

# PUCIT Project Coordination Office



## SENIOR PROJECT IDEAS FOR THE YEAR 2019-20

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BS Fall 16, MSc CS Fall 18

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## Ideas by Dr. Muhammad Idrees

### **Idea 1:**

Implementation of VisFra, a framework for development and implementation of VPLs. Abstract: Visual Programming Languages seems to have big share in the computing and programming fields in near future. We have developed a theoretical Framework for VPLs development using layered model facilitating the sharing of components of existing VPLs. Now, we need its implementation to make it a product for various platforms, including web, htm5, android, ios, windows, mac, etc. Special Instructions: Students should be a self-learner and good is programming

### **Idea 2:**

Translation of a High-level programming language HLPL subset to others. Abstract: Translation of most commonly used part of one HLPL to some other HLPL. Special Instructions: Student must be good in programming and data structures and have concepts of parsing studied in automata and compiler courses. Extreme guidance and help will be provided for dedicated group of students. Technologies: Any programming language.

### **Idea 3:**

Learning Responsive HTML/related technologies (some small pilot projects). Abstract: Developing a set of smaller sized web projects using state of the art HTML-5 and related technologies. Main emphasis on this project is on learning and development of a framework through experience. These project mainly facilitates various official of PUCIT. Special Instructions: Students should be a self-learner and good is programming. Technologies: HTML-5/Javascript/xhtml/css/xml

### **Idea 4:**

Computer vision related projects. Abstract: A number different topics of computer vision can be taken as project under my supervision. Facility: At PUCIT a dedicated Computer Vision Lab is established having Research material/software/ still and video cameras with stands. We have about 6 active researchers in PUCIT faculty in the area of Computer Vision and Image Processing. Special Instructions: Student must be excellent in mathematics especially Linear Algebra and good in programming. Extreme guidance and help will be provided for dedicated group of students. Technologies: Either of MatLAB, Java, C/C++, Python, R..

### **Idea 5:**

Robot Programming. Abstract: Using simulators (we may have a NXT robot in future), exploring various ideas and developing projects. Special Instructions: Student should be good in C/C++ and have know-how of the hardware internal working. Technologies: .NET/JAVA/ C/C++.

## Ideas by Dr. Muhammad Kamran

1. Ideas: PUCIT Chatbot

Description: This system will allow users (teachers/ students/ any person) to ask question in English, Urdu and Roman Urdu. System will answer the question in respective language.

2. Ideas: Urdu Text To speech System

Description: System will take Urdu as input and produces speech against the input.

3. Ideas: Urdu Speech to text system

Description: This system will allow users to generate Urdu text after listening.

4. Idea: Transliteration for Punjab, Sindhi, Pusto or any other local language.

Description: here is the example of Transliteration system for Urdu

Input: **app ka kiya haal hai**

Output: آپ کا کیا حال ہے

## Ideas by Mr. Muhammad Abdullah

### 1) Project Title: VS Code extension for ColdFusion

Reference extension: <https://github.com/KamasamaK/vscode-cfml>

**Technology stack:** TypeScript, npm

**Category:** Research

#### **Description:**

We'll extend the functionality of current VS Code extension for ColdFusion. The current extension lacks a lot of very much needed functionalities.

Some of very needed features are:

#### **1. script code formatting**

A lot of legacy code is poorly formatted, I'd love to see a format command. This would involve implementing a **DocumentFormattingEditProvider** ([https://code.visualstudio.com/docs/extensionAPI/language-support#\\_format-source-code-in-an-editor](https://code.visualstudio.com/docs/extensionAPI/language-support#_format-source-code-in-an-editor)). I'm not sure how the Sublime plugin does this, but it seems to me that you would need a parser to do this properly. Sublime at least has access to the syntax scopes from the grammar, which might be how it's doing it, but the VS Code API does not provide access to that information.

EDIT: Found where it's done. It looks like there are many references to the scopes as I expected.

#### **2. Go to function definition**

Go to function definition is not always working. Check IntelliJ for reference.

#### **3. Show function required parameter while calling (for custom functions)**

For custom function (or class functions) we need to option that can parse its details based on comments annotations above the function and can show hints of required parameters.

For further details, check functionalities in IntelliJ and the ISSUES section on the GitHub repository for this extension (<https://github.com/KamasamaK/vscode-cfm!>).

If someone wants to look into details of how the VS Code extensions are written, please follow the documentation at : <https://code.visualstudio.com/api/get-started/your-first-extension>

## **2) Project Title: Contribution to open source version (Lucee) of ColdFusion Language**

**Reference Repository:** <https://github.com/lucee/Lucee>

**Technology stack:** Java

**Category:** Research

### **Description:**

Lucee is the leading open-source CFML application server/engine. Lucee provides a lot of functionality (tags and functions) to deal with all kinds of web related actions. Manipulating images, PDF files, XML, String, numbers, dates and a lot more.

The project is to contribute to the core / admin panel / documentation of Lucee server and extend its functionalities by porting features from Adobe ColdFusion's latest releases.

## **3) Project Title: Workflow based Dynamic Web Crawler**

**Technology Stack:** Python, Django, Selenium, ReactJS

**Category:** Research

### **Description:**

Web data acquisition is the foundation of Web data mining. Web crawler is an important tool for Web data acquisition, but the frequent updates of Web data structures, data sources and distribution channels, results in high costs of crawler program development and maintenance. In order to solve this problem, we'll be creating a workflow-based program where a user can dynamically create web crawler by writing up simple workflows. These workflows can be changed anytime making the crawler dynamic and adhoc.

## **Ideas by Mr. Dilawar Hussain**

### **Palto Lelo**

I have created a project regarding Eat Organic from last year students team, they were able to make it a running system with web and Android apps. I want to use that system and convert it in a "Palto" animals sale/purchase market place like olx we have. I feel that there is a huge potential in this market and utilizing our past students work, I would be able to convert it quickly to another version and focus more efforts on making a successful business with this project.

I like to manage this project myself and would like to students group to start from what we have already build and move towards a goal making a successful business in this market place.

## Ideas by Mr. Umair Babar

<b>Project Idea No.</b>	01
<b>Teacher's Name</b>	Umair Babar ( <a href="mailto:umair.babar@pucit.edu.pk">umair.babar@pucit.edu.pk</a> )
<b>Project's Title</b>	Hostel Management System
<b>Project's Abstract</b>	Hostel management is a very tedious process; administration has to spend a lot of time in the said purpose. To overcome their headache a useful web based application should be build includes data about students, there rooms' allocation and evacuation, guest details and information about vacant rooms.
<b>Preferred Technologies</b>	Microsoft C#                      or                      Java Microsoft ASP .NET            or                      JSP Microsoft SQL Server        or                      MySQL/Oracle
<b>Number of Students</b>	03

<b>Project Idea No.</b>	02
<b>Teacher's Name</b>	Umair Babar ( <a href="mailto:umair.babar@pucit.edu.pk">umair.babar@pucit.edu.pk</a> )
<b>Project's Title</b>	Virtual Calculator for Visual Impairments
<b>Project's Abstract</b>	<p>Many people living with blindness or a visual impairment find life easier due to these apps. Many blind people's life is easier because of these apps being able to read things that are only in visual print, was a task that might have required a non-sighted person to seek the help of another.</p> <p>This app is specially designed for visually challenged persons who are depending on any third person for help. The basic workflow of the system is, the user will enter the data by voice commands and the system speaks out when the required results are ready.</p>
<b>Preferred Technologies</b>	Android
<b>Number of Students</b>	03



<b>Project Idea No.</b>	03
<b>Teacher's Name</b>	Umair Babar ( <a href="mailto:umair.babar@pucit.edu.pk">umair.babar@pucit.edu.pk</a> )
<b>Project's Title</b>	Child Monitoring System
<b>Project's Abstract</b>	<p>These days parents are worried about their children's so they want a complete track of them and monitor them all the time, This is physically not possible so we introduce safety monitoring system which is helpful for monitoring or tracking the child and their activities from anywhere in the world. The major issue of child missing can be solved with the help of child tracking system as well as parents who need to keep a track of their every steps, this system plays a vital role. The android application uses GPS and telephony services to locate their child's location. This application secretly retrieves all the call logs, message details, contact list and accurate location without the children's permission or without their knowledge as this application runs in background and the major advantage of this feature is, if child reboots the mobile phone the background process starts as the reboot is complete, so the process is never ending.</p> <p>This application sends all the data from the child's phone to the server and from the server to the parent's phone in every xy minutes interval. This application is divided into 2 apps, one is for the parent where they can see all the activities of their children and other is the child part, where the child can only see a calculator while the data is been fetched in the background without child's knowledge.</p>
<b>Preferred Technologies</b>	Android Java Development Kit (JDK)
<b>Number of Students</b>	05

<b>Project Idea No.</b>	04
<b>Teacher's Name</b>	Umair Babar ( <a href="mailto:umair.babar@pucit.edu.pk">umair.babar@pucit.edu.pk</a> )
<b>Project's Title</b>	Virtual LED Sign Boards
<b>Project's Abstract</b>	<p>LED displays are often found in outdoors including sports stadiums, public squares, as part of transparent glass area, train stations, airports, highways, commercial plazas, subways, parks, shopping centers, on tall buildings and for corporate image promotion and advertising.</p> <p>The purpose of this project is to design a software based LED display system to displays texts as well as symbols in the same way as if it was to be displayed in a real LED matrix screen. The system can be used to provide a demo to clients before making a real LED panel according to client needs. The system allows various changes and desired modifications such as speed, pixel length, text, color combinations and provides real time view of it using image processing functions.</p> <p>The project features are as follows:</p> <ul style="list-style-type: none"> <li>• User may set the text to display.</li> <li>• Next user is allowed to select the text moving directions.</li> <li>• After that the user may also select the text color and the background pixel color.</li> <li>• As user selects these options a real time preview of the display is generated in the system.</li> <li>• User may set speed, pixel length/shape and check the preview of the display on the go.</li> </ul>
<b>Preferred Technologies</b>	Microsoft C#
<b>Number of Students</b>	03

<b>Project Idea No.</b>	05
<b>Teacher's Name</b>	Umair Babar ( <a href="mailto:umair.babar@pucit.edu.pk">umair.babar@pucit.edu.pk</a> )
<b>Project's Title</b>	Virtual PC Mouse-Keyboard
<b>Project's Abstract</b>	This project is intended to provide a way to control the PC by means

	<p>of mouse and keyboard through an android application. The project controls PC keyboard functions and mouse operations through an android mobile phone. By just connecting it to through the Bluetooth or WIFI router (and mentioning the IP address of the host pc, and port number of running system, in case of WIFI). This system is based on the concept of using an android phone as a mouse and keyboard. The software application is installed on an android phone and allows users to play games or control other PC functionality through their cell phone.</p> <p>The application is creates a QWERTY keypad buttons similar to the one used in PC. The application when installed and run on an android based phone shows a keypad settings screen. With the keypad user can even use it for typing it on any word processor and can operate any application.</p> <p>In case of WIFI: The application requires a WIFI connection between the computer and the android device. Thus user can remotely access the computer instead of sitting beside it. Thus the application overcomes the limitations of a mouse.</p>
<b>Preferred Technologies</b>	Android Java Development Kit (JDK)
<b>Number of Students</b>	03

<b>Project Idea No.</b>	06
<b>Teacher's Name</b>	Umair Babar ( <a href="mailto:umair.babar@pucit.edu.pk">umair.babar@pucit.edu.pk</a> )
<b>Project's Title</b>	Pre Admission Entrance Test Management System
<b>Project's Abstract</b>	Contact Mr. Umair Babar for project details.
<b>Preferred Technologies</b>	Microsoft C# ASP .NET Microsoft SQL Server
<b>Number of Students</b>	05

<b>Project Idea No.</b>	07
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<b>Teacher's Name</b>	Umair Babar ( <a href="mailto:umair.babar@pucit.edu.pk">umair.babar@pucit.edu.pk</a> )
<b>Project's Title</b>	Home Electricity Management System
<b>Project's Abstract</b>	<p>Imagine you went for a trip with your family and leave your home alone and now when the night is dark and no light in the home, this will surely give an invitation to the culprits to entry the home, break the security and take away whatever they want to and this will surely create a huge damage to your financial condition.</p> <p>The idea is to develop a system with the combination of both hardware and software that will control the electricity equipments of the home; user can switch on/off any electricity item in the home also place a sensor at the most critical entry points where from if anyone enters it can buzzer.</p> <p>The system should be develop in two parts;</p> <ol style="list-style-type: none"> <li>1. Control everything with a remote controller (Infrared based).</li> <li>2. Control everything with SMS.</li> <li>3. Control everything using mobile application.</li> </ol>
<b>Preferred Technologies</b>	Java (for android) or Microsoft C# .NET (for windows mobile) Arduino Microcontroller Arduino Microcontroller Kit
<b>Number of Students</b>	03

<b>Project Idea No.</b>	08
<b>Teacher's Name</b>	Umair Babar ( <a href="mailto:umair.babar@pucit.edu.pk">umair.babar@pucit.edu.pk</a> )
<b>Project's Title</b>	Child School Security System
<b>Project's Abstract</b>	<p>In today's busy world where parents having long working hours are also worried about their children because of the high rate of kidnapping and other illegal activities. So they simply do not have as much time to spend for their children Moreover, they will be persuaded by kidnapper before they enter the school.</p> <p>So, it becomes the responsibility for the school to take care of their students and they also know in-time and able to send an alert message to their parents if the students are not at the school at school start time.</p> <p>This System ensures safety of the students by making their parents</p>



## **Ideas by Dr. Shahzad Sarwar**

The following projects carry the research and development aspects, both. Students are encouraged to discuss these projects with me before taking any decision; furthermore, several other ideas are available, as well.

**Project 1:** Internet of Things (IoT): Car driver Assistance Tool (CAT)

**Project 2:** Internet of Things (IoT): Smart Office Environment for Human Resource Management

**Project 3:** Internet of Things (IoT): Smart Building for Energy Efficiency

**Project 4:** Mobile Phone based Indoor Navigation using Wi-Fi Finger-printing

**Project 5:** Indoor Navigation using RFID Tags

**Project 6:** Energy Efficient Internet of Things (IoT)

**Project 7:** Studying Computer Science using Interactive/Enhanced Video Lectures

## Ideas by Hafiz Muhammad Usama Nazir

### **Idea 1: “Multivendor Store”**

It's Like Daraz.pk website. After analyzing in depth, the pros and cons of Daraz.pk we can build the list of features and then we will include it. We need to discuss this idea in details because this might became a product instead of project

### **Idea 2: “Escalator Automation for Metro Bus”**

Proposal of Escalator Automation system for Metro Bus to save energy. Need to discuss this with Metro bus Authority.

### **Idea 3: “Writing machine”**

If we can generate different fonts we can use this application in:

1. Writing Confidential letters . (Signatory writing)
2. We can use this machine in army and other civil defense offices so that the concerns make sure about the context of letter.
3. Specific font for Army Officers
4. Specified font for Civil defense like Police etc. other agencies.
5. We can also specified the pen

Idea is generated form the following video:

[https://www.youtube.com/watch?v=S8YVIR\\_1hlo](https://www.youtube.com/watch?v=S8YVIR_1hlo)

## **Ideas by Mr. Farhan Ahmad Ch.**

1. Title Educational game for children's.
2. App restricted the use of mobile for children's.



## **Ideas by Ms. Muddassira Arshad**

### **1. Usefulness Evaluation Of Visual Analytics Tools**

The project is an R & D project which focuses on evaluation of interaction and usability mechanisms of the visual analytics tool. ‘

Usefulness is defined as sum of utility and usability. Utility describes the functionality provided by the system whereas Usability is defined in terms of ease of use of a system. It covers the basic aspects of learnability, memorability, efficiency in terms of time and space, error prevention and handling and subjective pleasing.

The list of software tools (almost 50) would be provided. Students will be expected to deploy those tools and evaluate the usability w.r.t. usability and accessibility standards

The challenge exist in the deployment, configuration and establishing the understandability and suitability of the tools on primarily two platforms Windows and Linux.

Project Success Criteria: atleast 40 of the 50 tools must be evaluated thoroughly as per the standards evaluation criteria of usability and accessibility assessment. Writeup of evaluation must be submitted in the described format

### **2. Document Comparator Timeline**

In context of the domain of Personal Information Management sometime multiple versions of the document is created. We want to establish the comparator which takes as an input the multiple documents, establish a timeline showing the changes among the various versions w.r.t. last update and show the changes made among the various version of MS Word Document

Platform: Windows and Web

Success Criteria: the executable generating the timeline after highlighting the changes from one document to another. The timeline could be linear or network like.

### **3. End user Development Framework for Visual Analytics Applications**

End user development paradigm focuses on involving the end users who are the non-programmers to program the applications.

Visual analytics applications support exploratory as well as confirmatory analysis of the data which means they generate the visualization of the raw data as well as generate the visualization to support conclusions of our study.

We want to develop an application in which End users could **easily** use the application to conduct visual analytics using the pluggable components.

Technology: most of the pluggable components are available in Python we just need to incorporate them

Success criteria: an application support the use of pluggables for uploading the data, conduct analytics as well as visualization and store the knowledge.

#### **4. Android version of Story of Pakistan**

Representation of the History of the Pakistan from Muhammad Bin Qasim to current Era using videos, pictures available on Internet.

It would be a timeline representation in which point and click interaction style will be used.

Technologies: Android/ Flash

Success criteria: an application providing the dashboard of the various timelines which could be interactively usable.

#### **Project Ideas of 2018**

##### **PUCITWiki**

An idea to develop wikiedia like application for PUCIT. All the key terms including courses, their information, scholarships, sports activities, societies events, etc will be provided in the interface. The resources information will be filled in a rich text editor with options to add images, videos, etc. The information will be verified later by the administrator, the submission of which will allow the users to view the updated information. Name of the contributor will also be mentioned on the content.

The module will also include text reader, image and video caption reader to describe the information.

Calendar will contain the information informing the students about the upcoming events. Modifications in the wiki will require prior registration.

Components:

Rich text editor

Customization of the component

Text Reader

Voice input processor

Calendar

##### **Project Lifecycle Helper**

The project will facilitate the FYPs stakeholders in the following manner

Students:

UI for the proposal submission,

Mechanisms for the upload of the D1, D2 as per their templates.

Viewing their marks

Uploading upto 3 versions of the document (so that revisions could be traced)

Project Office

Forwarding the proposals for proposal evaluation form

Recording Comments of the proposals evaluators.

Uploading the templates of the deliverables

Uploading the schedule of the project office and sharing with the other stake holders

Uploading the Project evaluation criteria

Supervisor

Providing mechanism to record marks against each section in accordance with the Project Office Criteria

Providing mechanism to record remarks

Mechanism for comparing the existing and previous versions of the document

Submit result

Recording student progress against the meetings during lifecycle activities and sending reminders or warning messages if the students progress is not upto the mark.

### **Online course Tool for Adaptive Learning**

The tool for customization of the progression of question topics on the basis of concept dependency graphs of course topic. Initially the students knowledge state would be modelled. The tool will first ask few questions from the students, and will assess the student's knowledge state. The tool will not only recommend the areas to work upon but will also help the students in bridging the gap by systematically providing them with the concepts in a proper manner. The tool will help the students in mastering the topic in a non-linear fashion by helping them out in The tool will be used in accordance with the prerequisites and follow up of the computer science courses. It could be used later for revision of the concepts before interviews/ comprehensive exams preparation.

Initially the basic focus will be on Introduction to programming Visual Analytics tools evaluation:

The basic idea of the tool is to evaluate the dynamic measures of various visual analytic tools (list will be provided). this will involve the document preparation covering the installation, development of the step by step interactive help manuals of the 20-30 visual analytics tools, running the basic usecases and recording their efficiency, speed and various other dynamic measures. The project will also cover the 3 minute demo video of each of the tool under consideration.

The project will also compare the UX of the visual analytics tools on the basis of usability as well as performance metrics.

### **PAKCON: Mobile application for learning Pakistan studies concepts**

The application will serve as a basis of learning basic concepts of Pakistan studies for primary level in a sequential manner. The major challenge of the application is of user experience and performance. Major tasks will be performed using Drag and Drop and other gestures provided by the smart phones.

Series of questions will also be asked to evaluate students learning .

Since the idea is novel, please contact only (at muddassira@pucit.edu.pk) if you are serious to opt for this project

**ScienceCon: Gestures based application for learning General Science concepts**

The application will facilitate the users in learning the general science concepts using jigsaw puzzles drag and drop. Animations will be used to make the students understand the concepts of the science experiment of the primary level/ DIY experiments. Series of questions will also be asked to evaluate students learning .