WEB Applications for 3D Printerfilament

Radhab Obaid Juma[1] and Puttaswamy Malali Rajegowda[1#]

[1]Middle East College, Muscat, Oman
[#]Advisor

ABSTRACT

This paper revolves around the development of a web application for the service of recycling plastic materials to produce 3D printer filaments. Where the web application provides services to customers through web pages. The customer is allowed to log in and subscribe to the web application, and then determine the quantity, size, and type of plastic materials and send this data to the web application team, in order to agree and set a date for receiving these materials directly from the customer's home with ease and comfort, and transporting them to the designated places for recycling This is to facilitate the process of getting rid of these harmful materials to the environment and disposing of them in useful ways.

Introduction

Recycling Plastic for 3D Printing is a web application that provides environmental service for residential areas. It is the first web application specialized in collecting plastic materials for recycling in the Sultanate of Oman. The web provides an excellent, easy and very fast service to separate plastic materials from the rest of other waste. Plastic is one of the materials that They pose a danger to the environment as they are materials that do not decompose easily as they cause the formation of polluting gases and destroy the ecosystem, and this is what constitutes a burden and pollutes the environment. Frankly, we work to kill two birds with one stone, meaning we seek to achieve two goals with one goal by this system where we to produce plastic filaments for a 3D printer On the other hand, I seek to achieve sustainable development by securing raw materials through the use of environmental waste, in order to protect the environment, such as water and air, from polluting the air by burning waste and the spread of toxic gases and landfills that pollute groundwater. Moreover, it helps in raising the state's economy by reducing the areas in which waste is disposed of, the exploitation of these lands for agriculture and the creation of job opportunities.

Problem Statement

One of the most prominent problems that made me work and think about establishing The web application for plastic recycling and its exploitation to produce 3D printer filaments is the absence of a web application or an application in the Sultanate that provides this service that works to collect plastic materials from the homes of residents with comfort, ease, and very quickly, and among other reasons is the protection of the environment from environmental pollutants and the abundance of materials Plastic in the environment without decomposing, which poses many risks to people. As this process requires more time and effort by companies specialized in recycling materials and producing other useful materials, where the waste merges or submerges into each other, this requires effort, time and a somewhat high material cost to separate the materials or waste from each other, so It affects the environment with the passage of time. To avoid all these problems, it has been solved by this system, which provides good services. The system only requires the customer to send a request to receive this plastic waste or the tools used to dispose of it properly, where the customer chooses the amount of plastic materials he has and Its type, whether it is glass of water or other materials, with specifying the required data, such as specifying the location of

the house, the contact number, to facilitate the process of arriving to receive the materials as soon as possible. With specifying the date and hour of the date of receipt from the house, to organize the receiving process and finish it. The problem of these materials is to dispose of them in a healthy manner that does not affect the environment, in return for benefiting from them and exploiting them in the production of other raw materials such as 3D printer filaments and other materials. This web makes it easy to provide service around the clock and respond quickly.

Scope

The web application will be designed to provide environmental services to the community and provide the most important and best services to subscribers. The system is available to all segments of society who wish to be an active part and contribute to the recycling of plastic materials to produce 3D printer filaments. Environmental protection and recycling of plastic waste. It is expected that the implementation of this project will be completed within a period of time ranging between 7-8 months, as the initial stages of the project will start at the beginning of October 2022, and the transition to other stages of implementation will take place in the middle of the year 2023. It is likely that the cost will reach The project is approximately 5000 Omani riyals due to the use of some free software to design and develop a web application, so the cost of the project may be reasonable.

Web development will be done by a group of programs to reach the best possible design, including ASP.Net for the front end of the web page, Visual Studio for designing web pages, Java, Python.

The web application provides many advantages in order to provide the best services to customers and to facilitate the process of using the system in an easy way without complication, and the most important of these features: ease of login and subscription, providing educational methods to help use the system, a free system, and customers can leave their comments And their suggestions about the web application.

Literature Review

It is a general survey of a group of literary sources. By reviewing the literature, I got acquainted with many information that add to my knowledge and support the project system. Where this method helps in collecting a lot of information and data. As mentioned earlier, a literature review is a survey of a group of scholarly sources that help provide an overview of a particular topic or project. The literature review contributes to identifying the methods used in the web application system for plastic recycling, identifying the gaps that my project may encounter, and identifying some of the theories related to my project. Through the reference that I searched for about my recycling project, the article explains many theories and methods, including Ways to get rid of waste and know the ways plastic waste is formed and the source of this waste. Where the primary and first source of this waste is the manufacturers and secondly the wrong uses of the general public for these materials in their daily lives. Therefore, it is necessary to consider these factors that increase the sources of plastic waste and that negatively affect the environment. In addition, the article refers to the exploitation of plastic waste through recycling. Recycling is one of the most important and best solutions to reduce these plastic materials, which pose a threat to the ecosystem and society, and to dispose of waste in a safe and beneficial manner. The article supports the exploitation of these materials in the production of other useful materials without the need for landfilling and burning, as recycling is the best way to solve all plastic waste problems. Educating people and raising the cultural level of the general public through the use of the system and practices that support this. Science Progress (2007).

Goals and Objectives

Many goals that we will do to serve our community, including:

- 3D printer filament production.

- Recycling of plastic resources.
- achieving sustainable development.
- Protect the environment from environmental pollution.
- Reducing landfills.
- Increasing environmental awareness.

Methods

Agile this methodology includes short stages of work and is usually easy and quick to move and flexible, which means that it is able to adapt and change. This methodology usually includes many processes and tasks that are done at one time.

Scrum It is one of the agile models that usually focus on delivering, developing and sustaining complex products and projects through collaboration, iterative process and accountability.

Figure 1. Agile methodology

Advantages of The Scrum Model

- Help teams complete all project deliverables efficiently and quickly.
- It works on dividing projects of large sizes into speed races that allow them to be easily controlled.
- Provide a comprehensive view through meetings.

Application Methodology

Stages and application: The basic steps followed for project management when using the agile methodology, Scrum:

Step 1(Define or assign a scrum team): Form a team of 5-9 members. Where each member of the team is characterized by competencies, as the team consists of tested developers, support and business analysts, and designers. They are required to work together in confidence always, and they are responsible for the development and progress of the project.

Step 2(Determine the length of the run): The enemy, which is defined as the time period that the project takes for a period of time ranging from 7-30 days. This period also remains throughout the duration of the completion of the work or project, while a quick planning meeting is held and in each meeting the project is planned, the situation requires the completion of the work from Before each team member, at the end of the sprint a

presentation will be given and a review of the meeting will be made and the work tasks that have been completed will be made and with that the improvements and progress will be reviewed and the next work will be planned.

Step 3(Designate a scrum master): He is the competent worker to lead the scrum assembly when an obstacle or problem occurs. The Scrum Master follows up on the problem and solves it, which helps to ensure a progressive and efficient Scrum group.

Step 4(Designate the owner of the project): The owner of the project is required to verify that the work team is working on producing value from the project he is affiliated with, whether he is the final buyer, the customer or the company. The project or method official must write all the requirements that relate to customers in the form of stories, he is required to give all importance and priority to the work Accumulation and presentation.

Step 5(Create the initial Backlog for the project): It is a list that includes all the requirements and needs of users to be completed in the project, where it is required to place the most important requirements at the beginning or at the top of the list, due to this, the backlog is organized and arranged in relation to the importance of the request. There are also two types of backlog of work items: The epics: A collection of stories at a high level and with less detail. Stories: Requirements that require more details for the work. On the other hand, this epic can be divided into a group of stories.

Step 6(Planning and getting started): In this step, the team works on selecting the items on the list given the most important ones and completing the accumulated work from them. Brainstorming is done and then determining what can be completed, achieved and accomplished in the sprint. This meeting is usually called a quick meeting, direct Once the whole team agrees. The start is done by the sprint. In return, the team pays attention to the work and stories.

Step 7(Project completed)**:** While reaching the end of the race or the time square, it is expected that all the work required and previously planned will be completed and executed. Backlog list. There is no limit to the amount of sprint speed unless a deadline is confirmed that is determined by budget and time. The sprint speed continues if the backlog ends and these criteria are not found.

Data Collection and Analysis

In addition, information can be collected through a survey, and it may be through texts or narrative comments to obtain a specific concept. Literal texts are explored and analyzed using other analytical methods. The analysis should be the aim or purpose of the study. There are many different ways to collect secondary and primary data, for example (interviews, questionnaires, site visits, documents, scientific experiments, literature review).

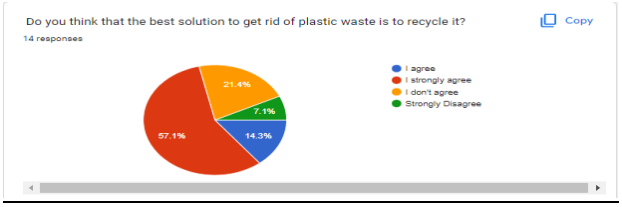

Figure 2. Questionnaires

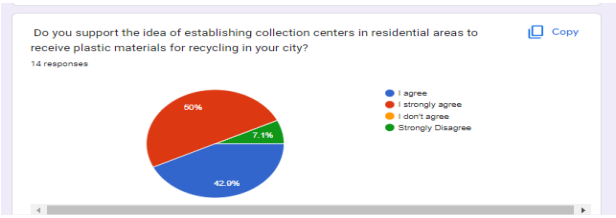

Figure 3. Questionnaires

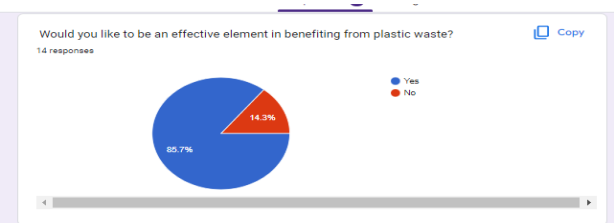

Figure 4. Questionnaires

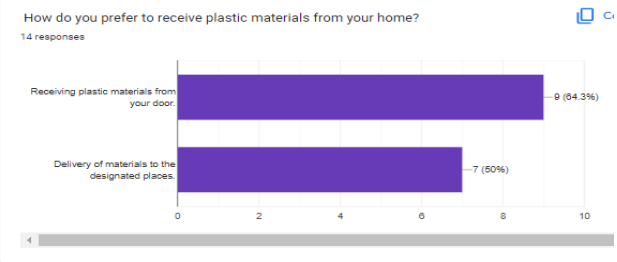

Figure 5. Questionnaires

Figure 6. Questionnaires

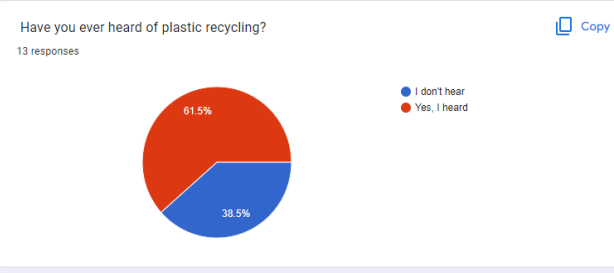

Figure 7. Questionnaires

Presentation of Results

The above mentioned different data collection results indicate that most customers or respondents support and encourage the idea of a plastic recycling web application system and this system will be a very effective approach.

Interpretation of the Result

With the development of technology and the advancement of technologies at the present time, such systems are very useful and important, as most people prefer to use applications and web pages, which we see the speed of adaptation and interaction of people with these systems, so I worked on creating this system, which is one of the reasons that made me work on Its implementation, as we mentioned earlier, is the absence of a system that includes the idea of collecting plastic materials for recycling in order to facilitate the process of collecting plastic waste for both environmental and community protection institutions, and work to achieve environmental safety. People accept such systems that contribute to providing protection from environmental risks and provide Convenience for customers or participants in the system by receiving plastic waste from customers' homes with just a click of a button in the plastic recycling web application. This system will enhance and support people's experience in using the system. It will educate people about environmental protection and learn about the correct ways to get rid of this waste, which is dangerous with the passage of time. This system provides a free recycling service in all regions of the Sultanate without the need to pay a monthly subscription due to sustainability, which is one of the highest priorities. By collecting points whenever the subscriber recycles.

Conclusion

This paper has proposed The filaments in the 3D printer are the basis and raw material for the heat feeding of the 3D printer, It is of high quality and at a lower cost, by exploiting plastic irregularities and working to recycle them. this paper is to collect these plastic materials for implementation in a web application system that specializes in collecting plastic materials for recycling and producing 3D printer filaments. Therefore, this system works to get rid of waste in a healthy and beneficial way that does not harm the environment, but rather contributes to raising the level of the environmental system. For the success of this system, it requires interaction from the community through the service provided by the system in a smooth and easy way, as the system takes care of transporting these materials or waste. On the other hand, there are many web applications specialized in recycling, but they are not in the Sultanate of Oman and do not provide the service provided by this system.

This web application is quick to collect plastic materials and is easy to use. It specializes in recycling plastic materials to produce 3D printer filaments at a lower cost and produce them in the Sultanate of Oman.

Acknowledgments

I am very grateful to everyone who helped me and contributed to the completion of this paper, especially God and then who worked to provide support and assistance in completing the article and my research project to the end.

References

1. What are external interface requirements? - Studybuff. (2019, December 11). https://studybuff.com/what-are-external-interface-requirements/
2. RECYCLING. (n.d.). City of Detroit. Retrieved January 7, 2023, from https://detroitmi.gov/ar/departments/dayrt-alashghal-alamt/jm-alqmamt/aadt-tdwyr-alqmamt
3. Create Infographic - Sign in. (n.d.). Infograph.venngage.com. Retrieved January 7, 2023, from https://infograph.venngage.com/edit/d4017bf6-eae0-436b-8b0f-f38853089264
4. Performance requirements documentation. (n.d.). Www.ibm.com. https://www.ibm.com/docs/en/aix/7.1?topic=implementation-performance-requirements-documentation
5. What are external interface requirements? - Studybuff. (2019, December 11). https://studybuff.com/what-are-external-interface-requirements/

6. Performance Requirements Definition: 150 Samples. (n.d.). Law Insider. RetrievedJanuary7,2023,fromhttps://www.lawinsider.com/dictionary/performance-requirements
7. Juillion, P. (2019, December 11). What is external interface requirements? - Studybuff. Studybuff.com. https://studybuff.com/what-is-external-interface-requirements/
8. Dataflowdiagram:Level1.(n.d.).Lucidchart.https://www.lucidchart.com/pages/templates/data-flow-diagramlevel-1
9. Performance requirements documentation. (n.d.). Www.ibm.com. https://www.ibm.com/docs/en/aix/7.1?topic=implementation-performance-requirements-documentation
10. FREE Citation Machine: Accurate & Easy-to-Use | Cite This For Me. (n.d.). Cite This for Me | Free Reference Generator – Harvard, APA, MLA,Chicago...https://www.citethisforme.com/us/citation-generator