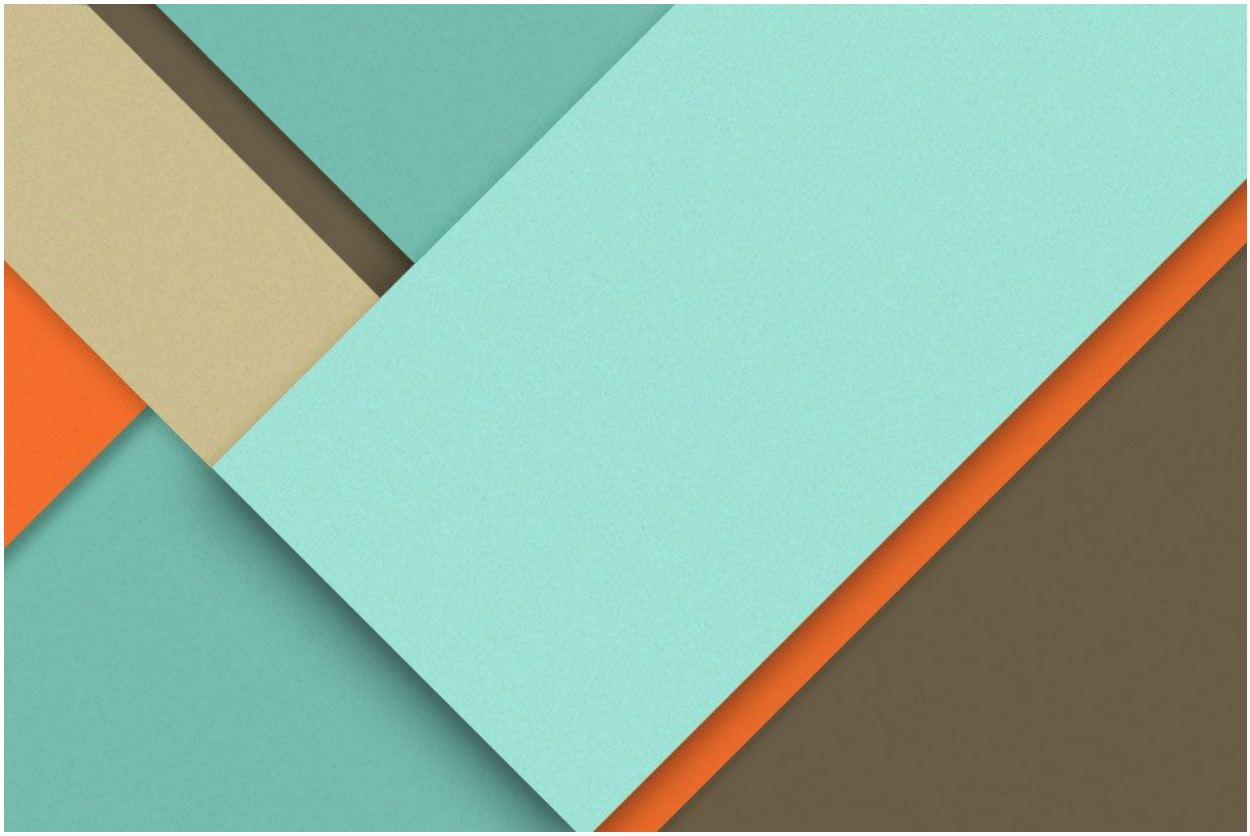

Elective Recommendation

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Problem Statement

To implement an elective recommendation system using basic Web Technology concepts learned throughout the Web Tech course and provide the system some intelligence using Machine Learning.

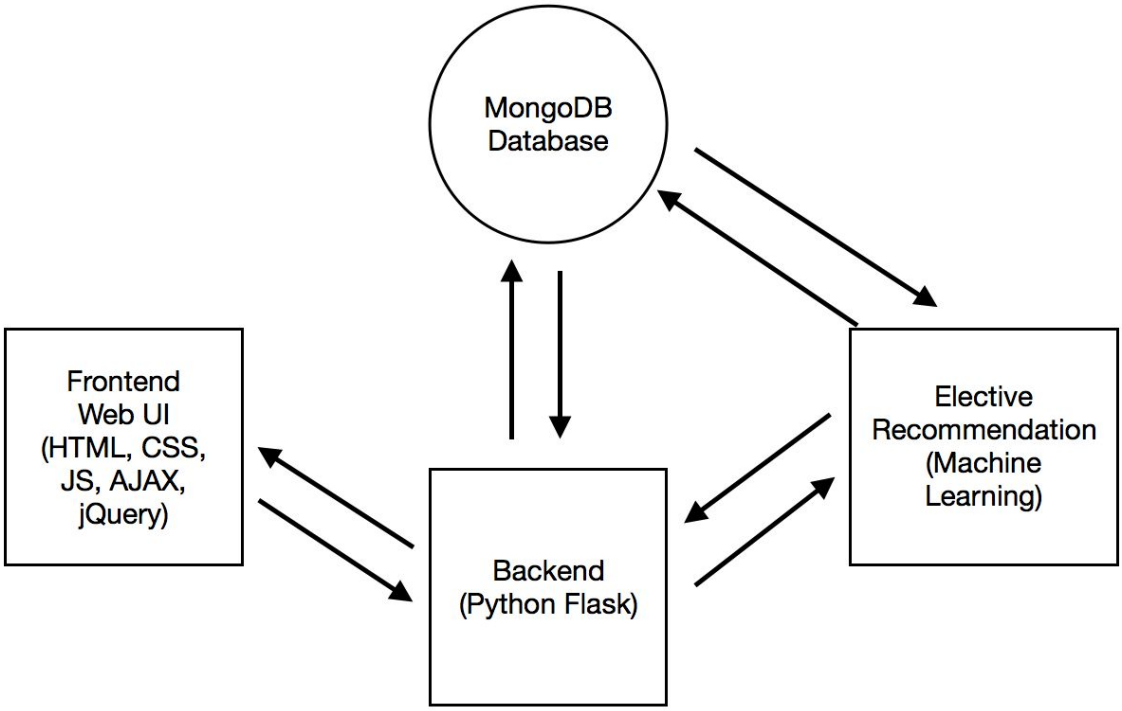
Overview

This Project describes and implements an elective recommendation system which provides the appropriate Recommendation for elective, based on student's grades input provided to the system. The system uses Basic HTML5, CSS and Javascript for frontend and uses Python Flask as a Backend. The recommendation engine is implemented using Machine learning, by training a Logistic regression classifier on previous recommended electives data

Design Methodology

1. **Frontend** :- The frontend for the project is implemented using HTML, CSS & Javascript. Ajax calls are used to fetch user information from the database asynchronously and shown on the frontend. JQuery UI is used for creating enhanced user interface for Forms. Bootstrap is also used as the front end framework
2. **Backend** :- The backend is implemented in Python flask and a database of users is maintained for users to keep track of their grade per subject in each of the semesters. The database is implemented in MongoDB
3. **Intelligence** :- The website is made intelligent by leveraging machine learning on a dummy dataset solely created for this purpose. The Recommendations for the elective are made by training a Logistic regression as a classifier which provides probabilities of all electives. A pie chart of the output of the recommendation is rendered to the user for better experience.

Design Diagram



Features

1. AJAX Requests
    a. Ajax is used to asynchronously fetch the information pertaining to a student from the database
    b. Ajax is also used to load the necessary visualizations from the database. The visualizations provide effective communication to the user about the distribution of the electives recommended.
2. Multistage Download
    a. Ajax requests are used to implement the multi-stage download to optimize the elective form page load performance

3. Highcharts framework for visualisation
    a. Used highcharts framework to render the pie chart that shows the percentage recommendation of subjects visually.

Screenshots:-

Multi-Stage Download

```
<script type="text/javascript">
    var xhr=new XMLHttpRequest();
    function init(){
        xhr.onreadystatechange=showContent;
        xhr.open("GET","../static/images.txt",true);
        xhr.send();
    }
    function showContent(){
        if(xhr.readyState==4 && xhr.status==200)
        {
            var res=xhr.responseText;
            var resArr=res.split("|");
            //console.log(resArr[2]);
            //console.log(resArr[3]);
            //document.getElementById("imgdiv1").innerHTML=resArr[2];
            //document.getElementById("imgdiv2").innerHTML=resArr[3];
            console.log("text received");
            d = document.getElementById('descriptionDiv');
            desc = document.createElement('h2');
            desc.innerHTML = 'Elective Recommendation';
            d.appendChild(desc);

            xhr.abort();
            setTimeout(getPic,2000);
        }
    }
    function getPic(){
        xhr.onreadystatechange=showPic;
        xhr.open("GET","../static/images.txt",true);
        xhr.send();
    }
    function showPic(){
        if(xhr.readyState==4 && xhr.status==200)
        {
                var res=xhr.responseText;
                var resArr=res.split("|");
                console.log(resArr[0]);
                console.log(resArr[1]);
                document.getElementById("imgdiv1").innerHTML=resArr[0];
                document.getElementById("imgdiv2").innerHTML=resArr[1];
                xhr.abort();

        }
    }

</script>
```

AJAX - Visualization

```
$(document).ready(function() {

    $('form').on('submit', function(event) {

        $.ajax({
            data : {
                fname : $('#first-name').val(),
                lname : $('#last-name').val(),
                s1s1 : $('#sem1_subject1').val(),
                s1s2 : $('#sem1_subject2').val(),
                s1s3 : $('#sem1_subject3').val(),
                s1s4 : $('#sem1_subject4').val(),
                s1s5 : $('#sem1_subject5').val(),
                s2s1 : $('#sem2_subject1').val(),
                s2s2 : $('#sem2_subject2').val(),
                s2s3 : $('#sem2_subject3').val(),
                s2s4 : $('#sem2_subject4').val(),
                s2s5 : $('#sem2_subject5').val(),
                s3s1 : $('#sem3_subject1').val(),
                s3s2 : $('#sem3_subject2').val(),
                s3s3 : $('#sem3_subject3').val(),
                s3s4 : $('#sem3_subject4').val(),
                s3s5 : $('#sem3_subject5').val(),
                s4s1 : $('#sem4_subject1').val(),
                s4s2 : $('#sem4_subject2').val(),
                s4s3 : $('#sem4_subject3').val(),
                s4s4 : $('#sem4_subject4').val(),
                s4s5 : $('#sem4_subject5').val()

            },
            type : 'POST',
            url : '/elective'
        })
        .done(function(data) {

            $("#res").html("Have A Look at the Recommendation");
            //change code here to render pie chart
            console.log(data)
            //$("#res").append(data);
            var resp = data;
            $(function () {
        //$('#container').highcharts({
            var myChart = Highcharts.chart('container', {
```

```
            var myChart = Highcharts.chart('container', {
                        chart: {
                        renderTo : 'container',
                        plotBackgroundColor: null,
                        plotBorderWidth: null,
                        plotShadow: false,
                        type: 'pie'
                        },
                        title: {
                        text: 'Recommendation'
                        },
                        tooltip: {
                        pointFormat: '{series.name}: <b>{point.percentage:.1f}%</b>'
                        },
                        plotOptions: {
                        pie: {
                            allowPointSelect: true,
                            cursor: 'pointer',
                            dataLabels: {
                            enabled: true,
                            format: '<b>{point.name}</b>: {point.percentage:.1f} %',
                            style: {
                                color: (Highcharts.theme && Highcharts.theme.contrastTextColor) || 'black'}}},
                        series: [{
                        name: 'Brands',
                        colorByPoint: true,
                        data: [{
                            name: "DA",
                            y: resp["DA"]
                        }, {
                            name: 'ADBMS',
                            y: resp["ADBMS"]
                        }, {
                            name: 'HPCA',
                            y: resp['HPCA']
                        },{
                            name: 'ADA',
                            y: resp["ADA"]
                        },{
                            name: 'CG',
                            y: resp["CG"]
                        }, {
                            name: 'WTS',
                            y: resp['WTS']
                        }]
                        }]
                    });});});event.preventDefault();});});
```

Recommendation Visualization