interfere with tumor detection. Preprocessing techniques should include image normalization, noise reduction, Skull Stripping, and artifact removal.
3. **Data Augmentation:** NeuroScan shall facilitate the augmentation of training data to enhance the diversity and robustness of the dataset utilized for brain tumor detection. The system shall offer a suite of data augmentation techniques, including rotation, translation, scaling, flipping, elastic deformation, intensity adjustment, noise injection, shearing, and random cropping. *Apply the Data Augmentation and increase the dataset by 3 folds.*
4. **Feature Extraction:** The system should extract relevant features from preprocessed images, including shape, texture, intensity, and spatial relationships. Feature extraction methods should capture key characteristics indicative of brain tumors while minimizing information loss.
5. **Model Selection and Development:** Investigate different deep learning architectures and select an appropriate architecture (e.g., U-Net, 3D Convolutional Neural Networks (CNNs), V-Net, DeepMedic, Residual Networks (ResNet), DenseNet, Attention Mechanisms, YOLO) for development.
6. **Train & Test Data:** Split dataset into 70% training and 30% testing dataset and train the model accordingly.
7. **Evaluation and Fine-tuning:** Assess the model's performance using standard NER evaluation metrics (e.g. Accuracy, F1-score, precision, recall, Receiver Operating Characteristic (ROC) Curve and Area Under the Curve (AUC)) and fine-tune the model for improved accuracy.

8. **Confusion Matrix:** Create a *confusion matrix* table to describe the performance of the classification model.
9. **Real-time Detection:** The system should provide real-time or near-real-time tumor detection capabilities to support efficient clinical workflows. Detection speed should be optimized to minimize processing time while maintaining high accuracy.
10. **User Interface:** NeuroScan must have an intuitive and user-friendly interface accessible to medical imaging professionals. The interface should facilitate image input, visualization of detected tumors, and access to diagnostic information. It should support interactive features for adjusting parameters, reviewing results, and annotating findings.

Dataset:
https://drive.google.com/file/d/1CKi6MtrSwARHvBQgJGzutfkAhEb_kuQi/view?usp=sharing
You must use your VU email id to access/download the dataset.

Tools:
- Python
- jupyter notebook
- Colab
- PyQt
- wxPython
- Tkinter
- Kivy
- PySimpleGUI

Prerequisite:
Artificial Intelligence, Machine Learning, and Image Processing, Computer Vision concepts,
"Admin (student) will cover a short course relevant to the mentioned concepts besides SRS and Design initial documentation."

Helping Material
Python
https://www.python.org/
https://www.w3schools.com/python/
https://www.tutorialspoint.com/python/index.htm
Deep Learning:
https://www.tutorialspoint.com/python_deep_learning/index.htm
https://www.tutorialspoint.com/deep-learning-tutorials/index.asp
Deep Learning Crash Course for Beginners (youtube.com)
Deep Learning | What is Deep Learning? | Deep Learning Tutorial For Beginners | 2023 | Simplilearn (youtube.com)
Image Processing:
Python tutorials for image processing and machine learning - YouTube

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Android Application for VU Blood Donation Society

Project Domain / Category:
Android Application

Abstract / Introduction:
Blood is the essential element of human body. About seven 7% of human weight consists of blood. In conventional way blood is donated though some blood organization or Blood banks. Blood bank is thought to be the place where blood is collected from the donor and stored/preserved for a period 28 to 35days for later transfusion. Blood banks also do not support online blood donor database. The number of donors is increasing with increase in population of the country thus we need to have an effective system to have better control and management of data. Using traditional techniques of data entry by operator a lot of issues may happen, like the risk of outdated data, human boredom, error in data and cost etc. Owing to solve all the problems the study is done on an automated Blood bank. In the present traditional system, the factors like gender, age, last date of blood donation, frequency of blood donation per year are not recorded which is given vital importance in this study and used as recruitment factors in blood donation. So, the prime objective of the project is to find a more efficient way in blood donor database management and to create a medium for people to get connected with potential blood donors around the locality.

Functional Requirements:
Donor:
1. Registration (After registration a donor must need administrator approval for login).
2. Login/logout.
3. Modifying profile (profile also contain donation history).
4. Searching record.
5. Can get a notification of blood donation according to his/ her blood group and relevant area.
6. An activity is showing patient requests according to blood groups and different areas.

    Patient:
1. Registration.
2. Login/logout.
3. Modifying profile.
4. Can generate a blood request, that must be published for doners after admin verification.
5. Search active donor record (There are also sleeping donners and this state will be maintained for six months from donation).
6. Requests for required blood (any blood group for other dear once).

    Administrator:
1. Login/logout.
2. Modifying profiles
3. Add/delete/block donor/patient.
4. Approve donor after verification.
5. Send messages to registered donor/patient.

Tools:
- Android Studio is required. (preferably) (or any other mobile app development IDE)
- Any tool for Web-server development (.Net/PHP etc.)
- Javascript, Kortlin Xml or any other front end programming language
- Firebase Real-Time Database or SQLite/Room
- Microsoft Project
- Microsoft Visio
- Microsoft PowerPoint &Microsoft Word

Make sure that you already have or can arrange a PC/Laptop with desired system requirements for Android development before enrolling for this project.

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Android Based Medication Alarm / Reminder Application

Project Domain / Category
Mobile App

Abstract / Introduction
Every year, thousands of senior citizens are placed in nursing homes because they did not take the right medication at the right time. Medication mix-ups are extremely dangerous. A medication reminder and organizer can help to prevent these life-threatening mistakes. They remind you to take the right medication at the right time. This application may help to improve adherence to prescribed treatment plans, leading to the possibility of better health outcomes.
For each medication, you need to input its name, dose, how often you take it, and when you'd like to be reminded to take it. For example, you could type in that you take Eziday once a day at 10AM for blood pressure.

You need to make Android based medication Alarm / reminder Application
 with the following requirements.

Functional Requirements:
Some of the functional requirements are:
1. Application must have a user registration/Log in page using firebase auth.
2. Application must have the feature of user credentials validation for authentication purpose.
3. Application must have flexibility to input the medicines (tab, cap, injection, or external use medication) schedule by inputting their name dose and time of the medicine according to each patient's prescription with number of days plan.
4. Application must alert the user by starting ringing medication alarm when it's time to take certain medicines, reducing medication errors.
5. Users must turn off the alarm button after taking the medicine.
6. Application must show the missing medicine red in color in database in case of a user miss any dose of medicine.
7. Application must stop giving alarm after reaching the number of days of plan have been set up.
8. Application must have offline database of storing the user's information.
9. Application must have Backup/restore for storing important medication information on online database.

Tools:
Programing language: Java
IDE: Android Studio
Database: SQLite & Firebase Real-time

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Android-based Personal Budget Tracker Application

Project Domain/Category:
Mobile/Android Application

Abstract/Introduction
In today's dynamic and fast-paced world, effective personal finance management is crucial for individuals seeking financial stability and security. With an increase in expenses, diverse income sources, and varying financial goals, the need for accessible and comprehensive tools to track, analyze, and manage personal finances has become increasingly pronounced. The Android-based Personal Budget Tracker app serves as a multifaceted solution, offering a range of features crafted to streamline the process of managing personal finances. At its core, the app provides users with the ability to track their expenses with precision and ease.

In addition to expense tracking, this app empowers users to set and manage budgets effectively. Users can establish budget limits for various expense categories based on their financial goals and preferences. The app provides real-time monitoring of spending against these budget limits, alerting users when exceeding predefined thresholds. This proactive approach to Budget management enables users to make informed financial decisions and exercise greater control over their expenditures.

Moreover, the app offers robust tools for financial analysis, allowing users to gain valuable insights into their spending patterns and financial habits. Through comprehensive reports, charts, and graphs, users can visualize their expenses over time, identify areas of overspending or underspending, and track progress toward Budget goals. The app authorizes users to make adjustments to their financial behavior and adopt more careful spending habits.

Ensuring the security and privacy of users' financial data is of primary importance. This app implements robust security measures to safeguard sensitive information, secure storage practices, and options for user authentication. By prioritizing data security and privacy, the app builds confidence in users and promotes trust in its reliability and integrity.

In conclusion, this app represents a comprehensive tool for individuals seeking to enhance their financial literacy and management skills. By combining intuitive design, advanced functionality, and security measures, the app enables users to take control of their financial destinies and embark on a path toward long-term financial success and prosperity.

Functional Requirements
o   User Registration and Authentication.
o   This Authentication may include options for biometric or facial recognition authentication.
o   Enable users to manage their profile information, including personal details and account settings.
o   Users should be able to record their expenses by providing details such as the amount spent, category (e.g., groceries, transportation), date, and optional notes.
o   Users should be able to add and track their sources of income, including salaries, bonuses, and other earnings.
o   Users should have the ability to create budgets for different expense categories and set budget limits based on their financial goals. The application should allow users to edit, delete, and track their budgets over time.

- The application should generate reports and visual analytics to help users understand their spending patterns and financial health. This could include charts, graphs, and summaries of expenses, income, and budget performance over time.
- The application should monitor users' expenses against their budget limits and provide alerts or notifications when they are nearing or exceeding their budget thresholds. Users should be able to customize these alerts based on their preferences.
- Allow users to set reminders for bill payments, budget reviews, or other financial activities to help them stay on track.
- Facilitate splitting expenses between multiple users or accounts, useful for shared expenses among roommates, friends, or family members.
- Users should have the ability to customize the app interface, expense categories, budget limits, and other settings according to their preferences.
- Users should be able to export their financial data in various formats (e.g., CSV, PDF) for analysis or backup purposes.
- Ensure accessibility for users with disabilities by implementing features such as screen reader compatibility, text-to-speech support, and high contrast modes.

Tools:
- IDE: Android Studio (or any relevant mobile app development IDE)
- Programming Language: Java/Kotlin
- Database: Any relevant DBMS (Firebase, MySQL, or any other)
- Unified Modelling Language (UML): Microsoft Visio etc.

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Food Waste Reduction App

Project Domain / Category
Mobile Application

Abstract / Introduction
Food waste is a significant global issue contributing to environmental degradation and economic inefficiency. To address this problem, we propose the development of a Food Waste Reduction App. This Android application aims to assist users in minimizing food waste by providing various functionalities such as suggesting recipes for leftover ingredients, offering expiration date reminders, and providing tips for proper food storage to prolong freshness. By leveraging these features, users can effectively manage their food inventory, optimize their grocery shopping habits, and make more informed decisions regarding meal planning and consumption.

Functional Requirements:

1- User Registration and Profile Management:

- Users should be able to create accounts and manage their profiles within the app.

- Profile management features should include options to update personal information, dietary preferences, and allergy information.

2- Food Inventory Management:

- Users should be able to input and manage their food inventory within the app.

- The app should support manual input of food items OR barcode scanning for convenience.

- Each food item entry should include details such as name, quantity, expiration date, and storage location.

3- Recipe Suggestions for Leftover Ingredients:

- The app should analyze the user's food inventory and suggest recipes based on available ingredients.

- Recipe suggestions should consider the user's dietary preferences, allergies, and cooking skill level.

- Users should be able to filter recipe suggestions by cuisine, meal type, and cooking time.

4- Expiration Date Reminders:

- The app should provide reminders for approaching expiration dates of food items in the user's inventory.

- Users should be able to customize notification settings for expiration date reminders, including frequency and timing.

5- Food Storage Tips and Guidelines:

- The app should offer tips and guidelines for storing various types of food to prolong freshness and prevent spoilage.

6- Search and Filter Functionality:

- Users should be able to search for specific recipes, ingredients, or storage tips within the app.

- The app should support filtering of search results based on various criteria such as ingredient availability, dietary restrictions, and cooking difficulty.

7- User Feedback and Rating System:

- The app should allow users to provide feedback on recipe suggestions, storage tips, and overall user experience.

- Users should be able to rate recipes they have tried and share comments or suggestions for improvement.

Tools:
- Android Studio (Java Language)
- Database (SQLite or Firebase)

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Project Domain / Category

Android App

Modern phone cameras capture stunning photos, but often at the cost of large file sizes. These bulky images can quickly fill your storage, lead to error messages, and take forever to share.

Image Optimizer solves this problem by shrinking your photos without sacrificing quality. Simply select the images you want to optimize, single, multiple, or even your entire album. With a single tap, Image Optimizer will compress your photos, displaying progress as it works. Once complete, your newly optimized images will be saved in a designated folder, freeing up valuable storage space. Plus, Image Optimizer will show you a summary of the number of pictures compressed and the total space saved!

Image Optimizer Functional Requirements

Here are the key functionalities for the Image Optimizer mobile application:

Image Selection and Browsing:

- **Integrated File Browser:** The app should include a built-in file browser to allow users to easily access and select images from both internal and external storage on their phones.
- **Image Preview:** The file browser should offer a built-in image viewer for users to preview images before selecting them for compression.
  Selection Options:

- **Granular Selection:** Users should be able to select individual images, multiple images, or entire albums for compression.
  Customization:

- **Output Directory:** The app should provide a settings feature where users can define a preferred directory to save the compressed images.
  Compression Process:

- **Progress Indicator:** A progress bar should be displayed to indicate the compression progress for each image or batch of images.
  Compression Results:

- **Summary Report:** Upon completion, the app should display a summary message showing the total number of images compressed and the amount of storage space saved.
  Sharing:

- **Share Option:** The app should integrate a sharing feature that allows users to conveniently share the compressed images directly from the app.
  Compression Quality:

- **Lossless Compression:** The image compression process should prioritize lossless compression techniques whenever possible to ensure that the image resolution and quality are maintained.
Additional Notes:

- The application should prioritize a user-friendly interface for easy navigation and intuitive operation.
- Error handling and informative messages should be implemented to guide users in case of any issues during image selection or compression.

Tools & Technologies
Android Studio \ Eclipse

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Kids Mart Android Application

Project Domain / Category
Mobile App / Cloud Computing

Abstract / Introduction
The Kids Mart Android application aims to provide a user-friendly and interactive platform for parents and guardians to shop for children's products conveniently. The application will offer a wide range of products including clothing, toys, accessories, and educational materials suitable for children of different age groups. Users will have access to various features such as browsing products, adding items to cart, secure payments, order tracking, and personalized recommendations.

The application will prioritize safety, ease of use, and a visually appealing interface to enhance the shopping experience for both parents and children.

Functional Requirements:

- There should be separate interfaces for users and admin
- User registration and login: The application should allow all types of users to create an account and log in using their credentials.
- Verify user identity through OTP (One Time Password) for secure authentication.
- Different interfaces should open based on the type of user.
- Display a comprehensive catalog of children's products categorized by age, gender, and type (e.g., clothing, toys, books).
- Allow users to browse products with detailed descriptions, images, and prices.
- Implement search functionality to allow users to find specific products by name, category, or brand.
- Provide filtering options to refine search results based on price range, size, color, etc.
- Show detailed product information including specifications, sizes, colors, and availability.
- Display customer reviews and ratings for products to assist in purchase decisions.
- **Checkout and Payment:** Provide a seamless checkout process with multiple payment options.
  Order Management: Allow users to view order history, track order status, and receive notifications on order updates. Also provide order tracking information including shipment details and estimated delivery dates.
- **User profile:** Allow users to manage their profile information, shipping addresses, and payment methods.

Tools:

Students may use Android studio or any other IDE as per his/her choice but he/she will have to use JAVA programming language. it is also required that data storage and retrieval be conducted via Google's Cloud platform, specifically Firebase. In regards to computational resources, any expenses incurred by students will not be covered by the Virtual University of Pakistan; students are responsible for managing such expenses themselves.

> **NOTE :**
> Before selecting the project, get complete knowledge of the project.
> Application should have an interactive and attractive user interface.
> In case of queries, discuss with the supervisor before selecting in order to avoid ambiguities.

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LeafScan: Smart Plant Disease Detection

Project Domain
Image Processing

Introduction
The "LeafScan: Smart Plant Disease Detection" aims to address the crucial need for early detection and management of plant diseases. This mobile application utilizes image processing techniques to analyze images of plant leaves captured using a smartphone camera. Users begin by capturing images of plant leaves using their smartphone's camera, which are then uploaded to the app. These images undergo a series of algorithms within the app, starting with preprocessing to reduce noise and enhance clarity. Next, relevant features such as texture, color, and shape characteristics are extracted from the leaf images. LeafScan uses image segmentation and pattern recognition to identify specific areas on the leaf images that may detect a disease. These segmented areas are then compared against a comprehensive database of known plant diseases to provide an accurate diagnosis. Upon completion of the analysis, the app displays the disease diagnosis along with recommended actions for treatment and management. With "LeafScan: Smart Plant Disease Detection," users can simply use their smartphones to detect and address plant diseases.

Functional Requirements:
1. User Registration and Login
2. Capture Images of Plant Leaves for Analysis
3. Image Processing for Noise Reduction
4. Feature Extraction from Leaf images
5. Disease Detection Using Image Segmentation
6. Display Disease Diagnosis
7. User Profile Management (Edit Profile, Change Password)

Non-Functional Requirements:

1. Easy-to-Use Interface for users
2. Accurate Diagnosis to provide trustworthy information.

Tools:
1. Development Environment: Android
2. Frontend: React, Flutter
3. Backend: Node.js, Express.js
4. Database: MongoDB
5. Image Processing Library: OpenCV

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Maintenance& Repairing Services Android App

Project Domain / Category
Mobile App

Abstract/Introduction

Now a day's people have difficulty to find professionals for home maintenance and repairing work. Moreover, skilled professionals may charge high rates for their services.

This proposed Android application aims to provide a convenient solution for users to connect with skilled professionals for maintenance and repair work at reasonable rates. The application will serve as a platform where individuals seeking maintenance services can easily find and hire professionals for various tasks.

For example Mr. Ali need a plumber, he will first register with our app. After registration, he will give description of the services that he requires under the plumber work portion. After that different plumbers submit their proposal including rates, material and number of hours. Then it's up to Mr. Ali which plumber he selects.

Functional Requirements:

1. The application will have an admin panel to manage the platform and authenticate users, including both professional workers and service seekers.
2. The application will categorize maintenance and repair work into different categories (e.g., plumbing, electrical, carpentry, etc.) for easy navigation and selection by users.
3. Professionals offering maintenance and repair services can register on the app by providing necessary information such as name, contact details, address, services offered, rates, and profile picture.
4. Users seeking maintenance services can register on the app and submit a description of the required work along with relevant pictures.
5. Upon receiving a service request, registered professionals can submit their proposals, including rates, required materials, and estimated duration to complete the work.
6. Proposals submitted by different service providers will be visible only to the service seeker who posted the service request. Other service providers will not be able to see each other's proposals.
7. The service seeker will have the option to select a preferred service provider based on the submitted proposals.
8. Once a service provider is selected and the work is completed, the service seeker can update the status of the work description within the app.
9. The application will allow users to rate and provide feedback on the quality of service provided by professionals. This feedback will help other users in choosing reliable service providers in the future.
10. The app will send notifications to users regarding new service requests, proposal submissions, selection of service providers, and updates on work status.

11. The application will include a messaging feature that allows communication between service seekers and providers to discuss project details, negotiate terms, and coordinate work schedules.
12. Optionally, the app can integrate payment functionality to facilitate secure transactions between service seekers and providers.

Tools:

Any Android development tool

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Roadside Car Help App

Project Domain / Category
Mobile App

Abstract / Introduction
Picture yourself driving on the highway when suddenly your car stops working. You're far from the nearest town and your phone has no signal. What would you do? Well, there's this Roadside Car Help App. It's designed to help you in situations like this. The app uses GPS to find where you are and then sends a signal for help to a list of people you've chosen beforehand. These people can see where you are and give you a hand, like picking you up or calling a tow truck. The app can also show you nearby places like gas stations, hotels, and restaurants, so you can get assistance even if you're not familiar with the area.

Functional Requirements:

The bulleted list of functional requirements are:

1. The application shall allow users to create an account with a username and password.
2. The application shall allow users to securely store login credentials on the device.
3. The application shall offer a secure method for password retrieval in case of forgotten credentials.
4. The application shall utilize the device's GPS to determine the user's current location with high accuracy.
5. The application shall display the user's current location on a map within the app interface.
6. The application shall allow users to refresh their location information manually.
7. The application shall allow users to create and manage a list of pre-selected contacts.
8. Contacts should include details like name, phone number (optional), and relationship to the user.
9. The application shall allow users to easily edit or remove contacts from the pre-selected list.
10. The application shall provide a clear and easily accessible SOS button for users to initiate an emergency request.
11. Upon activation, the SOS function shall send an emergency notification to all pre-selected contacts.
12. The emergency notification shall include the user's current location retrieved via GPS.
13. The notification shall display a clear message indicating the user requires assistance due to a car breakdown.
14. The notification should offer an option for contacts to easily acknowledge receipt of the SOS message.
15. Upon receiving an SOS notification, the recipient's app shall display the sender's location on a map within the interface.
16. The map view should allow zooming and panning for better situational awareness.
17. The application shall include a pre-loaded database of nearby service stations, hotels, and restaurants.

18. The database content, including location and contact details, shall be accessible even without an active internet connection.
19. The application shall allow users to search and filter the offline database by category (gas station, hotel, restaurant).
20. The application should display contact information for each entry in the database (phone number).
21. The application should launch and respond to user actions promptly.
22. The application's GPS functionality should acquire and update location data efficiently.
23. Sending and receiving SOS notifications should occur with minimal latency, even in low-signal areas (if cellular data is used).
24. The user interface shall be intuitive and easy to navigate, especially for users in potentially stressful situations.
25. The application should use clear and concise language throughout the interface.
26. Essential functions like SOS activation and location sharing should be readily accessible on the main screen.
27. The application should function reliably and consistently across various Android devices and operating system versions.
28. The application should be free from crashes or unexpected behavior that could hinder functionality in emergency situations.
29. The application shall implement secure storage for user credentials and location data.
30. Data transmission, particularly for SOS notifications (if cellular data is used), should be encrypted to ensure privacy.
31. Mobile app should also create the user log.

Tools:
Android Studio, SQL Lite

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Project Domain / Category

Mobile Application

Abstract / Introduction

In today's fast-paced world, managing personal finances and staying within a budget can be challenging tasks. This project aims to develop a comprehensive Android application that assists users in efficiently managing their finances, expense tracking, and budget constraints.

The proposed app will provide a user-friendly interface with features such as expense tracking, budget planning, goal setting, and financial analysis to empower individuals in achieving their financial objectives.

Functional Requirements:

Functional Requirements of the application are given below:

1. User Registration and Authentication:
   Users will be able to create accounts and log in securely to access the app's features.

2. Expense Tracking:
   The app will allow users to record their expenses under different categories such as groceries, utilities, entertainment, etc.

3. Budget Planning:
   Users can set monthly or weekly budgets for various expense categories and receive notifications/alerts when nearing or exceeding the allocated budget.

4. Goal Setting:
   Users can set financial goals such as saving for a vacation, buying a new gadget, or debt repayment, and track their progress.

5. Financial Analysis:
   The app will provide graphical representations and summaries of users spending patterns, savings, and adherence to budgetary goals.

6. Reminders and Notifications:
   Users will receive timely reminders for bill payments, budget updates, and goal deadlines.

7. Data Backup and Sync:
   The app will offer secure data backup options and synchronization across multiple devices for seamless accessibility.

8. Customization:
   Users can customize expense categories, budget limits, and financial goals according to their preferences.

9. Accessibility and Usability:
   The app will be designed with a user-friendly interface, ensuring ease of navigation and accessibility for all users.

Tools:
Languages: Kotlin
Design: Material 3
Database: SQLite / Firebase
Development Environment: Android Studio

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SafeCircle: Guardian Companion

Project Domain / Category
Mobile Apps

Important Note
<mark>This project can only be taken by a group of 2 students, one for front end /designing and 2nd one for back end.</mark>

Abstract / Introduction
This project aims to develop a mobile application focused on enhancing the safety and connectivity of users with their friends and family members. The application builds upon the concept of existing solutions like Life360, integrating features such as real-time location sharing, emergency alerts, and roadside assistance to elevate peace of mind and security for users. By providing a unified platform for tracking loved ones and valuable belongings, the application seeks to streamline communication and ensure the well-being of users in various situations. With a focus on user-centric design, privacy protection, and battery optimization, the project aims to deliver a robust and intuitive solution that addresses the evolving needs of modern families and social circles.

The proposed project centres around the development of a mobile application designed to facilitate safety and connectivity among friends and family members. Drawing inspiration from successful solutions like Life360, the application aims to offer a comprehensive suite of features tailored to meet the diverse needs of users in today's dynamic world. Key functionalities include real-time location sharing, emergency alerts, roadside assistance, and integration with Bluetooth trackers for belongings. By prioritizing user privacy, battery efficiency, and intuitive design, the application seeks to provide a seamless and reliable experience for users seeking to stay connected and informed about the well-being of their loved ones. Through this project, we aspire to contribute to the enhancement of safety and peace of mind for families and social circles worldwide.

Functional Requirements:

User Authentication:
1. Users must be able to register and create an account.
2. Users should be able to log in securely with their credentials.
3. The application should support user profile management.
    Safety and Location Sharing
1. **Real-Time Location Sharing:** Enable users to share their real-time location with friends and family members.
2. **Place Alerts:** Notify users when specific individuals arrive or leave designated places, such as home, school, or work.
3. **SOS Alerts:** Provide a feature for users to send emergency alerts to designated contacts in critical situations.
4. **Emergency Dispatch:** Integrate with emergency services to dispatch assistance when SOS alerts are triggered.

5. **Crash Detection:** Implement crash detection technology to automatically alert emergency contacts in the event of a car accident.
6. **Roadside Assistance:** Offer roadside assistance services for users in need of vehicle support.
7. **Identity Theft Protection:** Provide features to safeguard users' identities and personal information against theft or fraud.
   Integration and Unified Experience
8. **Integration with Bluetooth Trackers:** Seamlessly integrate with Bluetooth trackers (e.g., Tile) to track valuable belongings, such as keys, wallets, and phones.
9. **Unified Experience:** Ensure a cohesive experience by centralizing location tracking for both individuals and belongings within the app.
   Plans and Membership Options
10. **Membership Plans:** Offer various membership plans (e.g., Platinum, Gold, Silver) with different features and benefits tailored to users' needs.
11. **Free Features:** Provide essential features for free, such as basic location sharing, crash detection, and data breach alerts.
12. **Trial Period:** Allow users to experience premium features with a free trial period before committing to a membership plan.
    Privacy and Battery Optimization
13. **Privacy Settings:** Allow users to control privacy settings and choose who can access their location information within shared circles.
14. **Battery Optimization:** Implement algorithms to minimize battery usage, especially when the app runs in the background or during extended usage.

Tools:
- Android IDE
- Java,Kotlin,XML
- Figma

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The Organic store mobile app.

Project Domain / Category
Mobile Apps.

Abstract/Introduction
The project objective is to deliver online Organic food, ecological food shopping application to the android platform. Online shopping is the process whereby consumers directly buy goods or services from a seller in real-time, without an intermediary service, over the Internet. It is a form of electronic commerce. This project is an attempt to provide the advantages of online Organic food, ecological food, and shopping to customers of a real shop. It helps buy the products in the shop anywhere on the internet by using an android device. Thus, the customer will get the service of online shopping and home delivery from his favorite shop.

Functional Requirements:
- Admin can add, modify, delete and search Products by the first name, Last name, date of registration, category, and subcategory.
- User can create their login and profile by the first name, Last name, Gender, address, contact no, and date of registration, can order, select courier, and payment mode.
- Moderators can create their login and profile by the first name, Last name, Gender domain, address, contact no, and date of registration, Approve the quality of vendor product to sale, track order conformation and delivery,
- Admin can add, modify, delete and search announcements by date and Type.
- Admin can add, modify, delete and search insurance/payment receiving companies and courier for delivery, Manager payments record.
- Admin can add, modify, delete and search products of Moderators by different categories (head to toe wear.)
- Admin can add, modify, delete and search moderators' profiles by different product domains.
- Admin can add, modify, delete and search payments and transactions by users.
- Admin can add, modify, delete and search moderators by date, users type, and product category.
- Admin/system can add, modify, delete and search employees by id, first name, and Last name.

The mobile application must be Android-based, and its data is to be managed using SQLite. Also, the application should be easily accessible to users, secured, scalable, and well-performing. Those criteria are what would make the application stand up from a simple application to a product that can be delivered and used by real-life clients. However, the focus is more on implementing the application using the new tools before considering these enterprise application features.

Tools:
Android Studio / Eclipse / Netbeans
Database (SQLite or any modern database language)

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<p style="text-align:center">**Virtual Home Interior Design App**</p>

Project Domain / Category
Mobile Apps

Abstract / Introduction
In the digital age, homeowners and interior design enthusiasts seek innovative solutions to visualize and plan interior design concepts for their homes.

The Virtual Home Interior Design App aims to fulfill this need by providing an immersive and interactive platform that leverages virtual reality (VR) or augmented reality (AR) technology.

Through this app, users can experiment with different design elements, furniture arrangements, and decor styles in a virtual environment, allowing them to conceptualize and refine their interior design visions.

Functional Requirements:

I. **Users:** The app must support two types of users: Admin and Designer.
1. Admin: Admin will be responsible for a smooth operation of the platform by managing user accounts, handling technical issues, and monitoring app performance etc.
2. Designer: Designers can specify dimensions, layouts, wall colours, flooring, and ceiling styles for their homes and apartments etc.
II. **Authentication:** App should provide registration and login pages for admin and designers; store credentials at Firebase Authentication.
III. **Design Creation:** Designers should be able to create new room designs by specifying dimensions, layout, wall colours, flooring, and ceiling styles etc.
IV. **Dashboard:** Designers should be greeted with a dashboard displaying options to create new designs, access saved designs, browse furniture catalogs, and view design inspiration etc.
V. **Furniture and Decor Catalogue:** Tools for adding and arranging furniture, decor items, lighting fixtures, and accessories within the virtual room should be provided.
VI. **Real-time Rendering and Visualization:** Changes made to room designs, furniture placement, and decor selections should be reflected in real-time, allowing users to visualize their designs instantly.
VII. **Customization Options:** Users should be able to customize furniture and decor items by adjusting colours, textures, dimensions, and finishes to match their preferences and existing decor.
VIII. **Collaboration and Sharing:** Users should be able to share their designs with others via email, social media, or direct links.
IX. **Save and Export Designs:** Options for saving and exporting designs in various formats (e.g., images, 3D models) should be provided for sharing and printing purposes.
X. **Help and Support:** User-friendly help resources, FAQs, tutorials, and customer support options should be provided to assist users in navigating the app and troubleshooting issues.

Tools:

1. **IDE:** Android Studio
2. **Programming Language:** Java/Kotlin
3. **VR & 3D Modeling**: Unity (https://unity.com) & Blender (https://blender.org)
4. **Databases:** Firebase Real-Time/Cloud Fire-Store & SQLite/Room

Note: VU will not pay for any license of software/library/toolkit/API used in this project.

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WellnessWise: Your AI Health Navigator

Project Domain / Category
Mobile Application

Abstract/Introduction
Health prediction is a crucial aspect of preventive healthcare, allowing individuals to proactively manage their well-being and mitigate potential health risks. This project proposes the development of an intelligent health prediction mobile application that utilizes artificial intelligence (AI) and machine learning (ML) algorithms to analyze user data and provide personalized health predictions. By leveraging advanced technologies, the application aims to empower users to make informed decisions about their health and lifestyle choices.

Project Overview:
The primary objective of the proposed project is to develop a mobile application that serves as a comprehensive guide and navigator for users on their path towards wellness. Through the utilization of artificial intelligence (AI) technologies, the application aims to analyze user data and provide personalized health predictions, recommendations, and insights. By capturing user inputs such as medical history, lifestyle habits, and real-time health data, the application will leverage advanced algorithms to assess health risks, predict potential outcomes, and offer actionable strategies for improving overall well-being. The overarching goal is to empower users to make informed decisions about their health and lifestyle choices, leading to better health outcomes and enhanced quality of life.

Following will be some of the main requirements of this project.
Functional Requirements:
User Registration and Profile Creation:
- Allow the user to register an account by using his mobile number or email. To verify the user, make sure to use OTP verification mechanism so that the user can only register using his own information (mobile number or Email).
- Allow users to create a profile by providing basic information such as age, gender, height, weight, medical history, and lifestyle habits.
- Capture additional health parameters such as blood pressure, heart rate, blood sugar levels, and cholesterol levels.

Health Data Input:
- Enable users to input real-time health data using integrated sensors or manual input.
- You should use data synchronization APIs[1] to support synchronization with wearable devices and health tracking apps for seamless data integration.

AI-based Health Prediction:
- Implement AI and ML algorithms[2] to analyze user data and predict potential health outcomes.
- Consider factors such as health parameters, lifestyle habits, environmental factors, and medical history.

Personalized Recommendations:

- Provide personalized recommendations for lifestyle modifications, diet adjustments, exercise routines, and preventive measures based on predicted health risks.
- Offer actionable insights and strategies to help users improve their overall health and well-being.

Health Monitoring and Alerts:

- Enable continuous health monitoring and tracking of key health parameters.
- Send timely alerts and notifications to users regarding potential health risks or deviations from normal health indicators.

Data Visualization:

- Present health predictions and trends through interactive charts, graphs, and visualizations.
- Provide users with a clear understanding of their health status and progress over time.

Health Risk Assessment:

- Conduct comprehensive health risk assessments based on user data and predictive analytics.
- Evaluate risks for chronic diseases such as diabetes, cardiovascular diseases, hypertension, and cancer.

The requirements given above are just a few most important ones. The student can add more requirements after discussing it with the supervisor.

Tools:

Programming Language: Java/Kotlin or Dart (with flutter)
IDE: Android Studio
Backend: Firebase for authentication, data storage, and analytics
Machine Learning: TensorFlow Lite for integrating machine learning models
UI Components: Material Design Components for modern UI design

Note: If you want to React Native to create a cross-platform application, you must discuss with your supervisor first.

References:

1. https://developer.android.com/training/wearables/data/data-layer
2. https://developer.android.com/ml
3. https://www.appsdevpro.com/blog/integrate-machine-learning-in-android-apps/

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An Intelligent Learning Management System for Programming Courses

Project Domain / Category

Web Application.

Abstract / Introduction

In computer science education, C++ programming language stands as a cornerstone for its versatility, and widespread usage across multiple domains, from system programming to game development. However, ensuring the effectiveness of such programming courses requires diligent evaluation and continuous refinement. Traditional methods of course evaluation often fall short in capturing student learning experiences, timely feedback, and performance metrics. There is a need for an intelligent evaluation process for C++ programming courses.

The aim of this project is to design an Intelligent Learning Management System for programming courses by providing timely personalized feedback to individual students and suggest areas of improvement. The system should generate questions for programming courses and perform intelligent evaluation of programs. System should deploy deep learning algorithms to analyze students' performance by identifying weak areas to strengthen student motivation in programming courses.

Functional Requirements:

An intelligent Learning Management System for programming courses for both system programming and game development questions for C++ where all students could be evaluated at the same time and with same number of test administration during the semester.

The proposed system will have the following main users:

Admin, Teacher and Student.

1. Registration module: It will facilitate the registration process for students and teachers. Admin will approve and perform activation of the students and teachers accounts and registration requests.
2. Login Module: After successful registrations, all types of the users will be able to login to the system using their registered email and password.
3. Your application will assist the teacher with the automatic generation of programming questions.
4. Furthermore, your application will generate the questions of programming courses including both System programming and game development programming using C++.
5. Application should facilitate the teacher to perform static and dynamic code analysis for programming course.
6. Teacher can gather a labelled dataset of programming questions and their correct answers.
7. Train a supervised deep learning model (e.g., a classification model) to assess the correctness of programming question answers.
8. Teaches can able to do Integration of automated generation of questions with a question bank for system programming and game development programming using C++.
9. Teachers have liberty for collective compiling of students programs and scoring rubrics for different programming questions.

10. Teachers are able to define Rubrics for different programming questions, considering factors like code structure, comments, and variable naming conventions etc.
11. Teachers are able to generate overall performance reports for individual students enrolled in different programming courses.
12. Teacher is able to perform analytics to track question effectiveness and identify challenging programming questions.
13. Student is able to get immediate feedback on challenging programming question responses including code correctness, code improvement and code optimization.
14. Ensure that platform is mobile-friendly, allowing students to access learning materials and assessments on various devices, including smartphones and tablets.
15. Ensure that the platform support the speed programming testing for system programming and game developments for diverse student population.
16. Allow students to share their achievements or ask questions via social media integration, promoting a sense of community and enabling broader discussions for the related domains.
17. Include a help centre, FAQs, or chat support to assist students in case they encounter any issues or have questions about the platform.

Tools: GCC (GNU Compiler Collection), PHP, JSP, Python, JavaScript/HTML/CSS, PyTorch, Keras and TensorFlow, JSP, MySQL, Clang, Valgrind, gprof, Intel VTune Profiler

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Digital Electoral System for Chairperson Selection

Project Domain / Category
Web Programming

Abstract / Introduction
In a university, the Student Council is in charge of electing a new chairperson. Traditionally, this process has been conducted through physical ballots, causing inconvenience to both students and administrative staff. To streamline the election process and enhance accessibility, the Student Council has decided to implement a Digital Electoral System for Chairperson Selection.

Functional Requirements:

Voter:

➢ Students interested in voting for the chairperson shall register by providing personal details such as Name, Gender, Student ID, Department, etc.
➢ The system administrator reviews and confirms voter registrations to ensure only eligible students participate in the election.
➢ Upon successful registration, each student receives a unique Voter ID and Password from the administrator, which they can use to log into the voting platform.
➢ Voters securely log into the system using their Voter ID and Password to cast their votes electronically. They can view the list of registered candidates before casting their votes.

Candidate:

➢ Students aspiring to become the chairperson register by providing the necessary personal information.

Administrator:

➢ The administrator oversees the entire election process, managing voter and candidate registrations.
➢ They have the authority to approve or reject registrations based on eligibility criteria.
➢ Administrative functions include monitoring voter turnout, viewing cast votes, and generating reports on candidate results.

Tools:

HTML, CSS, JavaScript, jQuery, Bootstrap (Front-end)
MYSQL (phpMyAdmin) Database
PHP (Server-side programming)
XAMPP — Web Application Server

You are advised not to switch the tools. If you do so, you will handle the technical side yourself.

Note:

- These are the basic requirements of the application. Students may add further functionalities to make the application more useful.
- The Virtual University of Pakistan (VU) will not provide any kind of hardware for this project; a student has to arrange the required hardware by himself/herself.
- VU will not pay for any license of the software, the libraries /toolkits/APIs used in this project.

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EduHub

Project Domain / Category
Web Apps

Abstract/Introduction
EduHub is a web-based platform designed to enhance collaboration, communication, and learning among students. With its intuitive interface and robust features, EduHub aims to provide a comprehensive solution for students to access educational resources, collaborate on projects, and engage in interactive learning activities.

Objectives:
➢ Develop a user-friendly platform that enables students to access course materials, participate in discussions, and collaborate on projects in a virtual environment.
➢ Provide a centralized repository for educational resources, including lecture notes, videos, e-books, and supplementary materials, accessible from any device.
➢ Implement features for real-time communication, group collaboration, and peer-to-peer learning to enhance student engagement and interaction.
➢ Offer personalized learning experiences and support services to cater to the diverse needs and preferences of students across different disciplines and learning styles.

Functional Requirements:

- **User Authentication and Authorization:**
  Students should be able to register and log in securely to access the platform.
  Role-based access control should be implemented to differentiate between students, instructors, and administrators.

- **Course Management:**
  Students should be able to view a list of available courses and enroll in courses of their choice.
  Instructors should have the ability to create and manage courses, including uploading course materials and setting deadlines for assignments.

- **Resource Library:**
  A centralized repository should be available for storing and organizing course materials, including lecture notes, videos, e-books, and additional reading materials.
  Students should be able to search, browse, and filter resources based on course, subject, or keyword.

- **Discussion Forums:**
  Each course should have its own discussion forum where students can ask questions, share insights, and engage in academic discourse.
  Instructors should have the ability to moderate discussions and provide feedback to students.

- **Collaborative Projects:**
  Students should be able to create and join group projects, collaborate with team members, and track progress towards project goals.
  Tools for file sharing, task assignment, and version control should be available to facilitate teamwork and coordination.

- **Assessment Tools:**
  Instructors should have the ability to create and administer online quizzes, assignments, and exams.
  Automated grading and feedback mechanisms should be implemented to provide timely feedback to students.

<u>Tools:</u>
Software Requirements
Frontend: HTML5, CSS3, JavaScript
Backend: ASP.NET Core
Database: Microsoft SQL Server

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E-Recruitment system

Project Domain / Category
Web Programming

Abstract / Introduction
The E-Recruitment System provides a means to view, submit, and process applications. The HR department of any company often spends a lot of time searching for suitable candidates. Companies spend a lot of time and resources advertising job openings and selecting candidates.
An e-recruitment website can provide a centralized platform for candidates to create their profiles/resumes and search for jobs on the other side for recruiter to post job details. The system should facilitate communication between recruiters and candidates, such as sending automated emails for application confirmation, interview scheduling, and status updates.
This simplifies the recruitment process for both candidate and recruiters, saving them time and resources.
This website has three main modules:
- Candidate module
- Recruiter module
- Admin module

Functional Requirements:

Candidate module:
1. Candidates should be able to securely register and log in to the system.
2. Candidates should be able to Search/ view job vacancies, should also search job based on keywords or criteria.
3. Candidate should also be able to search for jobs based on various criteria such as location, industry, job title, and keywords.

4. Candidates should be able to submit their applications online, including uploading resumes and entering relevant information.
5. He/she should be able to view job alerts and notifications.
6. Candidates should receive application confirmation, interview scheduling, and status updates messages.
7. Candidates should be able to share the job vacancies to different social media platform(Facebook, Instagram etc.)
8. He/she should be able to post feedback relevant to websites or recruiters.

Recruiters' module:

1. Register and log in to the system.
2. Recruiters should be able to post job vacancies, including job descriptions, requirements, and other relevant details.

3. They should be able to edit, deactivate, or remove job postings as needed.

4. Recruiters should be able to track applicants throughout the hiring process, including reviewing resumes, scheduling interviews, and recording feedback.

5. The system should allow recruiters to search and filter resumes based on keywords or criteria.
6. He/she should be able to download, store, and manage resumes or CVs submitted by candidates for later use.
7. He/she should be able to shortlist and Contact candidates via email or the website's messaging system and can send an interview letter/notification.
8. He/she should be able to generate reports of candidates based on their experience, qualification etc.
9. He/she should be able to post feedback relevant to websites or candidates.

Admin module:
1. Manage the entire website including the candidate and employer modules.
2. He/she should be able to manage user accounts for candidates and recruiters.
3. He/she should be able to edit, deactivate or delete job postings.
4. Calendar integration to check availability and schedule interviews with hiring managers and interviewers.
5. He she should be able to create reports of register user.
6. Sharing options for job listings on social media should be provided.

7. He/she should be able to view and manage feedback.

Tools:
Front-end:
HTML, CSS, JavaScript, Bootstrap
Back-end:
PHP, MySQL

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E-Visa Processing System

Project Domain / Category:
Web Application

Abstract / Introduction:

The E-Visa Processing System allows users to apply for their visa online, providing enhanced security and convenience. To apply, users must upload some important documents for verification purposes. This system reduces the hassle of the traditional visa application process, allowing applicants to apply conveniently anywhere. As a result, a new generation of e-visa solutions has emerged, enabling users to view their entire visa process online through an e-visa portal.

Functional Requirements:

1. **Admin Module:**
   1) The administrator will input the necessary information and create login credentials.
   2) Admin can view, edit, or delete the HR details that have been added.
   3) Added employee details can be viewed / Edited / Deleted.
   4) Admin can view and renew current Visa status and expiry.
   5) Admin can search for employees by name or location and view applicant reports.
   6) A report of the employee interview will show its status.
   7) The Result report includes information about the candidate and their interview results.
   8) An administrator can view reports and details entered on-site by employees.
   9) An administrator can print detailed reports about employees and HR.
   10) Admin can view and delete feedback from employees and HR.

2. HR Module:
1) The HR person needs to log in using their valid login credentials.
2) All the added employees will be displayed to the HR person.
3) Selecting the employee and adding details of visa for country, dates, etc., and adding interview dates with consultant details.
4) Updating Interview details with its result and even updating the result.
5) All the visa reporting details can be viewed by the HR person.
6) The HR person can change the password with a new one anytime.
7) HR can send feedback directly to the admin.

3. Employee Module:
1) Employees need to log in using their valid login credentials.
2) Employees can check the next onsite Schedule and view details like source and destination, period, etc.
3) At regular intervals, employees can add details and update its status.
4) Employees can send feedback directly to the admin.
5) An Employee can change the password with a new one anytime.

Tools:
PHP, MySQL, C#, or as per choice.

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Logistics for Fragile Freights

Project Domain / Category

Web Application

Abstract / Introduction

Fragile freight logistics is really important in supply chain management. It's all about safely moving delicate items from suppliers to sellers.

Nowadays, logistic companies are moving their operations online. They're offering real-time booking, tracking, and visibility to businesses and other logistic companies. This helps businesses keep an eye on their shipments and make quick decisions. Plus, going digital helps logistic companies be more efficient, keep track of routes, manage shipments better, book services online, keep records, and handle payments all online.

Functional Requirements:

1. **User Registration:**
   - Users can sign up for an account by filling out a registration form.
   - The form will require essential details such as name, address, phone number, and   email   for future correspondence and account management.

2. **Login:**
   - User can login by using credentials Username(Email) and Password.
   - Proper validation should work for input fields.

3. **Freight Booking:**
   - Suppliers add freight details of fragile items(name, weight, type(fragile/non-fragile)).
   - They can select their desired route, and book logistics services accordingly.

4. **Admin Approve Booking:**
   -Admin can approve/disapprove booked freight details of fragile items and add vehicle, driver, shipment fee and total distance,tracking id required for this trip for approved bookings.

5. **Online Payments:**
   - Supplier should have the option to make online payments for their selected trips after booking freights.
   - Order confirmed by admin after online payment.

6. **Shipment Tracking:**
   - Users can track the route of their shipments in real-time by using tracking id.
   - They will receive updates on the current location and estimated time of arrival for   their freight.

7.   Vehicle and Driver Management:
   - Admin can input details of vehicles registered(brand,model,license no) with the   company.
   - Similarly, they can add details of drivers(name, age, address, contact, email, routes)   including their licenses and certifications.

8.   Trip Details Management:
   - Admins can enter available trip's details, including vehicle information, starting point, destination, distance covered, and charges per trip.

9.   Expense Management:
   - Admins can record various expenses incurred by the company, such as fuel expenses, maintenance costs, and driver salaries, damaged items during delivery.

10.   Income Tracking:
   - Admins can add details of all income generated by the company from freight bookings   and other sources(trip fee, rent of vehicle, etc.).

11.   Report Generation:
   - Admins can generate reports specifying a period for which total income and   expenses   will   be calculated.
   - Reports can be scheduled to be generated at the end of each month or on-demand as needed.

12.   Report Printing:
   - Admins can print the generated reports for documentation and review purposes.
   - This provides a physical copy of the financial status and performance of the company   for further analysis.

<u>Tools:</u>
Choose any tool form given options: PHP, MySQL, Xammp, Notepad++, Laravel, React.js, Vue.js
Asp.net, C#, Vs code, Visual Studio

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CulturalTraverse.pk – Online Cultural Trip Organizer

Project Domain / Category
Web Programming

Introduction
Cultural heritage has become a primary means for attracting visitors to countries. This is a good source to generate revenue to help a country's economy. Tourism has become a very well-organized industry and guided tours are designed that offer satisfying experiences at heritage sites.

Pakistan just like any other beautiful European country is a big market for tourism because it offers not only beauty of nature but also variety and diversity in cultures. Infect tourism is the most profitable and entrepreneurial business, especially for people living in the mountain areas as it creates new job opportunities and reduces the unemployment level for them.

CulturalTraverse is an online complete tourism management system which allows a tourist to plan a complete tour to exciting and beautiful scenic places of Pakistan.
Here a user (a Group) can choose from pre-planned trips or can design a customized one.

The website will allow its registered users to book for tours and record their comments/reviews against any completed trip. The comments / reviews will be published on the website with the trip information.

Functional Requirements:

Following are key functional requirements for the proposed system:

1. **User Registration and profile management:**

   There will be proper **interfaces** for user registration and sign in for the following **two** types
   of the users of the website:
   - Registered user (Tourist).
   - Registered user (Administrator)

   Roles of the users will be as follow:
   - A **registered user** can select from pre-planned trips or can design a customized one.
   - The **Administrator** (Admin) will have all the **rights/privileges:**
   ✓ To approve the registration requests from the other users.
   ✓ To add/remove packages
   ✓ To give final approval to a customer's selected/customized package.

2. **Admin Panel:**

   - There will be a proper Admin Panel through which the Admin will be able:

- ✓ To do user management (accepting / rejecting user registration requests).
- ✓ To do management of trips and bookings.

3. **User Panel:**

- There will be a proper Dashboard comprising of interactive interfaces through which a **user** can:
- Create an account.
- Do Profile management functionalities, like
- ✓ updating personal information,
- ✓ travel preferences, and
- ✓ past travel experiences.

4. **Trip Planning:**
- **Destination selection:**
- ➢ Allow users to browse and select cultural destinations from a comprehensive database.
- **Itinerary generation:**
- ➢ User should be able to generate a personalized travel itineraries based on his
- ✓ preferences, interests, and
- ✓ constraints like budget, time.
- **User** should be able to plan for trips that involve visiting multiple cultural destinations.
- There should be **recommendations** for cultural events and attractions based on user preferences.
- User should be able to make reservations for accommodations.
- ✓ Pricing and dates of availability info should be available to user.
- If the user clicks on any specific pre-planned trip:

- ✓ All detailed info about it will be displayed.

5. **Comments / Reviews/Feedback:**

- The registered users will be able to submit their comments / reviews/ratings on the website for completed trips.
- Feedback mechanism for organizers to gather insights and improve future trips.
- Display of reviews and ratings to help users make informed decisions about trip selection.

Tools:
1. PHP and MySQL (You can choose any framework such as Laravel)
2. Bootstrap or any other CSS Framework.
3. Any JavaScript library/ framework such as jQuery, Vue Js, react Js or angular Js

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Online Food Delivery System

<u>Project Domain / Category</u>

Web Application

<u>Abstract / Introduction</u>

An Online Food Delivery System is a web application through which customers can choose the restaurant of their choice and order specific food from their homes, offices, or hostels. Potentially, good quality restaurants will be connected through this application and customers will order food as per their choice. It allows the customer to order their food from nearby restaurants and the delivery person/rider will also be informed about their nearby orders as well as the restaurants will be notified as they need to prepare the food. The goal of this application is to make a web application for a company to deliver good quality food to the customers and the customer will get the food of their choice at home without any hassle.

A feedback form and customer reviews will be provided in this application to maintain customer trust and satisfaction. SMS will be sent to regular customers on any promotions or discounts. Customers can rate the dishes based on the quality of the food delivered.

Functional Requirements

There will be the following panels in this application:

- Administrator
- Customer
- Delivery Person/Rider
- Restaurant

The functional requirements of these panels are as follows:

Administrator:

- Login process to allow authentic users to access the admin panel.
- Admin will be able to add the list of restaurants and delivery men.
- Admin will be able to add/update/delete information about promotions and discounts.
- Admin can send SMS to regular customers on any promotions and discounts and order status.
- Admin will be able to view customer's profile, feedback and reviews.
- Admin should ensure that the ordered product has been timely delivered to the valid customer.

Customer:

- Customers will get themselves registered in this application and then will be able to access the website by logging into the system. At sign-up, the customer's mobile no. will be added, and a verification code will be sent to the customer for verification.
- Customers can update his/her profile.
- Customers can view/search the list of restaurants along with the dishes.
- Customers can view the feedback and reviews of other customers regarding any dish of a restaurant.

- The payment can be made via three payment options: Cash on delivery, Payment via Credit Card, or online transfer.
- Customer can update or cancel the order within the given time limit.
- Customers can view the promotions and discounts on websites as well as via SMS.

Delivery Person/ Rider:
- Riders will get themselves registered in this application and then will be able to access the website by logging into the system. At sign-up, the customer's mobile no. will be added, and a verification code will be sent to the rider for verification.
- Riders can update his/her profile.
- Riders can register themselves with the available list of restaurants.
- Riders will get an alert about their nearby orders.
- Riders will receive payments and will update the system.

Restaurant:
- Restaurants will add food items to their menus.
- Restaurants will add daily, weekly or monthly menus.
- Restaurants will be able to offer a discount or promotion.
- Restaurants will receive payment for the food delivered.
- Restaurants will be able to display open or closed status.
- Restaurants will receive an alert once the order is placed.
- The restaurant will update the system once the food is ready for pickup by the rider.

Tools and Languages:
Visual Studio, .NET Framework, C#/Java, SQL Server

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<u>**Online Marketplace for Used Auto Parts**</u>

Project Domain / Category:
Web Application

Abstract / Introduction:
The automotive industry generates a substantial amount of waste in the form of used auto parts. Most of these parts are often in good condition and can be reused, contributing to environmental sustainability, and reducing the demand for new parts. However, the process of buying and selling used auto parts can be challenging due to limited market access and lack of centralized platforms.
The project aims to address these challenges by providing a web-based platform (an online market place for used auto part) titled as ECO Trade Hub where individuals and businesses can easily buy and sell used auto parts. This platform will facilitate the exchange of used auto parts, promote recycling, and contribute to a more sustainable automotive industry.
This project proposal outlines the major functional requirements for the development of ECO Trade Hub, aimed at facilitating the buying and selling of used auto parts. By providing a user-friendly platform for transactions and promoting environmental sustainability, the ECO Trade Hub project aims to make a positive impact on the automotive industry and contribute to a greener future.

Functional Requirements:

Buyers/Sellers:

1. Registration: Users can register their accounts on the platform.
2. Login/Logout: Registered users can log in to their accounts and log out when done.
3. Profile Management: Users can manage their profiles, including updating contact information and adding details about the parts they have or need.
4. Product Listing: Sellers can list their used items (auto parts) for sale, providing details such as part name, condition, price, and images.
5. Product Search and order placing: Buyers can search for specific used auto parts based on criteria such as part name, model, make, and condition and will be able to place online orders for their selected items.
6. Communication: Users can communicate with each other through messaging features to negotiate prices, arrange for inspections, or discuss other details.
7. Rating and Reviews: Users can leave ratings and reviews for sellers based on their experiences with transactions.

Administrator:

1. Login/Logout: Administrators can log in to the system and log out when not needed.
2. User Management: Administrators can manage user accounts, including approving registrations and handling account-related issues.
3. Product Management: Administrators can oversee product listings, ensuring compliance with platform guidelines and removing inappropriate listings if necessary.

4. Reporting: Administrators can generate reports on user activity, sales trends, and other relevant metrics to monitor platform performance and make informed decisions.

Payment Method: User can select any payment option(credit card or cash on delivery)

Tools:

HTML, CSS, Bootstrap, JavaScript, MYSQL, PHP

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Online Portal for Tracking Birth-Death Ratio of Population

Project Domain / Category
Web Application

Abstract / Introduction
The birth and death ratio is a critical demographic indicator for each country reflecting the balance between new births and deaths within a population. The ratio explores the relationship between birth and deaths and indicators of socio-economic development. By knowing this ratio, the country policymakers and stakeholders can easily address the challenges and leverages opportunities associated with birth and death ratios. Various factors related to cultural and health-care influencing the birth and death ratio can also be investigated easily.
Tracking Birth-Death Ratio of population is a web portal, intended to use to convert the manual system of record keeping at Union Councils level within Tehsil and districts into online system. All the manual processes including entry of child's birth, Birth Certificates, deaths entry and death certificates are shifted to the portal. Overall, this system is designed to facilitate the public on one side and update the stakeholders to assess the implications of birth and death ratios on population growth. Various trends and patterns of birth and death ratios can be analyzed within a specific union council or tehsil/district and can carry the decision accordingly.

In this system, the administrators can add/edit District names within a province, Tehsil names within a District, Union Councils within a tehsil and design mechanism to authenticate end-users at Union Council, Tehsil and District level.
The public user will authenticate to the portal through his/her NIC number and will mark entry of child's birth and death if any. In case of getting certificates, the payment will be made online through banks or easy paisa or any payment channel into the concerned accounts. The end-users at Union councils, Tehsil, District and province level will generate various reports using this system.

Functional Requirements:

User:

➢ The user will login to the system using authentication mechanism
➢ Search the District, Tehsil and Union Council
➢ Enter the child's birth data including all particulars
➢ Enter the deceased data including all particulars
➢ Make online payments
➢ Search for the Birth Certificate of his/her kids
➢ Print the Birth Certificate of his/her kids after payment
➢ Search the Death Certificate of his/her deceased
➢ Print the Death Certificate of his/her deceased

Administrator Login: An authorized admin can login to the system to:

➢ Assign/update/delete username and password to end-users
➢ Add the name of Districts, Tehsil and Union Council
➢ Edit/delete the name of District, Tehsil and Union Council
➢ View/edit/delete the District, Tehsil and Union council-wise data
➢ Generate various reports at District, Tehsil and Union Council level

Tools:

Front-end:
➢ HTML
➢ CSS
➢ JavaScript

Back-end:

➢ PHP
➢ MySQL

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PET FINDER FOUNDATION (PFF)

Project Domain / Category
Web Application

Abstract / Introduction

In this project, we will create a website Pet Finder Foundation (PFF) which contains images and information about several pets for adoption.

As we know, in this busy life, it's difficult to go and spend time in searching for pets. So, from this website it would be easy to select any pet from your home and then just transfer the payment online to the pet owner and pet will be delivered to the customer home.

Pets will be categorized according to their age, breed, size, colour, energy level, friendliness, ease of training, and nearby area etc.

Functional Requirements:

1. **Signup/Registration:** New customer will register themselves with the website before proceeding to pet adoption process but anyone can visit the website without registration.

2. **Login:** Admin and customer will login to the system using id and password.

3. **Add Website Information:** Admin will add all the necessary information regarding pet-finder website like about pet-finder, adopting pets, animal shelter & rescues, pet-finder foundation etc.

4. **Add Pets:** Admin will add at least 10 pets with images based on each breed i.e. (10 dogs, 10 cats, 10 puppies, 10 kittens, 30 birds of different types etc.) and add all the necessary information regarding Pets whether its Dog, puppies, Cat, Kittens, or other type of pets like birds, exotic pets, horses, rabbits, reptiles and small/furry pets. Information should also include: Pets age, price, breed, energy level, friendliness, and ease of training, status and its vendor information etc.

5. **Update Pets Information:** Admin can also update any information regarding Pets.

6. **Search Information:** Customer can search pets based on different categories like age, breed,

7. size, colour, energy level, friendliness, and ease of training, price, status, nearby area etc.

8. **Change Pets Status:** Admin can also change pet's status to "Not available for adoption" in case some mishap occurs with a certain pet. This is also applicable when certain pets get adopted and unavailable now.

9. **Pet Adoption Booking:** Customer can book Pets online, thus resulting in change of the status of pet to be "booked for adoption". But customer has to pay through direct bank transfer before per delivery. But if customer fails to transfer the payment within 3 hours of booking then pet will be up for adoption again by changing its status to "Available for adoption".

Note: You have to develop a full fledge website that contains all the mentioned functional requirements, you can visit the following website for help
https://www.petfinder.com/

Tools:
- Visual Studio
- SQL Server
- Tomcat or any other webserver

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PHP-Based Web Page Speed Analysis Tool for SEO

Project Domain / Category
Web Application

Abstract / Introduction
In today's digital landscape, website speed is a critical factor not only for user experience but also for search engine optimization (SEO). Slow-loading web pages can lead to higher bounce rates, reduced user engagement, and lower search engine rankings. Hence, there is a growing demand for tools that can analyse and optimize web page speed to improve SEO performance. This project proposes the development of a PHP-based web application specifically designed to analyse web page speed and provide actionable insights for SEO enhancement.

Functional Requirements

The functional requirements of this project are as follows:

- **Web page speed analysis**: The application will analyse critical factors influencing web page speed, including server response time, resource loading times, and overall page load time.
- **Detailed metrics**: Providing comprehensive metrics / report such as page size, number of requests, and time to first byte (TTFB) to identify areas for improvement. This report should be downloadable in PDF format.
- **SEO insights:** Offering insights into how web page speed impacts SEO, including factors like mobile-friendliness and Core Web Vitals.
- **User interface:** Designing an intuitive interface where users can input URLs, view speed analysis results, and access SEO recommendations.
- Store any useful information in database as per requirement.

Tools:
1. **PHP**: Server-side scripting language for backend logic.
2. **HTML/CSS**: Structure and style web pages.
3. **MYSQL**: For any database storage task
4. **JavaScript**: Adds interactivity to the user interface.
5. **cURL or file_get_contents**: Fetches HTML content of web pages.
6. **Simple HTML DOM Parser**: Simplifies HTML parsing.
7. **WebPageTest API**: Provides comprehensive performance data.
8. **Database (optional)**: Stores and retrieves data if needed.
9. **Version Control (e.g., Git)**: Manages source code and facilitates collaboration.
10. **Development Environment (e.g., XAMPP, WAMP)**: Local server setup for testing.
11. **Integrated Development Environment (IDE)**: Software for coding and debugging (e.g., Visual Studio Code, PHPStorm).

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SkillHub- Online Platform for Self-Paced Short Courses

Project Domain / Category
Web Programming.

Abstract / Introduction
The **SkillHub** is an online automated Self-Paced Learning Management System for offering Short Courses. It is a comprehensive web-based platform designed to facilitate the delivery of short courses to learners flexibly and conveniently. This system aims to provide a seamless learning experience for users by offering a wide range of short courses across various subjects. Learners can access course materials, complete assignments, and excel in their courses at their own pace. The platform incorporates automated features to streamline course enrollment, and content delivery, enhancing efficiency for both learners and instructors. This project will equip students with valuable skills in web development, e-learning technologies, and database management.

Requirements:
1. **User Registration/Authentication:** The system should support user registration and authentication, allowing learners to create accounts and access course materials securely.
2. **Course Management:** Instructors should have the ability to create and manage short courses, including uploading course materials, setting deadlines for assignments, and monitoring learner progress.
3. **Automated Enrollment:** The system should automate the enrollment process for learners, allowing them to browse available courses, select their desired courses, and enroll without manual intervention.
4. **Course Content Delivery:** The platform should provide a user-friendly interface for learners to access course materials, such as videos, presentations, and reading materials, organized in a structured manner.
5. **Self-Paced Learning:** Learners should have the flexibility to progress through courses at their own pace, with the ability to pause, resume, and revisit course materials as needed.
6. **Assessment and Feedback:** The system should support automated assessment mechanisms, including quizzes, assignments, and exams, with instant feedback provided to learners upon completion.
7. **Administrative Tools:** Administrators should have access to a dashboard for managing user accounts, course catalog, and system settings.

By developing this Online Platform for Self-Paced Short Courses, students will gain practical experience in building scalable e-learning platforms and implementing automated workflows to enhance the learning experience for users.

Tools:
HTML/CSS, PHP, MySQL, Xampp, Any suitable IDE

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Video SEO tool for Title and Idea Suggestion using Machine Learning

Project Domain / Category

Web Application

Abstract / Introduction

We propose the development of an intelligent tool that leverages the YouTube API to suggest video titles and video ideas for YouTube channels. This tool will create a rich dataset by collecting and analyzing popular video metadata, enabling it to predict highly engaging video titles based on search queries and competition. Additionally, the tool will provide a list of related keywords, their competition, and volume. The primary objective of this project is to help content creators succeed on YouTube, grow their subscriber base ethically and legally, and produce content that resonates with their target audience.

Functional Requirements

YouTube API Integration: Integrate the YouTube API to access a wide range of video data, including titles, descriptions, tags, view counts, likes, and comments.

Data Collection: Create a rich dataset by collecting metadata from popular and trending YouTube videos in various categories.

Data Preprocessing: Clean and preprocess the collected data, including removing duplicates, handling missing values, and structuring the dataset for analysis.

Keyword Analysis: Analyze keywords related to specific video topics and evaluate their competition and search volume.

Machine Learning Model: Explore and research different machine learning models i.e. Linear regression, support vector machine (SVM) and neural networks etc. then choose and implement best machine learning model based on your research to predict highly engaging video titles for user-provided search queries and competition data.

User Interface: Develop an intuitive web-based or desktop interface for content creators to input search queries and receive video title suggestions.

Keyword Suggestions: Provide a list of related keywords based on the input query, along with competition metrics and search volume.

Ethical and Legal Compliance: Ensure that the tool respects YouTube's terms of service, content guidelines, and any applicable laws and regulations.

Tools

Programming Language: Python for data analysis, machine learning, and API integration.

Web Interface: Utilize a web framework (e.g., Django or Flask) to create an accessible and user-friendly interface.

YouTube API: Integrate the YouTube Data API to access video metadata and statistics.

Data Storage: Store collected data in a database system (e.g., PostgreSQL, MySQL) or in Excel file.

Frontend Technologies: HTML, CSS, and JavaScript for the user interface.

Deployment: Deploy the application on a web server or cloud platform for accessibility.

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Virtual Academy - Empowering Education Online

Project Domain / Category
Web Application

Abstract/Introduction

In today's fast-paced world, traditional learning methods are evolving rapidly to meet the needs of modern learners. With the increasing demand for flexible, accessible, and interactive educational resources, there is a growing opportunity to develop an innovative Online Learning Platform, known as Virtual Academy. Virtual Academy aims to revolutionize the way people learn by providing a comprehensive and user-friendly platform for online courses, tutorials, and educational resources.

Users can search and enroll in the courses from the convenience of their own homes. One of the primary features of enrolling in a course online is the availability of a wide range of categories of subjects for the courses. Users can use an online learning website to find courses that align with their interests and career path.

These tasks will be managed through Secure login and registration for **Users** and **Admin(s)**. They can apply to any course for registration that matches their interest. Users may simply enroll in a broad range of courses but not more than five (5) courses at a time. Each course consists of a period for completion in the terms of weeks and months. The user must complete a course before taking any new course *i.e*. the user cannot enroll in more than five (5) courses at a time.

There will be a separate **Admin Pannel** which will include dashboard for admin(s) to oversee the platform's activity. It will also enable the instructors / admins to manage users, create, update, or disable courses and categories with a few clicks. As a result, the application saves a lot of time for its users. This web application will be developed using C# / PHP.

Database: MySQL will be used to store users and course's data.

Functional Requirements:
1. **User Authentication:** The system should provide secure login and registration for users. There should be password recovery mechanisms for forgotten passwords.
2. **Admin Pannel:** The system should provide dashboard for administrators to oversee the platform's activity.
3. **User Profiles:** Users can create and manage their profiles, including personal information, skills, education, location, and work experience where they can track their progress, view completed courses, and connect with other users.
4. **Course Catalog:** comprehensive catalog of online courses covering a wide range of subjects, from technology and business to arts and humanities.
5. **Interactive Learning Material:** Engaging multimedia content, including videos, presentations, quizzes, and interactive exercises, to enhance the learning experience and engaging the learners.
6. **Discussion Forums:** Community forums where users can ask questions, participate in discussions, and seek help from instructors and peers.
7. **Instructor Dashboard:** Tools and analytics for instructors to create and manage courses, track progress, and communicate with learners.

Non-Functional Requirements:

- **Security:** The solution will implement proper security measures to ensure that customer and bakery owner data is protected.
- **Performance:** The system will be designed to handle many concurrent users and transactions, ensuring that the platform is always available and responsive.
- **Scalability:** The system should be easily scalable to accommodate new features and functionalities as the business grows.
- **Usability:** The solution will be designed to be user-friendly and intuitive, ensuring that customers and bakery owners can easily navigate the system and complete their tasks.

Technologies: C#, SQL Server, PHP, MySQL, HTML5, CSS3, JavaScript,

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Locating the Distance of Automobiles using GPS/GPRS

Domain/Category
AI/Web
Project Domain / Category

Networking

Abstract/Introduction
An effective automobile tracking system is designed and implemented for identification and tracking the location and distance of vehicles from each other on the roads. Android applications will be designed and developed in the way that will find out the total distance between users with the help of the exchange of text messages. This android application will make use of Global Positioning System (GPS) and Global system for mobile communication / General Packet Radio Service (GSM/GPRS) technology.
Coordinates will be calculated by the sender using GPS and this information will be shared with the intended recipient receiver(s). With the help of the application at receiver side this information will be utilized to calculate the time that will take the user to arrive at sender's location. The application will also have its database to store the information from the other users and its own coordinate s and other information.
The application will send the information regarding speed and the co-ordinates after some interval of time.

Functional Requirment
Coordinates will be collected by the android application and publish on the application database using GPS/GPRS.
The Coordinates will be updated after every 10 minutes.
Proper registration is required by all the users of the application.

User management
Simple communication between users Via GPS and GPRS/GSM
Resource gathering module, time calculation module

Report Management
- **Tools:**
- Android Studio (Android development studio)
- Java.

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An Enhanced Interdepartmental Communication System

Project Domain / Category

Networking

Abstract/Introduction

Effective communication and collaboration among different departments are essential for the smooth working of any educational institution. This project aims to develop and simulate a network infrastructure that integrates various departments within a University Campus using network simulators. The sole purpose of implementing a centralized network architecture, is to enhance communication, resource sharing, and data exchange among different departments.

Centralized User Management System:

The Domain Controller is installed in the IT Room. User accounts, logins, and access rights are managed by the Domain Controller. Users from one department have the facility to log in with their username and password from any department.

Data Transmission/ Communication:

Data communication is conducted through various platforms, including email, video conferencing, FTP server, and web server

Building a Secure and Efficient Network Infrastructure:

Design a Robust and Secure Network Infrastructure for Enhanced Communication and Collaboration Across Departments by implementing a suitable level of security

Functional Requirements:

(A) Windows server installation: Any version above 2012 window server

1. Domain controller
2. Additional Domain controller
3. Work stations
4. User Accounts management / Policies implementation
5. Shareable printer

(B) Network Infrastructure Development: Router and switches configuration

1. Router and Switches configuration
2. Dynamic Routing using OSPF
3. VLANs creation
4. Firewall / VPN deployment for security reason
5. Installation of DHCP server for assigning Dynamic IP addresses

(C) Reports/ Documentation:

1. Provide Documented report of all devices used/ configured in the network with screen shots where necessary.
   Tools:

   Tools which can be used at different stages of your project regarding section wise functional requirements are:
   (A) - Windows server installation: VMWare, Virtual Box emulator is used as tool for creating Domain controller/ Works stations and printers etc.
   (B) - Network Infrastructure Development: Packet Tracer or GNS3 can be used as network simulators for establishing Network Infrastructure. These simulators are GUI based which have the power to use image of real world IOS's of network devices like Routers and Switches.
   Bridging the Servers with Network infrastructure:
   Virtual Box is used to integrate GNS3 with VMWare for establishing the network.

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Analytics of Food Prices in Pakistan

Project Domain / Category

Information Mining and Retrieval.

Abstract/Introduction

World Food Programme (WFP) is the world's largest humanitarian agency fighting hunger worldwide, delivering food assistance in emergencies and working with communities to improve nutrition and build resilience. Each year, WFP assists some 80 million people in around 75 countries. Over the years, Pakistan has become a food surplus country and a major producer of wheat which it distributes to needy populations through various mechanisms, including the WFP. However, the National Nutrition Survey 2018 showed that 36.9 percent of the Pakistani population faces food insecurity. Primarily, this is due to limited economic access by the poorest and most vulnerable group of the population.

For the analysis of Pakistan food prices over time, you must process the '*wfp dataset*'. This dataset contains Food Prices data for Pakistan, sourced from the World Food Programme Price Database. The World Food Programme Price Database covers foods such as maize, rice, wheat, beans, fish, and sugar along with other non-food items like petrol/diesel prices and wages of non-qualified labor. This data is of utmost importance to researchers as it will help inform their work on finding solutions to the potential food price situation in Pakistan.

You must implement the latest AI algorithms to achieve the highest accuracy and precision for this project. The famous AI algorithms are Naive Bayes, Apriori, Association Rule Mining, Decision Trees, Support Vector Machines, Logistic Regression, C4.5, CART, CNN, RSNET and many more. You must know the valid reasons for choosing specific algorithms over others according to the data needs and requirements.

Domain Introduction:

The project is related to information mining and retrieval. An algorithm in this area is a set of heuristics and calculations that create a model from data. To create a model, the algorithm first analyzes the data you provide, looking for specific types of patterns or trends. The algorithm uses the results of this analysis over many iterations to find the optimal parameters for creating the mining model. These parameters are then applied across the entire data set to extract actionable patterns and detailed statistics.

Choosing Right Algorithms:

Choosing the best algorithm to use for a specific analytical task can be a challenge. While you can use different algorithms to perform the same task, each algorithm produces a different result, and some algorithms can produce more than one type of result. For example, you can use the Decision Trees algorithm not only for prediction but also to reduce the number of columns in a dataset, because the decision tree can identify columns that do not affect the final mining model. There is no reason that you should be limited to one algorithm in your solutions. Experienced analysts will sometimes use one algorithm to determine the most effective inputs (that is, variables), and then apply a different algorithm to predict a specific outcome based on that data. Data Mining lets you build multiple models on a single mining structure, so within a single data mining solution you could use a clustering algorithm, a decision trees model, and a Naïve Bayes model to get different views on your data. You might also use multiple algorithms within a single solution to perform separate

tasks: for example, you could use regression to obtain financial forecasts and use a neural network algorithm to perform an analysis of factors that influence forecasts.

Functional Requirements:

Your system must fulfill the following requirements:
1. Find the general trend in food prices over time.
2. Analyze the significant relationship between different food prices.
3. Analyze the impact of increased oil prices on the prices of other food items.
4. Estimate the economic impact of a potential food raise over time to non-qualified labor.
5. Compare all provinces' data over time and find general trends.
6. Develop policies to mitigate the impact of a potential food price according to food groups.

Tools:

The following tools can be used for developing the above project:
- Anaconda
- Numpy
- Jupiter Lab.

Dataset Download Link:
You can download the dataset from:
Pakistan Food Prices https://data.humdata.org/dataset/wfp-food-prices-for-pakistan

References:
https://learn.microsoft.com/en-us/analysis-services/data-mining/data-mining-algorithms-analysis-services-data-mining?view=asallproducts-allversions
https://www.wfp.org/countries/pakistan

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<p style="text-align:center"><u>Opinion Mining For Comment Sentiment Analysis</u></p>

Project Domain / Category

Information Retrieval / NLP

Abstract / Introduction

Sentiment analysis (or opinion mining) is a natural language processing (NLP) technique used to determine whether data is positive, negative or neutral. Sentiment analysis is often performed on textual data to help businesses monitor brand and product sentiment in customer feedback, and understand customer needs. As, humans express their thoughts and feelings more openly than ever before, sentiment analysis is fast becoming an essential tool to monitor and understand sentiment in all types of data. Automatically analyzing customer feedback, such as opinions in survey responses and social media conversations, allows brands to learn what makes customers happy or frustrated, so that they can tailor products and services to meet their customers' needs.

Comment Sentiment Analysis system that detects hidden sentiments in comments and rates the post accordingly. The system uses opinion mining methodology in order to achieve desired functionality. Opinion Mining for Comment Sentiment Analysis is a web application which gives review of the topic that is posted by the user. The System takes comments of various users, based on the opinion, system will specify whether the posted topic is good, bad, or worst.

We will use a SentiWordNet dictionary for the sentiments in user comments and then rank it. Once the user logins to the system, user can view his own status as well as he can view the topics posted by the admin. When the user clicks on a particular topic user can give his own comment about the topic. Sentiments will be extracted from the comments and will rank the topic. User can edit his own profile and can change his profile picture.

This application can be used by users who like to post view about some events that is already held, or can post about the events that is going to be held. This application also works as an advertisement which makes many people aware about the topic posted. This system is also useful for the users who need review about their new idea. This system is also useful for the users who need review about any particular event that is posted.

Functional Requirements:

1. **Admin Panel:**
   - ❖ **Login:** Admin need to login into the system by inputting the login credentials.
   - ❖ **Add Post:** Admin will post topics from any domain, and can view all comments posted by the users.
2. **User Panel:**

   - ❖ **User Login:** User login's to the system/application by using his/her user ID and password.

   - ❖ **Update Credentials:** User can edit his/her profile details along with display picture.

   - ❖ **Comment:** User will post comment on the topic uploaded by the admin.

   - ❖ **View Comment:** User can also view comment of other users posted on different/uploaded topics.

❖ **Rating Calculation:** Users should be able to comment on uploaded topics only once. The system stores each comments of the users for further processing and find out the sentiments and their weightage and store it in database.

❖ **Ranking:** The stored comments of the users will be analyzed by the system with the help of SentiWordNet dictionary and will rate/rank the comments accordingly.

❖ **Polarity Ranking:** User can easily decide whether the uploaded topics comments by the admin/ system are good, bad or worst based on sentiment classification.

Tools:
❖ SQL 2008
❖ Visual Studio 2010
❖ Senti Word Net Dictionary
❖ Wamp Server

Note:
1. SentiWordNet Dictionary will be used for sentiment classification tasks only.
2. You may use any other platform for coding in which you have command, but make sure all the mentioned FR's should be completely implemented.

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Toxic Comment Classification System Using Deep Learning

Project Domain
Sentiment Analysis

Project Abstract:
The Toxic Comment Classification System aims to develop a robust deep learning-based application capable of identifying and categorizing toxic comments in online discussions. With the proliferation of online platforms facilitating communication, the issue of toxic comments has become increasingly prevalent, leading to negative user experiences and potential harm. This project seeks to mitigate such toxicity by leveraging state-of-the-art deep learning techniques for natural language processing (NLP) to accurately classify and flag toxic comments. Through a combination of text preprocessing, feature extraction, and neural network architectures, the system will provide real-time analysis and classification of comments, allowing platform moderators to take appropriate actions promptly.

Functional Requirements:
1. **User Authentication and Authorization:**
1.1. Users should be able to register, login, and manage their accounts.
1.2. Different user roles (admin, moderator, user) with varying levels of access should be supported.
1.3. Admins should have the ability to manage user accounts and permissions.
2. **Comment Classification:**
2.1. The system should accept input text comments from users.
2.2. Comments should undergo preprocessing to remove noise, such as HTML tags, punctuation, and stop words.
2.3. Toxicity classification should be performed using deep learning models such as recurrent neural networks (RNNs), convolutional neural networks (CNNs), or transformer-based models like BERT.
2.4. The system will check if there is any toxic word in the sentence by comparing it with the pre-defined list of words. It will automatically give synonyms for the non-toxic words. After all the conditions are checked, the system will post the chat.
2.5. The system should provide multiple toxicity labels (e.g., toxic, severe toxic, obscene, threat, insult, identity hate) for each comment.
3. **Real-time Analysis and Reporting:**
3.1. Comments should be analyzed and classified in real time.
3.2. The system should generate reports summarizing the frequency and distribution of toxic comments over time.
3.3. Reports should include metrics like comment volume, toxicity distribution, and trends.
4. **Moderation Tools:**
4.1. Moderators should have a dashboard to view flagged comments and their classifications.
4.2. Moderators should be able to take actions such as deleting or flagging comments for review.
4.3. Flagged comments should be highlighted for quick identification.
4.4. The moderator can block the user if the frequency of using toxic words over the period is increasing.
5. **Scalability and Performance:**
5.1. The system should be scalable to handle a large volume of comments concurrently.

5.2. Performance metrics, including response time and throughput, should be monitored and optimized.

5.3. Efficient use of hardware resources such as GPUs should be implemented for faster processing.

6. **User Feedback and Improvement:**

6.1. Users should have the option to provide feedback on comment classifications.

6.2. Feedback data should be used to continuously improve the model's accuracy and adapt to evolving patterns of toxicity.

6.3. Feedback mechanisms should be integrated into the system's training pipeline.

Software Requirements

- Python
- Sublime Text Editor
- XAMP Server

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TV Show Popularity Analysis Using Data Mining with Python

Project Domain / Category
Sentiment Analysis

Abstract / Introduction
The domain of television has witnessed an exponential growth in content production over the years, with numerous shows spanning various genres being produced and aired globally. In rapidly evolving television landscape, the competition for audience attention is vast. With an abundance of content across diverse genres and platforms, understanding what makes a TV show popular is essential for content creators, producers, and broadcasters. This project, "TV Show Popularity Analysis Using Data Mining with Python," aims to delve into the factors driving TV show popularity using data mining techniques and Python programming.

In today's television landscape, understanding what makes a TV show popular is crucial for content creators, producers, and broadcasters. This project proposes to utilize Python programming along with data mining techniques to analyze the factors influencing the popularity of TV shows.

Functional Requirements:

1. **Data Set:**

    First step is to collect a dataset comprising various attributes of TV shows, including genre, cast, ratings, release year, seasons/episodes, viewer's comments etc. You can collect data from online sources, databases, and APIs such as IMDb, TVDB, or Kaggle datasets related to TV shows. To meet the project requirements you may have to combine two or more datasets.

2. **Data Pre-processing:**

    Second step is to clean and preprocess the dataset to ensure data quality, reliability and prepare it for sentiment analysis. You have to perform following preprocessing steps:
    Text normalization: Lowercasing, removing special characters.
    Tokenization: Splitting text into individual words or tokens.
    Stop word removal: Eliminating common words that do not carry significant sentiment information.
    Stemming or Lemmatization: Reducing words to their base form.

3. **Data mining Techniques:**

    In next step you will analyse the prepared dataset by applying data mining techniques such as clustering, classification within the dataset.

    So, in this step, you have to use different data mining techniques to perform following tasks:
1. Implement clustering algorithms (e.g., K-means) to group TV shows based on similarities.

2. Use classification algorithms (e.g., decision trees, neural networks) to predict TV show popularity categories.

4. **TV Show Recommendation:**

1. Interpret the findings from the analysis and provide actionable recommendations for content creators and broadcasters.
2. In this final recommendation phase, you have to give list of factors which plays an important role in the popularity of any TV show.
3. These factors can be labelled as per their importance.

Note:
- **More Functional requirements can be added to each deliverable.**
- **A detailed document for each deliverable, tools, and libraries to be used will be provided later after the selection of project.**
- **Python skills and prior knowledge of data mining is required. Please thoroughly study the proposal and then opt for the project.**

Tools:
- Windows OS
- R software
- Python
- Online sentiment analysis tool

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Project Domain / Category
Website

Abstract / Introduction

Our goal is to create a user-friendly online platform where people can explore and purchase unique antique items from various periods and styles. With a focus on simplicity and accessibility, our platform aims to bring the charm and elegance of antiquity to users' fingertips.

Users:
There will be four users of this website: Visitors, Customers, Admin, Sellers

1. Visitors: People who browse the website without creating an account. They can view product listings, read descriptions, and learn about the shop's offerings.
2. Customers: Individuals who create an account on the website to make purchases. They can browse products, add items to their cart, and complete transactions.
3. Administrators: Shop owners or managers who have access to backend functionalities for managing products, orders, and customer data.
4. Sellers: Individuals or organizations who list antique items for sale on the platform. They can create listings, upload photos, and manage their inventory.

Functional Requirements:

Following are the functional requirements:

1. Registration:
   Customers & Sellers will register first, so that they log in to the system.
2. Login:
   Admin, customers and sellers will login to the system (after registration) using id and password.
3. Manage users:
   Admin will manage all customer & sellers' details.
4. Manage Antique items:
   Sellers will add antique items that they wish to sell and provide all the details related to it like: Name, high quality images, detailed description, price etc. Also, seller should be able to edit or delete them. Also, when the item is sold, then seller should be able to change its status to SOLD or delete that item from the system.
5. Purchase item:
   Customer will make purchases by adding items to their cart and process to checkout.
6. Payment Method:
   Customer can pay through online or by cash on delivery.
7. View Items:
   Visitors, Admin, Sellers, Customers should be able to view all the listed items.

8. Approve/Disapprove items:
   Admin can approve or disapprove item added by Seller on the basis of invalid information.
9. Search items:
   Customer, Visitors & admin should be able to search for a particular item.
10. Social Media:
    Customer should be able to share items link on different social media platforms.

Tools:
C#, .net, Visual Studio, SQL, Tomcat

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BritishGarments

Project Domain / Category
Web Application

Abstract / Introduction
E-Commerce is helpful for both the customer and the businessmen. With the help of e-commerce, the customer can buy any of the desired products available online. The main advantage of buying the product online is that you just order it and it will be at your doorstep.

To facilitate the customer to buy products online, the businessmen need a website where he/she displays the products which he/she is offering to sell.

"BritishGarments" is a website that helps customers who intend to buy things online. Customers can easily navigate through the website and find the desired product category wise or individually. Product ordered through the website is delivered to the customer's desired place.
The project is aimed to manage the details of Products, Sale, Stock, Purchase and Date Wise Sale. It also manages all information about the Vendors, Sales Man and its Reporting. The project is totally built at administrator and user end of things. Only the administrator is guaranteed to have full control on the application. It provides search facility such as searching for Stock, Products and Vendors/Company.

It stores all information about staff to a secure database. It also generates reports. We can add, delete and update, the records easily. It can generate Vendor report. It manages all information of Customer Record. We can easily generate Invoice and take print for Customer.

Functional Requirements:

Following are the functional requirements, you have to fulfil for this project.
1. The proposed application should have two modules. Admin module and User module.
2. Further application should have following Interfaces. (i) User Registration (ii) Dashboard (iii) Stock Details (iv) Purchase Items (v) Sale Items Records (vi) Invoice Generation
   (vii) Vendor Details (viii) Daily, Monthly and Annually Sale Report (ix) Stock Items Report
   (x) Max sold out product List (xi) List of Items which are low in quantity or out of stock. (xii) Messaging feature to send order messages to customer number.
3. Admin have access to control all components of application but user can access limited components of application. When the user or admin open the application using login credentials their username will be displayed on the dashboard.
4. Admin can add the products into the stock.
5. Admin can maintain the records of purchase items.
6. Admin can generate and print the invoice of sale items.
7. Whenever the admin add any entry or generate invoice, entry will save in database with name of respective person.
8. User has access to visit the website and search and purchase any product of his choice and it must be necessary for user to create his account first before shopping on website.
9. When user purchase any product from website it will be first added into cart and different payment method will be shown to user to buy product.

10. Different menu product categories must be on website navigation bar related to garments products like (Men,Kids, Trouser,T-Shirts etc)

Note: For further information contact to supervisor through skype (ID given below) and discuss the website and desktop module in details.And it is mandatory to discuss the modules briefly before starting the project to avoid any confusion in future.

VU will not provide you any resources to buy any Software, Framework or any services if used in this project. Student has to manage all the project on its own.

Tools:
Visual Studio (2019 or any other above version of VS) with .NET Framework, SQL server, Crystal Reports

Programming Language
ASP.NET Core MVC (it is mandatory to use the mention language framework .Any other framework or language will not be acceptable)

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College Admission Management System

Project Domain / Category
Web Programming

Abstract / Introduction
The College Admission Management System (CAMS) is a software solution designed to streamline and automate the process of managing college admissions.

It aims to simplify the complex procedures involved in admitting students to educational institutions. CAMS provides an efficient platform for both applicants and the administrator, offering convenience, transparency, and reliability throughout the admission process.

By integrating various functionalities such as application submission, document verification, merit list generation. CAMS enhances the overall efficiency and effectiveness of college admissions.

Functional Requirements:

1. **User Registration:**
   o Applicants should be able to register.

2. **Application Submission:**
   o Applicants should be able to submit their applications online.
   o The system should support uploading of required documents such as academic transcripts and academic details.

3. **Document Verification:**
   o The administrator should have the ability to verify the authenticity of submitted documents against the entered academic details.

4. **Merit List Generation:**
   o The system should calculate and generate merit lists based on predefined criteria such as academic scores.
   o Merit lists should be available to applicants on admission portal.

5. **Application Tracking:**
   o Applicants should be able to track the status of their applications throughout the admission process.

Tools:
HTML, CSS, JavaScript, jQuery, Bootstrap (Front-end)
MYSQL (phpMyAdmin) Database
PHP (Server-side programming)
XAMPP — Web Application Server

You are advised not to switch the tools. If you do so, you will handle the technical side yourself.

Note:

- These are the basic requirements of the application. Students may add further functionalities to make the application more useful.
- Virtual University of Pakistan (VU) will not provide any kind of hardware for this project; a student must arrange the required hardware by himself/herself.
- VU will not pay for any license of the software, the libraries /toolkits/APIs used in this project.

Supervisor:
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Project Domain / Category
Web Application

Introduction

Portfolios provide you with a personal record of your success or improvement in a range of areas. They are essential and relevant to your own career development. Your personal portfolio is a compilation of relevant work samples and documents gathered during your school years and presented in a structured manner.

As this is your final project and after that most of students would join the software industry. So you are required to have an online existence containing your personal information that is required to be in knowledge to the organizations, hire you. So, you are required to develop a portfolio website that is dynamic and multi-featured that would be a great benefit for your career startup.

Project Requirements

You have to design your single paged portfolio website having your information in the following div's / sections of your web page;

- Personal Information (Also contains your picture to have your pictorial introduction)
- Contact Information (social media, Address, Phone etc.)
- Contact Me (If someone would like to write you message from your web page)
- A one or two paragraphs having narrative information about yourself
- Skills that you have
- Tools that you have expertise in
- Education
- Experience
- Case Studies / projects that you are handled / working on previously
- Services that you can provide

Mandatory sections / information in your portfolio website are.
- Personal Information
- At least one picture of yourself to have your pictorial introduction. (It may be more than one that may change within same frame after some time)
- Contact Information (social media, Address, Phone etc.)
- Contact Me (If someone would like to write you message from your web page)
- A one or two paragraphs having narrative information about yourself
- Skills that you have
- Tools that you have expertise in
- Education

Project Working:

- There are two types of users for your project that are Admin and General User (Portfolio User)
- Admins manage users able to approve user registration request and delete users
- Users must opt for a purchase plan before creating his / her portfolio
- There are three Plans for users I.e. Basic, Silver and Gold that are for 1000, 3000 and 5000 rupees respectively.
- For basic, there is only one portfolio design / basic template available to user at the time of creation
- For Silver, the user has the choice of three portfolio designs / templates while five portfolio designs are available for gold user.
- A unique URL is generated for each user portfolio (showing the website design that user decided at the time of portfolio creation)
- Silver and Gold users have liberty to change their portfolio design (from the designated designs / templates) anytime they want as per designs available to them as per their subscription
- What you must do is to save all your information in database tables. *If any of your sections have no information in database, then div / section / page for this section would not be generated in your portfolio.* For example, if you don't have experience then in your portfolio page, there's no head showing for experience.
- There's also a button that would allow to download your CV in PDF format in separate web page.
- You are allowed to use any five free available bootstrap enabled templates for designs of portfolio

Tools:
HTML, CSS, Boot Strap, JavaScript, PHP, MySQL, Xampp / wamp server

Supervisor:
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Project Domain / Category
Web Programming

Abstract / Introduction
The purpose of the web-based E-Learning System is to facilitate instructors' work in creating lessons, exercises, and tests. This allows the instructor to upload a lesson in the form of a PDF or video file. In addition, he has the ability to create exam questions and activity sets depending on the lesson he provided. Prior to being able to access the lesson and take the quiz, students must create an account. Additionally, the student may download and watch the videos and PDF files if they already have an account.

Functional Requirements:

Admin Panel
Lectures
- Admin can upload lesson.
- Admin can change the file.
- Admin can view lesson.
- Admin can delete lesson.

Exercises
- Admin can add question.
- Admin can edit question.
- Admin can delete question.

Student or User Panel
1. Students can register into system.
2. Students can login into system
3. Students can view lesson.
4. Students can take quizzes.
5. Students can generate score.

Tools:
- HTML, CSS, Bootstrap (Front-end)
- MYSQL(Backend)
- PHP (Server-side programming)
- XAMPP — Web Application Server

Supervisor:
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Project Domain / Category
Web Application

Abstract / Introduction
The proposed project aims to develop a comprehensive real estate listing platform where users can search for properties, list their properties for sale or rent, and connect with real estate agents. The platform will facilitate smooth interactions between buyers, sellers, and agents, enhancing the overall real estate experience. This proposal outlines the functional and non-functional requirements of the project.

Functional Requirements:

User Registration and Authentication:

- Users should be able to register on the platform using their email addresses.
- The system must authenticate users securely to ensure data integrity and user privacy.

  Property Listings:

- Users should be able to list properties for sale or rent, providing details such as location, price, property type, and amenities.
- Property listings should include images to showcase the property visually.
- Users should have the ability to edit or remove their listings.

  Property Search:

- The platform should offer a robust search functionality allowing users to filter properties based on various criteria such as location, price range, property type, and amenities.
- Advanced search options like sorting by popularity, price, and date added should be available.

  Real Estate Agent Profiles:

- Real estate agents should have dedicated profiles showcasing their expertise, contact information, and listings.
- Users should be able to contact agents directly through the platform.

  Messaging System:

- A messaging system should be implemented to facilitate communication between users and agents regarding property inquiries and negotiations.
- Users should receive notifications for new messages.

  Favorites List:

- Users should have the ability to save properties to a favorites list for easy access and comparison.

Admin Panel:

- An admin panel should be provided to manage user accounts, property listings, and reported content.
- Admins should be able to moderate user-generated content to maintain platform integrity.

Tools and Technologies:

- HTML, CSS, and JavaScript will be used for frontend development to create an interactive user interface.
- PHP will be utilized for server-side scripting to handle user requests and interact with the database.
- MySQL will serve as the backend database management system to store user data, property listings, and other relevant information.

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Project Domain / Category
Web application

Abstract / Introduction
As per the latest researches, Working parents are facing problems to manage their day to day responsibilities along with their parenting responsibilities. There are many challenges faces by working parents on daily basis causing exhaustion, deadline management, children activities management, stereotyping, career growth and managing other daily life schedules. These facts have been proven by the latest published HR journals.

To deal with these conflicts Online Daycare applications can be very helpful for working parents. Online Daycare platforms allow you to search for Daycare by location, experience, specific skills, and rates. This application will allow working parents to find part time or full time Daycare and child care options based on their requirements. Moreover this application will also match you with a caregiver based on your profile. Plus, you can connect with a Daycare, book a job, and pay using your phone.

Functional Requirements:

1. Users will be able to create an account by signing up a form.
2. The form will consist of basic information such as name, address, phone# and email address for future reference.
3. Users will be divided into two categories i.e. Daycare or parents.
4. Parents will be able to create detailed profiles.
5. Form will consists of all required information such as name, address, contact number, emergency contact number and emergency contact details, full time of part time child support, area, and time duration for Daycare.
6. Daycare will be able to create a detailed profile consisting of child care details such as basic information, professional qualification, Daycare experience, qualification or diplomas/Training.
7. Daycare Centre will be responsible for adding pictures of the facilities they are providing in their profile.
8. Moreover Daycare will be able to mention if they provide services at home or at the facility
9. The facilities in Daycare Centre needs to be mentioned in the profile such as CCTV, nursing facilities, Number of nursing staff, number of medical staff.
10. Daycare will be able to post a review of the child based on their experience and observation.
11. Daycare will be able mention their fee and payment options.
12. Daycare will be able to generate income report for a specific month or for a selected period of time.
13. Daycare will be able to generate expense report for a specific month or for a selected period of time.
14. Daycare will be able to search for a specific child and his/her history.

15. Daycare will be able to find number of appoints for a specific day or future dates.
16. Daycare will be able to keep complete attendance of children dropped at the facility.
17. Daycare will be able to check the attendance record of children monthly or for a specific period of time.
18. Daycare will be able to send an automatic text message when the child is received or dropped from the Centre.
19. Parents will be able to pay from their phone.
20. Parents will be able to write a review of the daycare for other parents to read.
21. Application will be able to suggest suitable options for parents as well.
22. Administrator will be able accept or reject Daycare based on their profiles.

Tools:
PHP, MySQL, Xammp, Notepad++.

Supervisor:
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Online Hardwood and Carpet Store

Project Domain / Category
Web programming

Abstract / Introduction
The Online Hardwood and Carpet store is a digital platform designed to streamline the process of purchasing flooring materials. It operates as a virtual marketplace, connecting customers with a wide array of hardwood and carpet options. Through intuitive interfaces, users can browse, compare, and select products based on their preferences and needs.

The system integrates secure payment gateways to facilitate transactions, ensuring a seamless buying experience. Leveraging advanced algorithms, it offers personalized recommendations tailored to individual tastes and requirements. Additionally, the platform provides comprehensive information on product specifications, pricing, and availability, empowering customers to make informed decisions. With its efficient logistics framework, the system orchestrates the timely delivery of orders to customers' doorsteps, enhancing convenience and satisfaction. Overall, the Online Hardwood and Carpet store system represents a digitized, user-centric approach to the flooring industry, combining convenience, accessibility, and reliability in one virtual space.

Functional Requirements:
The system will be used by two modules, which are Administrator and User. Each module is interconnected or integrated to each other. This system is very easy to understand and user friendly. In this system user can connect any time whenever he/she wants. This system should be secured.

1. User Registration and Authentication: Implement a system for users to create accounts and log in securely, ensuring authentication protocols are in place to protect user data.
2. Product Catalog Management: Develop functionality for administrators to manage the online catalog, including adding, updating, and removing hardwood and carpet products, along with their specifications, pricing, and availability.
3. Search and Filter Capabilities: Enable users to search for products based on various criteria such as material, color, style, and price range, providing a seamless browsing experience.
4. Product Comparison Feature: Implement a feature allowing users to compare multiple products side by side, facilitating informed decision-making.
5. Secure Payment Processing: Integrate secure payment gateways to enable users to make purchases securely using various payment methods, ensuring encryption and compliance with industry standards.
6. Personalized Recommendation System: Develop algorithms to analyze user preferences and browsing history, providing personalized product recommendations to enhance the shopping experience.
7. Order Management and Tracking: Provide functionality for users to track the status of their orders in real-time, along with automated notifications for order updates and shipment tracking.
8. User Reviews and Ratings: Implement a system for users to leave reviews and ratings for products they have purchased, fostering transparency and trust among customers.

9. Seamless Checkout Process: Design an intuitive and streamlined checkout process with options for guest checkout or saving user preferences for future purchases, reducing friction and cart abandonment rates.
10. Responsive Design: Ensure the platform is responsive across various devices and screen sizes, optimizing the user experience for desktops, tablets, and smartphones.
11. Report Generation: Customizable reports and analytics for better decision-making.
12. Support and Maintenance: Ongoing support and maintenance to address any issues or updates.

Tools:

ASP.NET/C#, HTML, CSS, JavaScript, Crystal report, SQL Server,

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Online Mobile Showroom

Project Domain / Category
Web Programming

Abstract / Introduction
After covid19 pandemic online shopping is common all over the world. Showcasing the digital products online helps the companies to provide the comprehensive browsing experience to customers without visiting the physical stores. Online mobile showroom is a web-based application that provides a platform for mobile users to have a virtual showroom experience. Through this application the visitors will be able explore various mobile phone models, compare specifications, and make informed decisions for purchase later. This type of experience is not possible in physical mobile stores because it is almost impossible to see and compare every mobile device. The online mobile showroom will have a user-friendly interface to better replicate the experience of a physically mobile store. Visitors will be able to browse through different categories of mobile phones, including flagship models, mid-range options, and budget-friendly devices. Each product listing will include detailed specifications, high-quality images, and customer reviews to assist users in evaluating their options.

Functional Requirements:
Following are abstract level function requirements of online mobile showroom. Students will provide detailed requirements in the SRS document.

User Management:
- There will be two types of users called casual visitors and registered users.

- There should be options to register an account.

- The registered users should be able to login and reset the password and mechanism to recover the account.

    Catalog Management

- Admin should be able to add, edit, and delete mobile devices through own interface

- Each mobile will have different features like brands, models, specifications, prices, etc.

- While entering a mobile detail there should be option to upload different pictures of that mobile

    Mobile Detail:
- Selecting a mobile should show detailed feature of that mobile

- There should be option to view different angles and pictures of a selected mobile

- Mobile detail page should have option to show small picture of different angles and colours

- On click a small picture show its high-resolution image is a specific area

Mobile Search and Comparison:

- There should be an option to search and compare maximum three mobiles side by side.

- In comparison if any feature of a mobile is better than other mobile this should be highlighted.

- There should be an option to search or filter mobiles on single or multiple search criteria. Few are given below

  o Filter by price range
  o Filter by screen size
  o Filter by RAM size
  o Filter by camera resolution
  o Filter by operating system
  o Filter brand name

Mobile Sorting:

- There should be option to sort the mobiles on following criteria
  o Sorting on the basis of price low to high and high to low
  o Sorting on the basis of popularity
  o Soring on the basis of arrival old to new and new to old

Add to Wishlist:

- There should be option for registered user to add any mobile(s) into Wishlist

- Registered users should be able to manage the Wishlist by adding more mobile or removing existing from the list.

User Feedback and Review

- There should be an option for users to give feedback and comments against each mobile.

Important Note:

- There will be mandatory sessions during office hours to show the progress of your project. The students who cannot join these sessions should not select this project. The students who will miss two sessions will be declared failed in the whole project.

Tools:
Python

Following book will help you to learn Python web programming and complete your project easily.
https://edu.anarcho-copy.org/Programming%20Languages/Python/learn-web-development-python-hands.pdf

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Project Domain / Category
Web Application

Abstract / Introduction
The main aim of this project is to develop an interactive and effective website for the needs of Pet animals & Birds buyers and sellers. It will be like an e- pet store website where Pets can be bought and can be sold from the comfort of home through the Internet. An online pet store is a virtual store on the Internet where customers can view the available pets for sale and can select pets of their interest as well as add a pet on the website for selling it. The website will feature a user-friendly interface that allows individuals to browse through a wide selection of pets, including dogs, cats, birds, and other animals. Users will have the option to filter their search based on criteria such as breed, age, and location, making it easier to find the perfect pet according to their choice. A user will be able to search for pets on the website by applying different search filters. After selecting a pet of his/her choice, a customer can contact the owner of the pet whose information will be visible to the buyer on sending a purchase request to the seller.

Functional Requirements:
There will be three categories of Website users:
- Guest (Unregistered User)
- Registered User
- Administrator (Admin)

Guest (unregistered user) user will be able to just view the available pet animals & birds and can search them on the website according to his/her need.
Registered user will have the privileges to place an order for a pet animal or bird that is available on the website as well as can add a pet animal or bird on the website for selling it. Administrator (Admin) is the super user of the website who can manage everything on the website.

- **User Module:**
  a)   **User Registration and Sign In:** There will be a proper signup interface for unregistered users to register on the website. A registered user will be able to login to the website by entering the correct credentials in the sign in interface.

  b)   **View Pets and Birds:** All available pet animals & birds will be available on the website with proper interface. Any registered user or guest can view information of available pet animals & birds and can view the complete details of any of them with its type, breed, images, demanded price, pet owner's contact & location and other necessary details. The guest can only view and search the available information and cannot make any upload or any purchase request without any registration on the website.

  c)   **Search Pets and Birds:** Any user registered or unregistered can search for the available pet animals & birds on the website. The search can be done using different filters like animal or bird type, breed, colour, price etc. If user requirement meets, then system will show result in proper format.

  d)   **Upload Pets:** A registered user will need to upload the pet details if he/she wants to sell a pet. After login to the website, the user will upload all the necessary details i.e. pet type (dog, cat, parrot etc), breed, price, images etc. of the pet on the website.

e) **Update details of uploaded Pets:** If a registered user has uploaded a pet on the website, he/she will be able to edit and update the price or any other details of that pet. The registered user will also be able remove the pet from the website.

f) **Update profile:** Upon successful login to the website by a registered user, he/she will be able to update any of his/her profile information and can update his/her account password.

g) **User Review and Feedback:** Any registered user will be able to submit his/her review about purchased pet and can give feedback about it to its previous owner.

h) **User Complain:** In case of any fraud or serious issue, any registered user will be able to submit complain about the concerned to the admin. After verification of the matter, the admin can either give warning to the concerned or can block the concerned account on the website.

i) **Give Rating:** Customers can give a rating to the concerned seller after the completion of purchase request according to his/her satisfaction.

j) **Buy Pets:** A user must login successfully to the website to place an order for buying a pet. A registered user needs to fill all the order details for buying the pet of his/her choice. After filling the details, user will be moved to the payment section.

- **Admin Module:**

a) **Login:** Using valid login credentials, admin need to login into the system in order to access the system.

b) **Manage Pets:** Admin can upload the pet's information, view all the added pets online with their details by the registered users. Admin can block and unblock any pet for displaying on the website.

c) **Admin Dashboard**: Admin can view the detailed summary of everything such as count of registered users, registered user details, total sold pets along with buyer and seller details, total available pets etc.

d) **Manage Users:** All the registered user details will be displayed to the admin. Admin will accept / reject the user registration requests and can block or unblock any user for uploading or buying a pet on the website.

e) **Report Generation:** The admin will be able to generate a complete report of total sales of pets purchased on daily, weekly, and monthly basis.

- **Payment Module:**

Upon successful completion of any order, customers can either pay the amount to the concerned delivery person on the spot or can transfer the amount to the concerned Pet sellers's account number available on the website. The responsibility of the delivery will be on the seller and the responsibility of verifying the selected Pet will be on the customer respectively.

 [**Note:** Student can add/enhance requirements as per need and keeping the time span and scope in view.]

Tools:
ASP.NET, C#, React JS, Node JS, HTML, CSS, JavaScript, Ajax, jQuery, Bootstrap, MS SQL Server

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Project Domain / Category
Web Development

Abstract / Introduction
The Electronic Tax management system is proposed with the aim to automate the process of tax collection and management for both taxpayers and tax authorities.

The proposed system aims to provide a user-friendly interface for taxpayers to file their taxes, access tax information, and communicate with tax officials. It will automate the calculation, payment, and filing of taxes, reducing errors and increasing efficiency.

The system will also feature a secure backend for tax authorities to manage taxpayer data, process payments, and generate reports, ensuring compliance and facilitating better decision-making.

Functional Requirements:

1. **User Registration:**
- Users can be admin/tax authority and tax payers.
- Both admin and tax payers should be able to create and update their accounts.

2. **Tax Data Entry and Management:**
- Users should be able to input and update their tax-related information.
- There should be different interactive forms for different tax categories (income tax, property tax, sales tax, etc.).

3. **Document Management**
- Document Upload: Taxpayers should be able to upload necessary documents for tax filing.
- Document Verification: Automated verification of uploaded documents for accuracy.
- Document Retrieval: Easy retrieval of past tax documents for reference.

4. **Automated Tax Calculation:**
- System should calculate taxes based on tax payer's inputs.
- Generation of tax reports, summaries, and statements.

5. **Payment Module**
- The system should allow Secure payment for tax payments.
- There should be multiple payment methods (credit/debit card, bank transfer, etc.).

6. **Reporting and Analytics**
- Tax Reports: Generation of tax reports for tax payers and authorities.

7. **Notifications and Alerts**
- Automated Alerts: System should send reminders for tax deadlines and updates.
- Custom Notifications: Admin should set up custom alerts for specific tax events.

8. **Administrative Functions**
- Tax Rate Management: Admin will create and update tax rates and regulations.
- Tax Payer Account Management: Admin will manage taxpayer accounts.

Tools:
HTML, CSS, PHP, MYSQL

Supervisor:
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ResearchHub

Project Domain / Category
Web application

Abstract / Introduction
ResearchHub is a web application designed to facilitate collaboration and knowledge sharing among researchers, academics, and students. It provides a platform for users to upload, share, discuss, and discover research papers, articles, datasets, and other scholarly resources.
By the end of the project, you will have developed fully functional research sharing platform that enables users to collaborate, share, and discover research resources effectively. This project not only enhances your web development skills but also provides a valuable tool for researchers and academics to advance their scholarly work through collaboration and knowledge sharing.

Functional Requirements:

1. **User Registration and Authentication:**

   Allow users to register accounts and log in securely. Implement authentication mechanisms such as email verification and password hashing to ensure user data security.

2. **Admin Dashboard:**

   Create an admin dashboard for managing users, content moderation, enforcing community guidelines, and monitoring platform activity.

3. **Profile Management:**

   Enable users to create and manage their profiles. Include features such as profile pictures, bio descriptions, affiliations, and research interests.

4. **Resource Upload and Sharing:**

   Allow users to upload research papers, articles, datasets, presentations, and other scholarly resources. Implement file upload functionality with support for various file formats.

5. **Resource Discovery:**

   Provide a search functionality for users to discover relevant research resources. Implement search filters based on keywords, authors, categories, publication dates, and citation metrics.

6. **Discussion Forums:**

   Create discussion forums where users can engage in scholarly discussions, ask questions, share insights, and collaborate on research topics. Implement features such as threaded comments, upvoting/downvoting, and tagging.

7. **Collaborative Projects:**

    Enable users to create and join collaborative research projects. Each project can have its own discussion forum, document repository, task board, and timeline for milestones.

8. **Social Networking Features:**

    Implement social networking features such as following/followers, user mentions, and notifications to keep users engaged and connected with their peers.

9. **Analytics and Reporting:**

    Provide analytics dashboards for users to track metrics related to their research contributions, such as download counts, citation counts, and user engagement statistics.

Tools:
HTML/CSS, JavaScript, React.js, Node.js
MongoDB, SQL, MySQL
php, java, C#

Supervisor:
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Serenity Healthcare Centre Information System

Project Domain / Category
Web Application

Abstract / Introduction
You are required to develop a web application for a hospital named "Serenity Healthcare Centre". This web application designed to fulfill the diverse information needs of hospital administration and aims to encompass all sides of hospital operations, including medical, administrative, financial, and patient management.

The system will enable hospital staff to efficiently schedule appointments, manage doctor duty timings, process outpatient fees, conduct diagnostic tests, and generate reports pertaining to patients, diagnostics tests, salaries, and various financial matters, both on-demand and periodically.

Functional Requirements:

1. Admin Panel:

- Log in and log out functionality for admin users.
- Ability to add and edit staff records.
- Scheduling outdoor patient appointments.
- Viewing the history of a patient.
- Creating receipts for outpatient fees.
- Adding, editing, or printing data of indoor patients.
- Generating reports for various purposes such as patient data, fees, medical history, diagnostics test results, and doctor appointments.
- Managing on-duty doctor's timings.
- Managing staff members salaries.

2. Pharmacy Management:

- Adding, editing, or viewing different aspects of pharmacy inventory such as available medicines, purchase requirements, and bills.

3. Patient Functions:

- Signing up for the Hospital Information System (HIS).
- Logging in and out of the system.
- Viewing diagnostics test results and printing reports.
- Placing appointment requests.
- Accessing details of doctors.
- Viewing various financial bills including appointment charges, medical bills, and diagnostics test bills.
- Submitting complaints in case of any issues or concerns.

Tools:

- Programming languages:
  PHP
  HTML, CSS, JavaScript
  SQL (e.g., MySQL)

- Frameworks:
  PHP Framework (e.g., Laravel, Symfony)
  Front-end Framework (e.g., React, Angular, or Vue.js)

- Tools and Editors:
  Code Editor (e.g., Visual Studio Code, Sublime Text, PHPStorm)
  Database Management (e.g., phpMyAdmin, MySQL Workbench)
  API Integration Tools (e.g., Postman, Guzzle for PHP)
  Project Management Tools (e.g., Trello, Asana, Jira)
  Web Server (e.g., Apache, Nginx)
  User Interface Design Tools (e.g., Adobe XD, Sketch, Figma)

(Note: Student can use any other tool/editor as per his/her choice, with same programming language)

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Ambulance Booking System (ABS)

Project Domain / Category
This project belongs to Web Programming (Web based Application)

Abstract/Introduction

Ambulance plays crucial role when an accident occurs on the road or medical emergency at home and the need arises to save valuable human life. Carrying of a patient to hospital in case of emergency is quite difficult and gets more difficult during peak hours and especially at night. So the Abundance Booking System (ABS) application enables users to register themselves and log in to the system in case of emergency and book the ambulance for patient transportation.
This system may stores the users' personal and login data, ambulance data like its size, number etc. and transportation data like Pick-up point, destination (hospital name), date and time, area (accident area) etc. the system may also have to store drivers data who drive the ambulance.

Functional Requirements:
   A set of functional requirements of the proposed system may include the following.
1. The users must be able to register themselves
2. The users are able to edit/update their profiles.
3. There must be a login process for users/Admin to access the application.
4. The users must be able to book a transportation (Carrying of patient). while booking a transportation, the users should be provided with a list of nearest Hospitals.
5. The users must be able to edit/update the transportation.
6. The users should be able to mention the patient status (type of injury, disease etc.) and the system should recommend the nearest hospital according to the patient status.
7. The system should have list of specialist doctors along with their locations and availability (Duty time at their duty station).
8. The admin is able to generate different reports like weekly transportation, monthly transportation, area wise transportation etc.

Note: Make sure that the above list is a sample of functional requirements, students do not need to be limited with these only. Students are supposed to think (or visit the problem domain) and implement some other functional requirements not mentioned in above list.

Tools:
MySQL, PHP etc.

Supervisor:
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CLML - An online Car Loan Management System

Project Domain / Category:
Web Based

Abstract/Introduction:
This is a web-based Management System for XYZ Bank. The system will be linked with the database at the backend and all the users can check/update/enter the information as per their given rights/functions/responsibilities. The editable contents available to any user can be updated/entered by him however non-editable contents can only be checked. Details regarding the different users involved in the system and the functions which they can perform are given below:

Functional Requirements:

Following are the users of this system. Each user except "Visitor" must log in first, to use the system.

Visitor
Bank Manager Car Dealer Admin
Responsibilities and functions of each user are given below:

Visitors:
1. There can be multiple visitors. The visitor can access 5 editable (Drop Down List) and 4 non-editable contents:

a. Editable

- Car Company Car Name
- Installment Years Advance Deposit
- Car Delivery (in months, as charges will apply if the consumer needs the car earlier)

b. Non-Editable
- Processing Charges (Separate for each car) Estimated Tax (Separate for each car) Users Income estimation Charges Documentation Charges
- Monthly Installment

Bank Manager:
1. Bank manager can access 4 editable and 5 non-editable contents:

c. Editable
- Processing Charges (Separate for each car) Estimated Tax (Separate for each car) Users Income estimation Charges Documentation Charges
d. Non-Editable
- Managers Name Managers Bank Branch Managers Email ID
- Car Dealers Name Car Dealers Email ID

Car Dealer:

1. Car Dealer can access 4 editable contents:

Admin:

- Car Company Car Name
- Car Price

1. Admin is the power user and has the rights of each user. He has the rights check/update/enter each type of information in the system. He can add/remove any Bank Manager and Car Dealer and their re

cords such as name, branch, and email id.

Proposed Tools:

Java, PHP, MySQL, SQL server etc.

Supervisor:

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Exam Date sheet Scheduler

Project Domain / Category
Web Application

Abstract / Introduction
In conventional educational institutes, making an exam date sheet is a hectic job. One needs to simultaneously take care of all the things involved likes courses (with number of signups), examination halls, superintendents and students. Constraints like eliminating / minimizing the event of scheduling a student in two or more exams on same day (or worst in same time slot) makes it a challenging task. This project aims to develop an automated solution to the exam scheduling task.

The exam scheduler will
    i)   take as input: courses and their enrollment, examination halls and superintendents,
    ii)   produce an exam date sheet that will fulfill all the specified constraints like the one discussed above.

        Functional Requirements
        The application should be able to:
1. Manage the record of courses (whose exam is to be conducted) and enrollment in these courses
2. Manage the record of examination halls
3. Manage the record of superintendents
4. Calculate an exam date sheet on the basis of given data and constraints
5. Provide user management facility. Stakeholders of the application are: admin, student, superintendent and exam coordinator.

Tools
ASP.Net, SQL Server, PHP, MySQL Server etc. or any web development tool and its relevant DBMS

Supervisor
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EyeCare Center

Project Domain / Category
Web Programming

Abstract / Introduction
The **XYZ** Foundation is running a welfare program to help needy people all across Pakistan. The foundation aims to create a website for its newly opened EyeCare center located in Sialkot. The goal of the EyeCare center is to provide free treatment to visitors to determine eligibility for the free services.

You will be developing a website for the EyeCare center. The EyeCare center website will provide visitors with information about the different eye specialists available for recommendations. Patients must physically visit the EyeCare center in Sialkot for a check-up. Before visiting the EyeCare center, users must make an appointment by registering through the online portal on the website.

The patient's complete record will be maintained so that the Eye Specialist (Doctor) can check or revise the patient's history during their next visit to the EyeCare center.

Functional Requirements:

- Only the registered user can access the website portal i.e., Patient or Eye Specialists' Dashboard.
- User will upload a clearance certificate, issued by the XYZ Foundation, at the time of registration

- The user will log in to the portal and then send a request to schedule an appointment with an Eye Specialist.

- The admin will be able to verify certificate number using the system.

- The admin will set the website homepage for visitors who are not registered users but want to access information about eye specialists available online or at the EyeCare center.
  o Other details that a visitor can obtain from the website include:
  ▪ About Us, Our Services, Tests, Contact Us.

- Users will be able to view reviews from individuals who have visited the EyeCare center.

- Only verified users are able to give reviews about staff members (Eye Specialist, helping staff) at the EyeCare center. Review details will be displayed on the website homepage.

- The Eye Specialist will be able to view the patient's history during their visit to the EyeCare center.

- The report generation option will also be available if the Eye Specialist wants to obtain information about the patient's record.

- The Eye Specialist can input the patient's information, along with related data, like prescribed medication, and details of lab tests etc.

- The feedback interface will be available to users who have completed their appointments for sharing their experiences. The system will provide an interface to give suggestions and reviews

- The search option will also be available if a user wants to search for a Eye Specialist through the system.

Tools:
HTML, CSS, JavaScript, PHP, MySQL, Visual Studio Code/ Sublime Text.

Supervisor:
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Full Stack Job portal with Strapi and Next.js using REST API and Postgres

Abstract/Introduction

Next.js empowers developers to craft top-tier web applications by leveraging the capabilities of React components. Its key features include file-based routing, server and client-side rendering, and built-in optimization. Similarly, Strapi is an open-source headless content management system (CMS) that enables developers to build powerful and customizable APIs quickly and easily. Unlike traditional CMS platforms, Strapi focuses on providing a flexible and extensible backend infrastructure without dictating the frontend technology. For our Full Stack Jobs Portal project, we'll employ Next.js, Strapi, and Postgres while adhering to industry best practices to guarantee a resilient and effective application.

Requirements

Key Requirements for this web application:

- Registered User/Company can add jobs with (registered user who want to post the jobs must have a firm or company)
a. Company name/Firm Name
b. Address
c. Expected Salary
d. Job Type (Permanent, Contractual, Full Time, Part Time)
e. Experience Required (1 year,2 year and so on etc.)
f. User cannot apply jobs on expired jobs (when last date of applying is passed)
- Users can search the job on the basis of job keyword and location
- Users can filter (using checkboxes) jobs on the basis of job type, education, experience, Salary Range
- Registered users can upload their CVs.
- Registered users can update their profile and should see the list of applied jobs
- Registered User/Company can see their posted jobs and update the posted jobs and see the list of the candidates who applied to their posted jobs
- Content Editors/Managers can Approve/Publish the jobs posted by registered users/company.
- Super Admin must have all the rights to see the overall stats/update/delete etc.
- Complete Authentication with Simple JWT
- Protecting Routes from Unauthenticated Users
- Uploading files to Cloudinary (CVs)
- Custom Exception Handling
- Server-Side/Client-Side Rendering with Next.js
- Generate Topic Stats with any keyword regarding jobs for example if user search jobs of a FULLSTACK DEVELOPER the system show the user about the total jobs available, average salary, maximum salary, minimum salary etc.
- Deploy app on Railway & Vercel

Administrative Roles

1. Super Admin / Administrator:
   - Responsibilities: Overall site management, user management, access to all features, content moderation, and configuration settings.
   - Access: Full access to all admin functionalities.

2. Content Editor / Manager:

- Responsibilities: Content creation, editing, and publishing. Managing jobs, images, videos, and other media. Ensuring content is accurate and up to date.
    - Access: Access to content management features.

3- Frontend Users

   Frontend registered users/companies can enter their jobs on job portal as well as the users can apply and can upload their CVs.

Tools Used
1. **Next.js (version 14 and higher)**
2. **Strapi (version 4 and higher)**
3. **Rest API Framework**
4. **Postgres**
5. **Visual Studio Code**

NOTE: Next.js version 14 or higher and Strapi 4 or higher are obligatory for this project. This project will exclusively utilize Strapi 4 or higher, Next.js 14, and REST API, and I will not consider requests for changing these tools.

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Online Cargo Management System

Project Domain / Category
Web programming

Abstract / Introduction
The logistics and freight industry plays a crucial role in the global economy, facilitating the movement of goods from suppliers to consumers. However, managing cargo operations effectively is a complex task that involves coordination among various stakeholders, including cargo companies, freight carriers, and customers.

An Online Cargo Management System is proposed to streamline and enhance the efficiency of cargo operations through digital transformation.

This web-based platform aims to connect all stakeholders in the cargo and freight industry, allowing them to manage bookings, track shipments, handle documentation, and communicate in real-time, thereby improving the overall efficiency and reducing the chances of delays or losses.

The users of this application are given below.

1. **Cargo Companies (Administrators):** Responsible for managing the platform, including user management, shipment tracking, and providing updates.
2. **Freight Carriers:** Companies that transport goods, able to update shipment statuses, and access transport documents.
3. **Customers:** Individuals or businesses that send or receive goods, able to book shipments and track cargo.
   Functional Requirements:
   The Online Cargo Management System will cater to the following functional requirements:
1. **Cargo Companies (Administrators)**
- Manage user accounts for freight carriers and customers.
- Oversee and update shipment information and statuses.
- Provide real-time updates and notifications related to cargo shipments.
- Manage and publish pricing details for different shipping options and services.
2. **Freight Carriers**
- Register on the website and manage their profiles.
- Update the status of shipments (e.g., in transit, delivered).
- View and manage bookings.
3. **Customers**
- Register on the website and manage their profiles.
- Book cargo shipments.
- Track the status of shipments in real-time.
- Provide feedback on the shipping service.

Tools:
Microsoft Visual Studio, SQL Server, Asp.net.
Note: You are advised not to switch the tools. If you do so, you will handle the technical side yourself.

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Online Home Bakers (Cake Purchase System)

Project Domain / Category

Web Application

Abstract / Introduction

The main aim of this project is to develop an interactive website that facilitates the user with an on-the-click functionality which is useful to find cakes for any occasion with different flavor/size/price like Wedding cakes, Birthday Cakes, Eid cakes, Christmas Cakes etc. and customer can buy them at any time. The aim of this application is to reduce the manual effort and time needed to manage transactions; the software will be helpful for the administrator for the maintenance of the cake purchase system also.

Using the proposed application user can check for various cake categories, sizes displayed with their prices, available at the online store and purchase online. If the user wants to buy a cake he/she may contact the owner through **Customization Request** (create a separate form for customization requests) and can ask the details or request for customization and then add it to his/her shopping cart. Once user wishes to checkout he/she must register on the website first. Payment mode will be cash on delivery/ advance payment through credit card. On the successful transaction a copy of the shopping receipt will be sent on the customer's email id. Moreover, the customer can view/search the cake catalogue without logging into the system or getting him/her register while to buy cake, customer should follow the registration (login) process.

Functional Requirements:

Here are following modules in **Online Home Bakers (Cake Purchase System)**
- ➢ **Cakes Catalogue Module**:
- ➢ **Customer Module**
- ➢ **Admin Module**

- ➢ **Customization Request**

- ➢ **Payment Module**

   The Functionality of each module of **Online Home Bakers (Cake Purchase System)**
   is as follows:

1. **Cakes Catalogue Module**: In this module each and every operation related to the cake category and cake size such as adding new cake category/size, editing the existing cake category/size, delete cake category/size, gets the lists of cake category/size and reports of cake category/size will be managed.
2. **Customer Module**: This module helps the customer to Sign-in, Create an Account, Search cake category/size, Select cake category/size, Buy cake, Continue Shopping, View/Edit Cart, Checkout, Bill Information, Confirm order, and Delete Order.

3. **Customization Request:** This module helps the customer and baker both to customize the size, design, Payment mode information, Confirm order, and Cancel Order etc.(try to expand this module by yourself with correct information: gather info through your browsing skills)
4. **Admin Module**: In this module, add cake category/size, modify cake category/size, delete cake category/size, accept order, delete order, edit order, Sale Record, Database's data Report, transactions history, order Status, add/update/delete the product details in the catalogue are included.
5. **Payment Module:** In this module, user will select the payment method i.e. cash on delivery/ through credit card/Jazz Cash/Easy paisa. Here you need to bound the customer that in case of customization demand/request, payment method must be advance payment.
   Tools:

   Software Requirements:
- Operating System: Window7and above
- RAM: 8.00 GB preferably
- HTML,CSS, (Front-end)
- SQLite database (Backend)
- Python (Flask web application)
- **Note:** Students can use Jinja/Flask or both (No other framework will be acceptable)

Important: Please check your computer system's specifications before selection of the project, this project will not run on small RAM

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Online Kitchen

Project Domain / Category
Web Programing

Abstract / Introduction
In this project, we will build a web based application named as "Online Kitchen", in which the user will first read the food dishes recipes, its cooking time, picture etc. and then demand for a particular food dish. The admin will delivered that particular food dish to the user.

Admin panel features
1. The Admin can login/logout.
2. The Admin can provide the available food dishes recipes.
3. At the time of adding the recipes, the Admin should provide all the relevant information like, all the ingredients of the recipes, ingredients quantity, cooking procedure, time required for cooking, etc.
4. The Admin can add, update and delete different categories of Food Dishes.
5. The Admin can add, update and delete different Food Dishes information such as food dish name, food dish quantity, food dish price etc.
6. The Admin can view the order of the user in which all details should be visible to the admin like, selected food, total price, shipping address etc.
7. The Admin can generate voucher for the user.
8. The Admin can verify the user online dues or paid vouchers and after the verification, the Admin can deliver the order.
9. The Admin can add, update, and delete the shipping charges in the order.
10. The Admin can view the user request for a particular food dish (if not available in the online kitchen) and can provide feedback accordingly.
11. The Admin can manage the stock.
12. The Admin can manage expense reports.
13. The Admin can manage profit reports.

User/Parent panel features:
1. The user can register.
2. The user can login/logout.
3. The user can update his/her profile.
4. The user can search the food dishes as per his/her choice.
5. The user can view all the available food dishes information such as food dishes pictures, its category, price, etc.
6. The user can add as many as per his/her choice food dishes to the shopping cart.
7. The user can add or delete any item from the shopping cart.
8. The Total Price of food dishes should be automatically adjusted after the addition or deletion of food dishes in the shopping cart
9. The user should provide the complete shipping address, when the user confirm the order.
10. The user can pay the total dues online or the user can download the voucher and paid it and then upload the paid voucher.

11. The user can check the status of his/her order. In the status, the user should find some information like, dish preparation time, delivery time, total time to deliver the dishes to the user etc.
12. The user can send a request for a particular food dish and its recipe (if not available on online Kitchen). At the time of request, the user should provide some information like food dish name, picture (if available) and further description of the food.

Tools:
XAMPP Server, MySQL, PHP language

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Online Responsive E-Commerce Platform for Kitchenware

Project Domain / Category
Web Programming

Introduction
In this digital era, "online shopping" is making it possible for businesses to carry on their business activities in such a way that the customers can browse and place online orders for their desired products /services 24/7 in more convenient and efficient way. It also breaks the barrier of physically visiting the markets or business centers for buying goods or services. In view of this, the proposed project aims to develop an Online (web based) Responsive E-Commerce platform for Kitchenware which will serve as the one-stop destination for its registered users to buy kitchen accessories / appliances /products with comfort and ease. The platform will facilitate its users with the interactive interfaces to browse kitchen accessories / appliances category and sub category wise along with item image, brand/company name, price, number of items available in stock, customer reviews about the product (if any), star rating and related description etc. in proper layout and design. In order to place order for any available products, the users must have to register on the platform. The users will be able to search for their required item/ product through interactive and effective search filters. The registered users will be able to give their reviews and rating about the purchased products. The project will provide hands on experience of developing an e-commerce website.

Functional Requirements:
Following are key functional requirements of the proposed platform:

1. **User Registration/Sign Up, Sign In**
   There will be proper interfaces for user registration and Sign In for the following three types of the users of the website:

   - Visitor (Unregistered User)
   - Registered user (Customer/ Buyer)
   - Registered user (Administrator)

     Roles of the users will be as follow:
   - Visitor will be able to visit the platform to browse / search his/her the available products.
   - A user registered as a customer / buyer will be able to place order, post review against purchased products and rate the products.
   - The Administrator (Admin) will have all the rights/privileges of information management on the platform.

2. **Email Notification and Verification**
   An unregistered user will register him/her on the platform by filling the information form. On submitting the registration information, an email notification will be sent with a confirmation link to the user's given email ID. On confirmation through link, the user will get registered on the platform and related notification will be sent to the customer at the registered email ID.

3. **Admin Panel**

   There will be proper Admin Panel / Dashboard comprising of interactive interfaces through which the Admin will be able to perform information management, stock management and category management etc. In addition, Admin Pannel will include a reporting section which will facilitate the admin to generate different reports such as Day Wise, Week Wise and Month Wise sales and list of registered users on the platform etc.

4. **Product Catalog**

   A comprehensive catalog of kitchenware products including the item name, category, brand/company name, thumbnail image, price and number of items available in stock, customer's reviews and rating new arrival, promotions, sale / discount (if any) should be displayed in user-friendly design.

   The platform will deal in the Kitchen accessories category and sub category wise such as stoves (gas stoves, electronic stoves), electronic appliances (microwave ovens, electric Kettle, food mixers, blender, juicers, coffee maker, sandwich maker, toasters, dishwasher, measuring scale etc.), Mechanical appliances (Knifes, Can Opener, Food Grinder etc.) You may add further related categories and products.

5. **Shopping Cart & Placing Order**

   The platform will enable the registered users i.e. customers/ buyers to put their selected products into shopping cart, review the items in the cart and place order by passing through payment method. The platform will offer different payment methods, however, cash on delivery will be used for order transactions.

6. **Confirmation Email on transaction (Order Placing):**

   A confirmation email on any successful transaction will be sent to the customer's registered email.

7. **Search Facility**

   The platform will provide rich search feature through which all types of users should be able to search information using different filters and keyword such as:
   o Product Name
   o Brand / Company Name
   o Category Wise
   o Price Wise
   o New Arrival
   o Sales / Promotions
   o Discounts

8. **Confirmation of Received Order:**

   The platform will provide proper interface through which the customers will be able to confirm the receiving of their ordered products.

9. **Reviews / Rating**

The registered users will be able to submit their comments / reviews against any purchased item. The platform will provide a star rating mechanism through which the registered users will be able to rate their purchased product. This facility / feature will be enabled for the registered users (customers) after their confirmation on platform about receiving the order.

10. **Complaints / Feedback**

The registered users will be able to submit their complaints / feedback to the Admin regarding the platform services. This facility / feature will be enabled for the registered users (customers) after their confirmation on platform about receiving the order.

Tools:

1. PHP and MySQL (You can choose any framework such as Laravel)
2. Bootstrap or any other CSS Framework
3. Any JavaScript library/ framework such as jQuery, Vue Js, react Js or angular Js

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Project Domain / Category
Web Application

Abstract / Introduction
Travel and Tour companies are looking for a complete Web based smart and genius booking solution system for their business. The Smart Booking system should be an Ultimate Travel Agency and Booking system based for Travel Agency, Tour Operator, Resort Rental, Car Booking, Space Rental business, and many more specialized purposes related to the booking system.

Through this web based system the Users will be able to register themselves free and they are able to make Different Booking Options for them like hotels, cars, tours, and space booking. This system should give customer the best performance for travel and booking sites with user-responsive flexibility with optimized UX/UI.

Admin will get profit from the basic and featured fee as well as from the withdrawal percentage. Everything is dynamic and should be set up from the admin panel. It should have strong SQL injection protection system which should keep away this system from hackers.

Functional Requirements:
- System should have a Smart Dashboard screen at launch with lots of information.
- Admin user should be able to create New Hotel.
- Admin should be able to manage all the Hotel by Different Advanced Options.
- Admin should be able to manage Hotel Room.
- Admin should be able to manages Hotel Room Attributes
- Admin should be able to manages Hotel Attributes
- Admin should be able to manage All the Hotel Bookings.
- Admin should be able to manage Pending Hotel Bookings.
- Admin should be able to manage all the Tour by Different Advanced Options.
- Admin should be able to manage Tour Category.
- Admin should be able to manage Tour Attributes.
- Admin should be able to All the Tour Booking.
- Admin should be able to manage Pending Tour Booking.
- Admin should be able to manage All the Spaces By Different Advanced Options
- Admin should be able to manage Space Attributes
- Admin should be able to manage all the Space Booking.
- Admin should be able to manage Pending Space Booking.
- Admin should be able to manage All the Cars By Different Advanced Options.
- Admin should be able to manage Cars Attributes.
- Admin should be able to manage all the Cars Bookings.
- Admin should be able to manage Pending Cars Booking.
- Admin should be able to handle All the Cancel Booking Requests Manages Staffs
- Admin should be able to manage User.

- Admin should be able to manage Advanced Withdrawal.
- Admin should be able to manage Systems Role.
- Admin should be able to manage Subscribers.
- Edit Profile and Password Changing System

Sample Screen Shots for Mobile App:

Hotels Attributes

Hotel Rooms Details:

Tour Screen:

Tools:
Use Any Web Development Technology like PHP, Java, ASP.NET, PWA etc.

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Virtual Question Bank System

Project Domain / Category:
Web Application

Abstract / Introduction:
The Virtual Question Bank System offers a comprehensive solution to streamline the examination preparation process for students and educators with the aims to enhance learning outcomes and academic performance. The Virtual Question Bank System is designed to provide a user-friendly platform for students to prepare comprehensively for their midterm and final term examinations. The system facilitates the storage, organization, and retrieval of multiple-choice questions (MCQs) and descriptive questions across various subjects. Administrators can efficiently manage question banks i.e input, manage, and organize exam questions, while users can view and practice these questions to enhance their exam preparation and self-assessment.

Functional Requirements:

Admin:

1. Authentication and Authorization:
- Login/logout functionality for administrator.
- Role-based access control to manage permissions.

2. Question Management:
- Create/Read/Update/Delete MCQs and descriptive questions for different subjects and topics.
- Organize questions into categories (e.g., subject-wise, topic-wise) for easy navigation.
- Assign difficulty levels (e.g., easy, medium, hard) to questions.

3. Analytics and Reporting:
- View statistics on question usage, performance metrics, and user engagement.
- Generate reports on exam results, including score distribution and question-wise analysis.

4. User Management:
- Add/edit/delete user accounts (e.g., students) with appropriate roles and permissions.
- Monitor user activity and track progress through the system.

User:

1. Authentication and Registration:
- Register/login/logout functionality for students.
- Profile management to update personal information and preferences.

2. Question Access and Practice:
- View MCQs and descriptive questions categorized by subject, topic, and difficulty level.
- Search and filter questions based on keywords, topics, or difficulty levels.
- Practice questions individually or in simulated exam sessions with time constraints.

3. Performance Analysis:
- Receive immediate feedback on question responses, including correct answers and explanations.
- Track performance metrics such as scores, time taken, and question accuracy.
- Access historical performance data to identify areas for improvement.

4. Communication and Support:
   - Seek assistance through built-in messaging or support channels for any queries or technical issues.
   - Receive notifications on system updates, exam schedules, and important announcements.

Tools:
- Frontend: Framework: Next.js (React) Languages: HTML, CSS, JavaScript
 - Backend Framework: Node.js (Express)
- Database: MongoDB

<mark>NOTE</mark>: <u>**No other tool will be allowed.**</u>

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TopicTalk – Online Forum Platform

Project Domain / Category
Web Programming

Abstract / Introduction
TopicTalk is a web-based forum platform that allows users to create discussion topics, participate in conversations, and engage with a community of users on various topics of interest. The platform provides an interactive and collaborative environment for sharing ideas, asking questions, and connecting with like-minded individuals.

Functional Requirements:

1) **User Authentication:** Implement user authentication and authorization functionalities to allow users to sign up, sign in, and manage their profiles. Users can have different roles such as regular users, moderators, and administrator. Allow users to create profiles with bio, avatar, and other optional information. Profiles can display users' activity, posts, and contributions to the forum.
   a) A default "Admin" account shall already be available.
   b) Whenever a new user registers, its default role shall be "Regular User".
   c) Only "Admin" can promote or demote the role of a user to "Moderator" or back to "Regular User". Hence, no option should be provided to be registered as a "Moderator".
   d) There cannot be more than one "Admin". But there can be multiple "Moderators".
2) **Discussion Topics:** Users can create new discussion topics or threads on specific subjects. Each topic can have multiple posts or replies from users.
3) **Categories and Tags:** Organize discussion topics into categories and allow users to tag their posts with relevant keywords to improve searchability and categorization.
4) **Post Management:** Enable users to create, edit, and delete their own posts. Moderators and administrator have additional capabilities to moderate posts, such as locking topics, deleting inappropriate content, or banning users.
5) **Rich Text Editor:** Provide a rich text editor for composing posts with formatting options, embedded media (images, videos), and hyperlinks.
6) **User Interactions:** Allow users to like, dislike, and comment on posts to engage in conversations and express their opinions.
7) **Search Functionality:** Implement a search feature to allow users to find specific topics or posts based on keywords, authors, or categories.
8) **Notifications:** Notify users about new replies, mentions, or activity on topics they are following via email or in-app notifications.
9) **Social Sharing:** Integrate social sharing buttons to allow users to share interesting topics or posts on social media platforms.
10) **Gamification:** Implement gamification elements such as badges, points, or levels to reward active participation and encourage user engagement.
11) **Mobile Responsiveness:** Ensure the application is fully responsive and optimized for mobile devices to provide a seamless user experience across different screen sizes.

Tools:

1. **Frontend:** HTML, CSS, JavaScript, and Bootstrap for building the user interface.
2. **Backend:** PHP or Laravel for server-side scripting, and a database system like MySQL to store user data, posts, and other information.

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Project Domain / Category
Web based Application.

Abstract/Introduction
In today's interconnected world, efficient management of network bandwidth is crucial for ensuring optimal performance and resource utilization. Our project aims to develop a web-based bandwidth management system that empowers users to control and optimize network traffic effectively. This system will enable users to set bandwidth policies, prioritize traffic, and track usage, thereby enhancing network efficiency and reliability.

Functional Requirements:

Admin Responsibilities

- **Bandwidth Policy Management:** Admin will define and configure bandwidth policies based on specific criteria such as IP addresses, protocols, and applications.

  Policies may include bandwidth limits, prioritization rules, and scheduling options.

- **Traffic Prioritization:** Admin allows users to prioritize different types of network traffic (e.g., VoIP, video streaming, critical applications) based on their importance and requirements.

  This ensures that essential services receive adequate bandwidth and quality of service.

- **Usage Tracking and Reporting:** Comprehensive monitoring tools enable users to track bandwidth usage in real-time and generate detailed reports and analytics.

  This facilitates informed decision-making and resource allocation.

- **Alerts and Notifications:** The system provides alerts and notifications for bandwidth utilization exceeding predefined thresholds or policy violations.

  This helps administrators proactively manage network resources and address potential issues.

- **User Management:** Administrators can define user roles and permissions to control access to system features and data.
- This ensures security and compliance with organizational policies.

  User Responsibilities

- **User Authentication:**
  - **Sign Up:** Users can create a new account by providing necessary details such as username, email, and password.
  - **Login:** Registered users can securely log in to the system using their credentials.

- **Dashboard:**
  - **Overview:** Upon logging in, users are greeted with a dashboard providing an overview of their network bandwidth usage, current policies, and alerts.
  - **Quick Actions:** Users can access commonly used functionalities such as setting policies, viewing reports, and managing alerts directly from the dashboard.
- **Bandwidth Policy Management:**
  - **Create Policy:** Users can create new bandwidth policies by specifying parameters such as bandwidth limits, priority levels, and scheduling rules.
  - **Edit Policy:** Existing policies can be modified to adjust parameters or criteria based on changing requirements.
  - **Delete Policy:** Users can remove outdated or unnecessary policies from the system.
- **Traffic Prioritization:**
  - **Set Priorities:** Users can prioritize different types of network traffic (e.g., VoIP, video streaming, browsing) based on their importance and criticality.
  - **Customize Rules:** Users can define specific rules and criteria for traffic prioritization, such as IP addresses, protocols, or application types.
- **Usage Tracking and Reporting:**
  - **View Usage Statistics:** Users can view real-time statistics and graphs depicting bandwidth usage, traffic patterns, and historical data.
- **Alerts and Notifications:**
  - **Receive Alerts:** Users receive real-time alerts and notifications via email or SMS when predefined thresholds are exceeded, policies are violated, or critical events occur.
- **User Profile and Settings:**
  - **Edit Profile:** Users can update their profile information, including contact details, preferences, and notification settings.
  - **Change Password:** Users have the option to change their password for enhanced security.
  - **Logout:** Users can securely log out of the system to end their session and protect their account.

  Technologies:
- **Frontend:** HTML, CSS, JavaScript (React.js or Angular)
- **Backend:** Python or Node.js
- **Database:** SQL (MySQL or PostgreSQL) or NoSQL (MongoDB)
- **Networking Libraries:** SNMP (Simple Network Management Protocol), NetFlow, IPTables
- **Frameworks:** Flask or Django (for Python backend), Express.js (for Node.js backend)

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