**ViQu – A smart viva and quizzing solution**

**Capstone Project Proposal**

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# **Project Overview**

Engineering design problems are generally open-ended. They have no single correct answer, rather a range of possible solutions. The yearlong Capstone project keeps the desirability of open-ended design problems, the limitations of students’ knowledge and experience in check while helping us learn.

In the various laboratory classes in the college we have numerous viva(s) and quizzes. This task of conducting vivas and quizzes is quite cumbersome for the teachers as it takes a lot of preparation. Also, the checking process is quite redundant, time taking and tiring which leads to delayed results.

So, our team is trying to create a product “ViQu” which is a solution to the problem. A product based on Raspberry Pi 3 along with some sensors will be created, which will be able to conduct vivas, create quizzes and even check them hence, creating a digitized result sheet instantly.

Moreover, a database of MCQs and subjective viva-like questions will be created overtime by the teachers which will help in the future. This question bank will have ques of 3 difficulty levels.

Finally, the product ViQu will be able to conduct vivas, mark them, create quizzes, mark them and a fine database of questions will be created for the above.

# **Need Analysis**

* **Need to simplify the viva process:**

As the number of students is increasing every year the work load on teachers also keeps increasing. Viva(s) are an integral part of lab work but on the other are too tedious for the teachers. Hence, ViQu will take this responsibility off their shoulders.

* **Need for a question bank:**

Now a days the Quizzes need to be created by the teachers every time they are held. But with ViQu a large database of MCQs as well as subjective viva like questions will be created overtime which will help in the future.

* **Need for quicker and easier quiz checking process:**

As we see the process of checking quizzes is quite redundant, tedious and time taking hence, the results sometime get delayed. ViQu will simplify this process.

* **Need for a simpler attendance mechanism (optional feature) :**

Right now the teachers tale the roll call in a class of hundred, which is a very tedious process. To simplify this ViQu can be used to take the roll call and mark the attendance which can further generate a digital summary of the student attendance.

* **Need for facial datasets (optional feature) :**

As we see a lot of students are working on machine learning projects which require Indian facial datasets, which are not easily available online. ViQu will help us get such a dataset of student under viva conditions. This will be done with the prior permission of the candidates involved and the administration.

# **Objectives**

In order to fulfill our capstone project we intend to achieve the following objectives:

* **To simplify the viva process :**

1. ViQu will ask the questions.
2. ViQu will create a transcript of the answer given by the student by using text summarization.
3. ViQu will do a probable marking and create a mark sheet.

* **To create a question bank :**

1. When the teachers will make the quiz the questions will be added to their question bank and by the passage of time it will improve.
2. ViQu will create quizzes and ask viva questions from these question banks.

* **To simplify the quizzing process :**

1. ViQu will generate the quiz based on the question bank.
2. ViQu will apply image processing to check the answered quizzes.
3. ViQu will evaluate these quizzes and will create a mark sheet.

* **To simply the attendance process (optional) :**

1. ViQu will be able to make roll calls
2. ViQu will be able to mark attendance of the students on a spreadsheet.

* **To improve our skill set :**

1. We want to have a project experience in a team.
2. We would like to learn new technologies such as using Raspberry Pi, applying natural language processing.

# **Methodology**

* We will be collecting the problems faced in the viva and quiz taking process and will also evaluate how the whole process is undertaken. Will properly analyze how the quizzes are set and how the marking schemes of viva and quizzes is set.
* Then we will be searching for the perfect solution through research about how these problems can be solved such as the use of Raspberry Pi, NLP, various APIs, etc. We will firstly try to test these individual modules on our own system before putting them to test on the actual product.
* Then we will go on with the proper hardware implementation and side by side create modules for various features.
* Now we will run certain tests and try to keep the scenario as real as possible. We will involve a few teachers in it who might help us in getting a small question database to be created.
* Finally, we will try to solve the errors which are seen in the previous stages and will further improvise/optimize the product as needed.
* Now we will put the product to real time testing and will also create a report on the same.

# **System Requirement**

**Hardware Requirement:**

* Raspberry Pi 3
* Camera
* Mic
* Speakers
* Raspberry Pi box case
* Laptop

**Software Requirement:**

* Python 2.7
* Various Python Libraries such as openCV, pytesseract, etc.
* Raspbian OS for Raspberry Pi 3

# **Work Plan**

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **S.No** | **Activity** | **Month** | **January** | | **February** | | | **March** | | | **April** | | | | **May** | |
|  |  | Week | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 |
| 1 | Identification of project |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| 2 | Planning of project and feasibility study (technical – software and hardware and, economic) |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| 3 | Module testing |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| 4 | Hardware interfacing |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| 5 | Software implementation |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |

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| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **S.No** | **Activity** | **Month** | **July** | **August** | | | | **September** | | | **October** | | | | **November** | | | | **December** |
|  |  | Week | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 | 25 | 26 | 27 | 28 | 29 | 30 | 31 |
| 5 | Software implementation |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| 6 | Design optimization |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| 7 | Performing Modifications |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| 8 | Results Evaluation |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| 9 | Final Report |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |

# **Project Outcomes**

Our project named “ViQu” is an assistant for taking viva, creating quizzes and analyzing them and evaluate accordingly and some the main objectives are as follows:

* ViQu will be a box case in which raspberry pi will be embedded with speakers, camera and mic.
* ViQu will be able to take the viva of a student and evaluate it, so as to make the process of viva faster and easier for both student and faculty.
* ViQu will also record these viva for any future discrepancies if there are any.
* ViQu will also be able to create quizzes (MCQ type) and evaluate them by feeding the answered quiz picture to the ViQu and will finally give an excel file of the mark sheet.

**Optional :**

* ViQu will also be able to make roll calls and mark attendance while the teacher just needs to verify the digital attendance sheet in the end.

# **COURSE SUBJECTS**

* Natural Language Processing – for summarizing text after speech recognition.
* Information Management System- for creating and maintaining our database and using SQL(structured query language)
* Image Processing- for recognizing MCQs based quiz sheets.
* Engineering Design- for implementation of Raspberry Pi (like Arduino)
* Python