TED UNIVERSITY

PROJECT SPECIFICATIONS REPORT

CMPE 491

Senior Design Project I

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1. Introduction

In today's competitive environment, businesses tend to overlook the motivation of employees to produce products. However, businesses may increase employee motivation and overall productivity by implementing workplace gamification strategies. Today, gamification performance management has become a widely used term.

According to the research conducted by TalentLMS, 89% of employees state that gamification increases their sense of productivity at work. Furthermore, in another research, if a business utilizes gamified activities, 69% of its employees are more likely to remain longer than three years. These figures demonstrate the effectiveness of gamification in retaining company workers. In this project, we propose the development of an application that aims to increase productivity in production by increasing positive competition through gamification.

1.1 Description

Lead the Board is a software that integrates gamification in manufacturing to offer rewards to employees for their contribution to their work. It gives managers and employees the ability to track their progress and reward employees who are bringing their full potential to the game. With 3 different user types such as admin, manager, and employee, different modules will be provided with position-unique content. Employees will earn points and badges based on metrics such as production, operation type, and difficulty level and be placed on a leaderboard. Employees who reach specified rankings will be rewarded.

The completion of the tasks by the operators will be tracked and counted through sensors. As a result, the operator will earn points as much as the task he/she performs. Also, a feed page will be constructed for everyone to share their achievements, thoughts, ideas, and comments.

1.2 Constraints

1.2.1 Economic

A variety of software, database, and sensors will be used in the creation of the project. Also, the budget for research, development, testing, and maintenance should be included both for the software and the sensors. Although it is thought that the use of sensors will not create a huge cost, the number of sensors and therefore the cost will increase depending on the size and the number of operators of the company. As a result, it may be expensive for both the developers and, ultimately, for the client, who are the owners of the factories.

Furthermore, while admin and manager will be used over the web, operators will be connected to the system via mobile. In this part, it is the employer's responsibility to ensure that employees use phones with sufficient technology to use the application with maximum efficiency.

1.2.2 Environmental

The environment where our project will take place will be the manufacturing industry such as factories. It is also important how convenient the place is to establish our system. For the sensor system to be successfully and accurately operated, the size of the environment and how suitable it is are particularly important and can constrain the system. According to the possibilities of the environment to be established, alternative solutions can be brought to the project.

1.2.3 Social

Since the application will be used in the manufacturing working area, the process of leaving the old working traditions and moving to a new system in a way can be difficult for the employees. Employees who find it difficult to accept and adapt to the new system may experience inadequate performance. In addition, in the process of learning the system, there

may be a slowdown in the works at first, but in the future, this loss of time will be compensated by the commitment to our project for more efficient and quick work.

Since feed space is open to everyone, we expect every user to behave fairly and respectfully, and not engage in any behavior related to harassment, bullying, and discrimination based on any characteristics such as race, religion, gender, disability, age, national origin, sexual orientation, gender identity, or gender expression.

1.2.4 Political

Regarding the project we are developing, there are no political constraints.

1.2.5 Ethical

The desire to be higher on the leaderboard may lead employees to plagiarise a product in many ways such as presenting someone else's work as one's own. Although necessary measures will be taken to prevent behaviors that abuse or takes advantage of the system, in the long run, it will be based on the honesty of the users. At the same time, the positive competitive environment should not deviate from its purpose.

1.2.6 Health and Safety

As for the effects of sensors on health, according to research, sensors do not have a negative effect on health to be a concern. Since users are encouraged to share their achievements on feed space, this situation can lead to psychological pressure, feeling of inadequacy, and anxiety. Although it may cause the negative feelings mentioned above, we will try to prevent the application from being in such a stressful atmosphere with the help of positive gamification and a reward system.

1.2.7 Manufacturability

Throughout the project, various software programs and languages will be employed. As a result, it is conceivable to claim that the project has a relatively low manufacturability restriction in the programming stage. Sensors can be considered in the manufacturing constraint category. Although it is planned that the sensors to be used in job control will not create a very high cost, it is an item that can constrain us in the manufacturing and maintenance stage.

1.2.8 Sustainability

Since we have no sustainability constraint on the software part of our project, we focus on the enhancement of the sustainability of sensors. As a result of market analysis, we have found sustainable alternatives that have qualities such as the use of polyimide optical fibers which are recyclable in the casing, and replaceable batteries which extends the life span of a sensor rather than discarding the entire device when the battery is dead.

1.3 Professional and Ethical Issues

- Respect, uphold, and advance the principles of the Code.
- Be sincere and trustworthy.
- Respect for privacy.
- Do not discriminate and act fairly.
- Avoiding harm.
- Analyse potential dangers while providing full and comprehensive assessments of computer systems and their effects.
- For every professional computing work, make sure the common good is the primary consideration.
- Accept and offer suitable expert evaluation.
- Give group or organization members the chance to develop professionally.
- Recognize that all people are stakeholders in computing and contribute to society and human welfare.
- Honor confidentiality.

- Make an effort to produce professional work that is of high quality, both during the process and afterward.
- Uphold high standards of professional competence, ethical practice, and conduct.
- Be mindful of the effort put forward to create innovative concepts, inventions, creations, and computing artifacts.
- Know and abide by the rules that apply to a professional job.
- Improve the quality of working life by managing resources and staff.
- Create secure systems that are both robust and usable.

2. Requirements

2.1 Functional Requirements

- The system shall allow users to log into their accounts by entering their email and password.
- The first page users view in the app shall be the login page.
- The system shall allow users to reset their password by clicking on "I forgot my password." and receiving a link to their verified email address.
- Authentication of a user when a user tries to log into the system.
- When the user's email or password is invalid, an error message shall appear.
- When required fields are left blank, the user shall see an error message.
- It shall have a register button that starts the registration process.
- An employee should see the registration page when they click the register command button on the login page.
- If the user already exists, it shall be reported as an error.
- System shall have 3 different user types; Admin, Manager, and Employee.
- Employees shall enter the system via their mobile phones.
- Admin and managers shall enter the system via the web.
- On the web, the navigation bar shall appear on the left side.
- The user's complete information is available in the account section.

2.1.1 ADMIN

- Admin shall be granted for manager actions such as registration of a new manager, deleting of an existing manager record, and updating of an existing manager's information.
- Admin shall assign managers to the product (or products) that they are responsible for.
- Admin shall be granted for registration confirmation of both managers and employees.
- Admin shall be granted for product actions such as registration of a new product with name and type, deleting of an existing product record, and updating an existing product's information.
- Admin shall be granted to add, delete, and update necessary operation actions for each product.
- Admin shall be granted to perform badge operations such as the creation of a new badge, deletion of an existing badge, and necessary points to earn a badge.
- Admin shall be able to access all the details of production records, badges, and points of employees.
- On the admin navigation bar, there shall be options such as: Registration Requests, Manager Operations, Operator Operations, Product Operations, Product Catalogue, Badget Operations, Account, and Log Out.

2.1.2 MANAGER

- Managerser shall see the overall performance of their employees. (Via a list or a graph)
- Manager shall be granted to add, delete, and update necessary operation actions for product/products that they assigned.
- Manager shall be granted to perform badge operations.
- Manager shall be able to access all the details of production records, badges, and points of employees who are under his/her supervision.
- Manager shall assign operations to the operators.
- Manager shall assign the appropriate difficulty level and points to the product range they are responsible for.
- Manager shall be able to view the records of operators and be able to edit and delete the records.

- On the manager navigation bar, there shall be options such as: Operator Operations, Tasks Operations, Product Catalogue, Operators, Account, and Log Out.

2.1.3 EMPLOYEE

- Employees shall have a profile that consists of their detailed production records, badges, earned total points, and his/her ranking on the leaderboard along with the full list.
- Employees shall register to the app and wait for the admin or manager to accept its application.
- Employees shall log in to their accounts when they start operating.
- The operation detected by sensors shall be automatically written in the operator's profile as a score.
- Admin, manager, and employees shall be able to see the leaderboard and statistics. Also, every manager and employee shall be able to see each of their profiles.
- Everyone shall share their achievements, thoughts, ideas, and comments on the feed.

2.2 Non-Functional Requirements

- The system should be stable.
- System should be protected against malicious users.
- Registration acceptance requests should be able to be seen by the admin within a maximum of 5 minutes after the request is created.
- Every unauthorized request to a resource must be logged and stored for audit over the next 6 months.
- System should be easy to use for users from different backgrounds.
- System should work on various browsers such as Google Chrome, Microsoft Edge, and Opera.

3. References

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