Card Grader
Project Proposal

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Executive Summary

The project Card Grader created by, Ed Musi, Jabin Shrestha, Rohit Rokka, Thomas Muldoon and Wei Ong is intended to create a system that will use machine learning to find the grade of a card. We intend to do this using AWS Rekognition, an Android App, and a website.

The grade of a card is a factor of its physical condition and using theProfessional Sports Authenticator grading system we will be using is graded from 1 – 10. The grading of a card currently can only be done by sending the card to a grading company who will have the card gradeD manually which takes time, costs money and can be inaccurate because of the reliance on THE PARTICULAR person SELECTED to grade the card. A machine learning system will allow users to grade cards themselves without needing to send their card off to be graded. The card will be graded using an AWS Rekognition system that will connect to an AWS backend to take input from the website and app, the user will THEN grade cards by either taking a photo of the card using their phone or by uploading a photo to the website which will then send the photo to the backend for comparison using AWS Rekognition and will then output the VISUAL grade of the card.

Project Summary

Purpose

The purpose of this document is to inform about the project intent and goals, the complexity of the project and to gain feedback on the methodology to achieve the goals of the project at the end of the planning phase before the project is to commence in earnest.

Working Title for the Proposed Project

The working title for the project is Card Grader.

Background

The grade of a card is a major factor for deciding the value of an individual card and is a function of the physical condition of the card. The card grading system we are using is the Professional Sports Authenticator (PSA) system which is a grading standard for collectible cards which grades from 1-10.

Objective(s)

The project intends to provide a cheaper alternative for collectors and card enthusiasts in determining the value their cards. The free platform enables individuals to know the approximate cost of their cards before going to professional graders.

Since professional grading is quite expensive and is highly subjective depending on the individual person grading the particular card, by using our service first collectors will be able to know whether going on to professional graders is worth it. If their cards happen to be of low grade, they will not be tempted to have to go on paying for the service of professional graders.

When we launch our application, it will be able to grade scores of the card impartially and accurately by scanning its surfaces corners, edges, and pointing. With the technological features, we are using AWS recognition by combining AI Machine learning so that users can grade cards by taking pictures on their mobile phone and submitting it to the system either through application or website.

The initial Project Scope recognizes the high-level requirements and achievements that must be met to deliver a desired result that contains condemning success factors, initial project goal, project boundaries, and Assumptions.

Project Complexity

The project is expected to be of medium complexity due to the need for both an app and a website to work in concert with a cloud system and use machine learning.

The Primary source of complexity is AWS Rekognition which helps in image and video detection. However, since we have to create our own custom labels, the process of coding this will take time. This is a result of the Cards being in different conditions. The recognition might fail to capture all the image details thus leading to a delay of results production or inaccurate prediction which will require us to ensure that the Rekognition is set up correctly.

Potential Benefits

The successful creation of our card grader application will benefit all stakeholders (developers, consumers, and insurers) of the project's scope. From a consumer's perspective, our provided application will be free of charge, which compared to other services/ applications, requires a payment of some sort (e.g., a subscription service), this allows the average person, who is not well-versed or as invested in card grading, to have their cards graded and (with further development not included in the current project) appraised for free which will allow them to have the proper knowledge on the actual value of their cards before attempting to sell them or committing to a professional card grading service. From the perspective of insurers, the growing value of card collections has created a need to have those collections valued to ensure that they are insured for the correct amount of money, this project helps them by allowing them to gain an objective and reliable grading of a collection. From a developer's perspective, by creating a functional app, we are gaining useful knowledge and experience of using different programs/applications that are commonly used in many other industries which will be beneficial experience to demonstrate to others for future employment.

Feasibility Statement

With the level of skill the group has this project will be feasible. The tools we have such as Cloud systems for hosting, Integrated Development Environments (IDEs) for app building, and website builders such as WordPress allow us to save time and work which further improve the feasibility of the project.

Recommendation

I recommend that this project proceed because with our level of skill I believe it will be feasible and the benefits it will give to users will be valuable

Business Assessment

Situation Assessment and Problem Statement

The problem we are solving is that at the moment it is expensive for a trading card to be graded. The grade of a card is a function of the physical condition and is a valuable metric for finding the price of the card and is normally required before a card is to be sold. At present someone wishing to have a card officially graded will need to send it off to a grading company, which is time consuming and costly. We intend to make the preliminary grading of cards faster and cheaper and in the process reduce the barrier for entry for people starting out in the business of collecting and trading these cards.

Options considered

During this project we considered a number of options:

For the App we considered:

- Option 1: An IOS App
- Option 2: an Android App

We decided against the use of an IOS app for the reason that it costs money to distribute an IOS app ($99 a year) while an Android app will cost however much it takes to host the .apk file. An IOS app can also be considered later in the project as a parallel service once market penetration and acceptance, and a market need for the IOS app is demonstrated.

For the Website we considered

- Option 1: using WordPress
- Option 2: Using Wix.
- Option 3: Manually coding the entire website.

The idea of using Wix was discarded because it would be difficult to ensure compatibility with the other systems we intend to use. Manually coding the website was also discarded because it would be excessively difficult. We decided to use WordPress because it allowed us to save time compared to manually coding the website. WordPress also allows us to host it ourselves and add plugins to ensure compatibility with other systems.

For the Machine Learning system we considered:

- Option 1: Using AWS Rekognition
- Option 2: Using an App based Machine Learning system

We decided to use AWS Rekognition because it allowed us to use the same system for all of the other components and we would not have to rely on the phones processor to perform the actual comparison and in the process have improved compatibility that can rely on database and scanning systems that are updated in one location rather than pushing out app updates that a user will be required to install.

Consultation

As a part of this project we consulted with Mel Razmjoo and Patrick who are teachers at TAFE NSW who were supportive of the project.

Proposed Scope

Scope Definition

Table 1: Card Grader Proposed Scope

Element	Detail
Objective	The objective of the Card Grader Project is to make it easier and cheaper for people to grade trading cards that they collected.
Outcome	The desired outcome is that the buying and selling of cards will become faster, safer, and cheaper by allowing people to get more object gradings of cards.
Output	We intend to output a Machine learning system running in AWS using AWS Rekognition that uses an AWS backend to communicate with an Android app and website to find the visual grade of a card
Quality Criteria	The Machine Learning system will be judged by its accuracy in finding the grade of a card in comparison to existing card grading systems. The website and app will be judged by their ease of use. The AWS backend will be judged by its ability to support the above outputs.
Customer(s)	The intended customers for this project are buyers and sellers of trading cards as well as insures for those collections

Assumptions

The main assumptions are:

That the machine learning system we are using is capable of finding the grade of the cards with sufficient accuracy.

That we can learn to create an Android App, WordPress website and create a cloud system that would allow them to interact with a Machine Learning system without problems.

Constraints

This project has a number of constraints that we must comply with. the due date of the 17th of May 2022 is a constraint on how much time we have to accomplish the project. We are also constrained by our budget of $100. Legally and ethically, we are constrained by the need to ensure that our project is secure so that user information is protected.

Scope of Work

Table 2: Card Grader Scope of Work

Part of the Project (Inside Scope)	Responsibility
Create Dataset for Pokémon cards	Wei Ong
Create Machine Learning system to find the grade of a card	Ed Musi
Create AWS Cloud Backend	Thomas Muldoon
Create Android app	Rohit Rokka
Create Website Dashboard	Jabin Shrestha

Implementation Strategy

The estimated resources that will be required to implement the proposed project are detailed in table 3 below.

Table 3: Card Grader Project Implementation Strategy

Element	Detail	Issues
Project Schedule	The Project has exited the planning phase and commenced on the 30/03/22, it is expected to conclude no later than 16/05/22	The final date of 16/05/22 has been assigned to us and is impossible to move without us being able to prove significant hardship in our performance of the project. We have allowed a 2-week buffer period before 16/05/22 to allow us to solve problems that may delay the completion of the project as a result of the aforementioned immobility of the due date.
Budget Estimate	We expect the budget to not exceed $100	AWS costs are hard to calculate with a significant degree of accuracy and as a result the $100 budget is an upper limit
Other Resources	No other resources are expected to be needed	No issues are expected to occur with our use of other resources due to our lack of need for them.

Project Management Outline

Governance

The Project's governance structure is based on the *Tasmanian Government Project Management Guidelines Version 6.0* prepared by the Department of Premier and Cabinet.

The Project Sponsor is: TAFE Meadowbank

The Project Manager is: Thomas Muldoon

The Project Team consists of:

- Ed Musi
- Jabin Shrestha
- Rohit Rokka
- Wei Ong

Key Risks and Issues

These major risks or issues will be investigated further should the project proceed:

- The viability/compatibility of using the nominated applications and services to create the Card Grader app. If an application cannot work for whatever reason, then an alternative will need to be sourced as a replacement which can be costly/time-consuming.
- The Machine Learning model is unable to function as intended. As it is the backbone of the project, the machine learning model must be functional. To ensure this, resources (time, learning how to use it, etc.) must be prioritised for it first before to other parts of the project.
- Miscalculation of the project's budget. There is always the possibility of the budget to go over what was initially delegated for the project. To prevent this, adequate research was conducted beforehand (as seen in the project charter) to ensure that the allocation of the budget is properly assigned.
- If the project turns out to be a success and many people adopt the use of the app, this will require further development and maintenance of the app which will require more finances. Since this service is offered for free, we will have to meet the costs ourselves or have to look for financiers. A failure to do so would force us to stop the grading as the web traffic would be too much.

Future Expansion

There is room in this project for future improvement outside of the current scope. The addition of an IOS app will increase the available market. At the current time we are only grading Pokémon cards, but we could expand that into other card games. We could also make the addition of allowing the user to check against a price database of cards and allow them to check the possible value of their cards