Department of Computer Sc. & Engg, Govt. Engg. College – Thrissur
PROJECT(P1) Interim Evaluation of project progress
2022-2023
ODD

1. **Program:** B.Tech. in Computer Sc. & Engineering **Batch:** 2019 Adm.
2. **Team Members:**
   1. Devi Krishna M K Uni. Reg. No: TCR19CS026
   2. Maria Viji George Uni. Reg. No: TCR19CS039
   3. Navneeth Variar Uni. Reg. No: TCR19CS047
   4. Niranjan Neelakantan (leader) Uni. Reg. No: TCR19CS049
3. **Team leader:** Niranjan Neelakantan Uni. Reg. No: TCR19CS049 **Group number:** 8
4. **Guided by:** Mrs. Princy Ann Thomas, Assistant Professor
5. **Broad area:** Artificial Intelligence
6. **Sub area:** Natural Language Processing and Optical Character Recognition
7. **Project Title:** Automated Hand-written Malayalam Descriptive Answer Script Evaluation System Using Machine Learning
8. **Objectives of project work:**

   O1: To alleviate the task of malayalam answer paper evaluators.
   O2: To explore different techniques to improve the accuracy of Malayalam handwriting recognition algorithms.
   O3: To tweak the existing automated evaluation systems and enhance the scope and usability of it.
   O4: To increase the familiarity with the concepts of optical character recognition and machine learning techniques.
   O5: To design and implement a prototype by efficiently utilising the diverse skills of the team, using concepts of project management and software development.

9. **Skill set matching:**

   Identified Skill set for project
   Python3: Handwriting recognition is to be achieved with machine learning models which are implemented in python, OpenCV library To process the input image and extract data, Keras library: To create a machine learning model to recognize characters in image , Writing skills: To document the work done and create report , Web devlopment skills(frontend): To create a user interface (website) , Web development (backend): To connect the machine learning model with the user interface created

Skill needed in Project	*Sk1*	*Sk2*	*Sk3*	*Sk4*	*Sk5*	*Sk6*
Niranjan Neelakantan	03	02	01	02	01	00
Maria Viji George	03	01	00	02	03	02
Devi Krishna M K	03	01	00	02	02	00
Navneeth Variar	03	01	00	02	03	03

10. **Important information about project work**

Classification: {Internal}{~~Internal with External Collaboration~~} {~~External Internship~~} {~~Other: fill here~~}	{~~Industrial~~/Social}{Academic Research} {new idea} {~~new variant of an idea~~} {~~/e/x/i/s/t//in//g//w//o//r/k//~~}
Source of Idea:	{Student} {~~Guide~~} {~~BOTH~~}

11. **Important information about project potential**

Product is *NEW Variant* {~~System-both H/W, S/W~~}{Software} {Has IPR content-NO//~~YES~~} {~~IPR at Design~~ ~~/a/n//d//F//i/n/i/s/h//e/d///G//o//o/d//s level~~}	{~~Industrial~~/S//o/c//ia//l}{~~Finished Goods~~} {//S/e//r/v/i/c/e//} {Can compete ~~globally~~/l/o//c/a/l/l/y/} {~~Global~~ /~~C//o/n//t/i/n/e//n/t~~/ L//o//c/a/l//~~N//o//t~~ Patentable} {Business value ~~Immediate~~ /t/o//d//o//e//s/t/i/m//a/t//io//n/ }
{~~Variation by Parametric tuning~~} { Alternate /d/e/s//ig//n/, implementation}	{~~Run faster, More work per /u//n/i/t//t/i/m//e/, dollar~~ } { Better acceptance by end users }
{~~Scalable~~} {Portable} {Ethical} {Safe}	{~~/O//l/d~~/ Current technology} {~~Future Technology~~}
{OSS License} {~~OSS/Proprietary mix~~}	{~~Proprietary~~} /{/C//o/l/l/a/b//o//r/a/t/o//r/} {~~Own Startup~~}

12. **Related works:**

(Name at least three core references inspired you to come up with this new work, put cross reference by the side)

(a) Subjective Answers Evaluation Using Machine Learning and Natural Language Processing - [1]:
The paper proposes a novel approach using different NLP techniques like Wordnet,Word2vec,cosine similarity to evaluate subjective answers automatically.Solution statements and keyword matching are used to evaluate the answers.ML model is trained to predict the scores.

(b) Proposed method to Malayalam Handwritten Character Recognition using Residual Network enhanced by multi-scaled features - [2]: A novel hybrid approach for recognizing the characters of malayalam handwritten texts is proposed in the paper.By combining the statistical features and structural features of the characters,more accuracy is obtained in malayalam character recognition. The proposed system has claimed to have obtained around 97 percentage accuracy in malayalam character recognition.

(c) Towards Automated Evaluation of Handwritten Assessments - [3]: The paper introduces a framework that integrates ideas from information retrieval,NLP and feature based keyword spotting to automate the evaluation of short descriptive answers.Along with keywords from textual reference,semantically relevant keywords to that in textual reference is obtained using information retrieval and various Natural Language Processing Techniques.The added feature of spotting semantically relevant keywords has resulted in the increased accuracy of score prediction.

13. **Project synopsis:**

(Answer to the questions below need to be in a para, clear and concise)

(a) Problem diagnosis:

Evaluation of handwritten answerescripts often becomes a hectic task for evaluators. Variation of moods, health, time available etc can vary the manual evaluation process. The problem domain addressed here is the manual evaluation of answer papers in Malayalam language.

(b) Problem statement:

Manual methods of handwritten malayalam answer script correction involves a lot of time consumption and repetitive tasks.

(c) Methodology of solution:

Create a machine learning model to recognize the malayalam characters from uploaded images. Comparing the answer key provided by the evaluator, assign scores to each uploaded answer and generate a score sheet. This project mainly focuses on simple malayalam alphabets and basic words which can be generated using them. A templated sheet will be provided to candidates to fill and the scanned image of that template will be uploaded to the machine.

(d) Correctness and completion of work:

The accuracy of the machine learning model in correctly recognizing the characters out of image.

Percentage difference in predicted score sheet and manually rechecked scoresheet.

$$Accuracy = \frac{No.\ of\ characters\ correctly\ recognized}{No.\ of\ total\ test\ characters} * 100$$

(e) Demonstration plan:

By testing the software by uploading a scanned document of each answer and comparing the generated score sheet with a manually evaluated score sheet.

(f) Your technical development:

Deep understanding about neural networks.

Deep understanding of different technologies -OpenCV, Keras Library Module,Web Development tools,Latex.

Develop the skill of proper documentation and proper communication within the team as well as the outside the team.

14. **Work plan:**

Action plan				
Sl. No.	**Activity**	**Date**	**Signature of guide**	**Remarks**
	Project course activity starting	12-09-22		
	Date of fixing project topic,title	20-09-22		
	Date of Zeroth step valuation	18-10-22		
	Date of completion of SRS	25-10-22		
	Dt. of finishing work-plan, task allocation	30-10-22		
	Dt. of completion of project synopsis	01-11-22		
	Date of Interim evaluation	08-11-22		
	Date of completion of conceptual design	16-11-22		
	Date of completion of methodologies	21-11-22		
	Dt. of completion of work-plan for S8	30-11-22		
	Date of completion of funding proposal	03-12-22		
	Date of Endsem evaluation	06-12-22		
	Date of completion of report review	13-12-22		
	Date of approval by coordinators	19-12-22		

15. **Completion in one semester time:**

Score off the unwanted choices in each group OR fill in the information in blank portions

Completion of work:{can not be completed}	{by Action plan time /e/a//r/li/e/r///t/h/a//n/ of item 12 your suggestion}
Draft Report writing: {can be completed}	{by Action plan time /e/a//r/li/e/r///t/h/a//n/ of item 14 your suggestion}
Funding requirement: {/N//I/L/ ~~Needs funding~~} through {Own resource} {~~Institutional~~}	arranged by {Student} {~~Guide~~} {~~BOTH~~} {~~funding agency:fill the details~~}
{Approximate cost expected:} NIL	
{Other:} In this phase, the aim is a basic recognition of malayalam characters in the scanned templated document	

16. **Approximate Workload distribution:**

Member1: Niranjan Neelakantan Member2: Devi Krishna M K
Member3: Maria Viji George Member4: Navneeth Variar

	% Work	*Mem1%*	*Mem2%*	*Mem3%*	*Mem4%*	**TOTAL**	
Completed							
Project Reseravation Document	05	25	25	25	25	100	
SRS	05	20	20	20	40	100	
Project Interim Document	05	30	30	30	10	100	
To be Completed							
Reading Reference Documents	15	25	25	25	25	100	
						100	
Creating machine Learning model	15	40	20	20	20	100	
Creating front end interface	15	20	20	30	30	100	
Connecting interface with backend	15	20	20	20	40	100	
Final project report	20	25	25	25	25	100	
TOTAL	100	22.7	20.5	21.1	23.8	100	

17. **Plan for self publication:**

No plans for self publications as of now.

18. **Facilities to be provided by department:**

Write your suggestions here as a pointed list

- Uninterrupted high speed wi-fi connection.
- Lab space to work
- High end machine capable to train ML models with large datasets.

19. **References:**

Provide all reference including any journal, conference, text portions, handbook portions, collections, previous work-report, technical reports, web references, publications of your guide

[1] Abdul Rehman Javed Natalia Kryvinska Shahab S. Band Muhammad Farrukh Bashir, Hamza Arshad. Subjective answers evaluation using machine learning and natural language processing. IEEE Access, 9(25), November 2021.

[2] Chandran Saravanan Samatha P Salim, Ajay James. Proposed method to malayalam handwritten character recognition using residual network enhanced by multi-scaled features. 2019.

[3] Jawahar C.V Vijay Rowtula, Subba Reddy Oota. Towards automated evaluation of handwritten assessments, 2019.

20. **Approval note of Guide:**

Approved By Guide

Date of approval: 11/11/2022

Signature of Student
email-id:
niranjan2neelakantan@gmail.com

Signature of Guide
email-id:
princyannthomas@gectcr.ac.in

Note:- Use these e-mail ids for communication. Communication send to any other address is invalid or is not part of seminar correspondence.