Design and Analysis of Remote Control River Cleaning Machine

Submitted in partial fulfilment of the
requirement of the degree of

BACHELOR OF TECHNOLOGY
IN
MECHANICAL ENGINEERING

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2020

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This is to certify that the Research work titled **Remote Control River Cleaning Machine** that is being submitted by **Adhyan Painuly, Anubhav, Prakhar Chauhan, Utkarsh Yadav** is in partial fulfilment of the requirements for the award of **Bachelor of Technology**, is a record of bonafide work done under my guidance. The contents of this research work, in full or in parts, have neither been taken from any other source nor have been submitted to any other Institute or University for award of any degree or diploma.

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We are grateful to my supervisor ……..

Mr. Abdul Ghani

(Department of Mechanical Engineering)

ABSTRACT

This project gives importance to design and fabrication of the river waste cleaning machine. “Remote control river cleaning machine'' a machine which includes the eliminating the waste from water surface and safely arrange them for dumping from the water body. This project work has done inspecting at the current scenario of our nation’s rivers which are dump with tones waste of sewage and loaded with pollutants and toxic wastes etc. As in rapid increase in water pollution in the form to waste, it is disturbing the life of aquatic animal and making them endangered. A remote controlling machine will remove the waste products from the water bodies which will eventually decrease the pollutants in the water so there will be no disturbance to aquatic life and such problems will be reduced. The most important aim of the project is to decrease the man power and time consumption for cleaning the water bodies. This model cleans water with the help of motor and chain drive arrangement which is powered by the battery where energy is being stored.

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1.

Introduction

1.1 Project Background

The “Remote control river cleaning machine” is mainly used where water gets polluted due to waste and so it needs to be eliminated. This model uses conveyer mechanism to collect & remove the wastage from the surface of the water. It also consists of a container which is at the one end of conveyer belt which decreases the problem of collection of waste. This machine will remove the waste products from the water bodies which will eventually decrease the pollutants in the water so there will be no disturbance to aquatic life and such problems will be reduced. The most important utilization of this model will be made in lakes, rivers and other water bodies to clean the waste products from the water bodies.

1.2 Research purpose and meaning

Network of precisely design pipes are engineered to transport the used water from households and industries for the reusable treatment. The water from those areas where chemical are used it leads to the chemical pollutant in the used water which is difficult to cleans by man power, as it can have harmful effect on their health . Though we have advanced in many areas but still dumping of large scale waste product is still a challenge for us through sewage. There have been many cases where there have been casualties while cleaning of the drainage system as it is very dangerous in many ways for the workers. To avoid such cases river cleaning machine idea can be taken here for cleaning purposes.

1.3 Objective of Study

The objective of this project is to give emphasis on decreasing the consumption of time and the man power. Most importantly to have clean water bodies. To provide with the resource so that the pollutants can be removed from the water bodies. During the work of cleaning the water make sure that mechanization is maintained

.To provide with performance which is fast and very reliable during the river cleaning operation. To improve the quality of a water bodies. Work for society for cleaning up the section of a water bodies. To provide with solutions for a improved environment for aquatic life and humans .

2.
Literature Review

1.3 Introduction

This literature review is the summary of studies related to River Cleaning machine. It identifies and summarizes all the relevant research conducted on this machine. This literature review helped accomplishing relevant resources about the researches that has already done to avoid duplications. There may be some areas of improvement to some researches but they also provide certain help with aspect to our research. Knowing how the other has approached regarding river cleaning machines, this gave us an opportunity to identify some problems and find different ways to research and study. This project eradicates some of the biggest issue that are related to environment. As our planet have already so many environmental issues this project takes a step to help the cleaning and reviving of our water bodies which are very important parts of not only ecological system but also for living being in this planet.

1.4 Reviews

Design and Fabrication of Remote Controlled Sewage Cleaning Machine

The purpose of this mechanism is automation of cleaning process of sewage in drainage, which would decrease the spread of dieses. The pests are attracted towards the water which contains high residue which is black in colour, cleaning and decreasing the residue will decreases such problems. Sewages are cleared by the help of this system by controlling it through a remote control system. Therefore, this decreases the effect from waste and harmful gases from sewage. The biggest problem now days are mosquitoes and diseases they carry, so it will also eventually control their generation due to waste.

Review on Advance River Cleaner

River water maintains environmental balance and ecology of surroundings. Irrigation is the most important use of river water which is used for growing food. This project gives emphasis on cleaning river. This model not very essential and helpful for the environment and living being as it provide method to clean river. In this arrangement river water flow rotates the turbines. From the arrangement of mechanical gear two conveyor belts are arranged. Both the conveyor belts has different function in this, as one belt removes waste product by lifting it from water and the other one moves it to the container for its further processing.

Using Pedal Operated Boat for Efficient Lake Garbage Collector

The heart and soul of India is river Ganga which is the sacred river in the entire world. It would be very beneficial for the future if we find ways to completely clean it as due to increasing water crisis. The main focus of this project is cleaning of the lake water. Use of pedal operated boat is implemented here. The garbage is collected by the help of conveyor belt from the lakeSeveral agencies have provided with the initiative to remove waste from the lake by providing various equipments. Not only the garbage from the water surface is accumulated but if done some more

innovative changes it can also be used to cut the unwanted aquatic plants above the surface.

Design of River Waste Collector

This project is used to remove waste from the water bodies where there is drastic need of it, that's why its called River Waste collector. This machine decreases the problems for collecting debris from water as it consist of two fins between which waste is collected in-between. In this machine one end of fins is mutable and another side is fixed, by the convenience of servo motors we lift the fins from mutable side. The waste in the end gets collected in the collector which is at the lat section of the boat.

3.

COMPONENTS AND SPECIFICATION

3.1 Base Frame

Basic function of a frame is to act as a structure and support all the components. It is in the bottom section of the boat.

Specification-Length=1210 mm, Width=470 mm,
Square Pipe of 2.5 mm thickness.

Fig-3.1: Base Frame for support

3.2 Hollow Pipe

The two hollow pipes which help boat to float on the surface of water are joined firmly by the help of adhesive.

Specification Length=1210mm
D1=2100mm D2=200mm.

Fig-3.2: Hollow Pipe for floatation

3.3 T Section -2 No

The mounting of the bearing is done on this T section which is welded on the frame.

Specification-Width =200mm
Height=375mm

Fig.3.3: T-Section for basic frame

3.4 Shaft

The power transmission is done through shaft which is its basic use.

Specification- D1 =25mm D1 =20mm

Fig-3.4: Hollow shaft

7.5 Motor

The motor used here is DC which converts the electrical energy into mechanical energy .This depends on the force produced by the magnetic field.

Specification-DC Motor- RPM=60

Shaft diameter=15

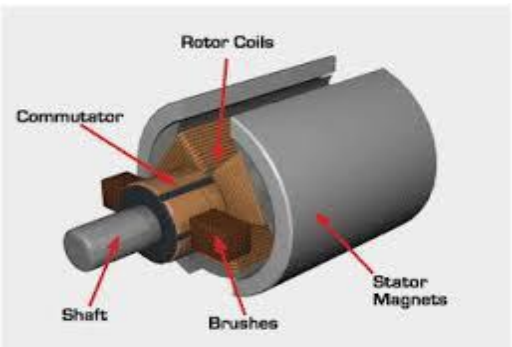

Fig- 3.5: DC Motor (4 in use)

3.6 Gear

Here spur gears are used which are commonly used. The gears here are mounted on parallel shafts. They consist of flat teeth. To produce very large gear reduction many spur gears are used together. The stress on gear teeth is also increased by it.

Specification -This Gear has a pressure angle of 20° full depth.

Fig-3.6: Spur Gear

3.7 Chain & Sprocket

A chain and sprocket drive is a power transmission mechanism which consist of roller chain which engages with two or more toothed wheels or sprocket.

Specification- No. of Links =105

No of Teeth on upper Sprocket=43T

No of Teeth on lower Sprocket=15T.

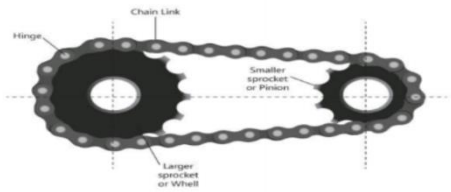

Fig-3.7: Chain and Sprocket design

3.8 Ball Bearing

A ball bearing is a type of rolling-element bearing that is used for smoother action by reducing friction. It reduces the rotational friction during the operation and also emphasis to reduce radial and axially acting load.

Specification-

Deep Groove Ball Bearing 6920

Fig-3.8: Deep groove ball bearing

3.9 Collecting Container

Collecting container is used to contain the garbage taken out from the water body.

Specification-

Length = 440 mm, Breadth = 310 mm, Height = 350 mm

Fig-3.9: Collecting Container

3.10 Conveyor Belt

The part of the belt conveyor system which carries garbage from water to the collecting tray.

Specification- Length =1700mm, Width=400mm

Fig-3.10: Conveyor Belt

3.11 Propeller

The propeller develops thrust inside the water which makes the boat to move forward.

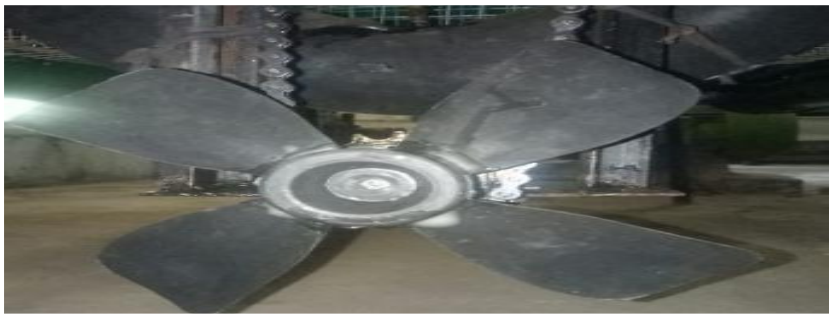

Fig-3.11: Propeller for thrust

3.12. RF Control

A headheld and wireless device which controls the electronic equipments by the help of radio frequencies**.**

Fig-3.12: RF Controllers

3.13. Battery

A battery supply necessary current to the motors.
Specification-12V 7.5 A ups battery.

Fig-3.13 Battery of water cleaning machine

4.

CATIA DRAWINGS of The River Cleaning Machine

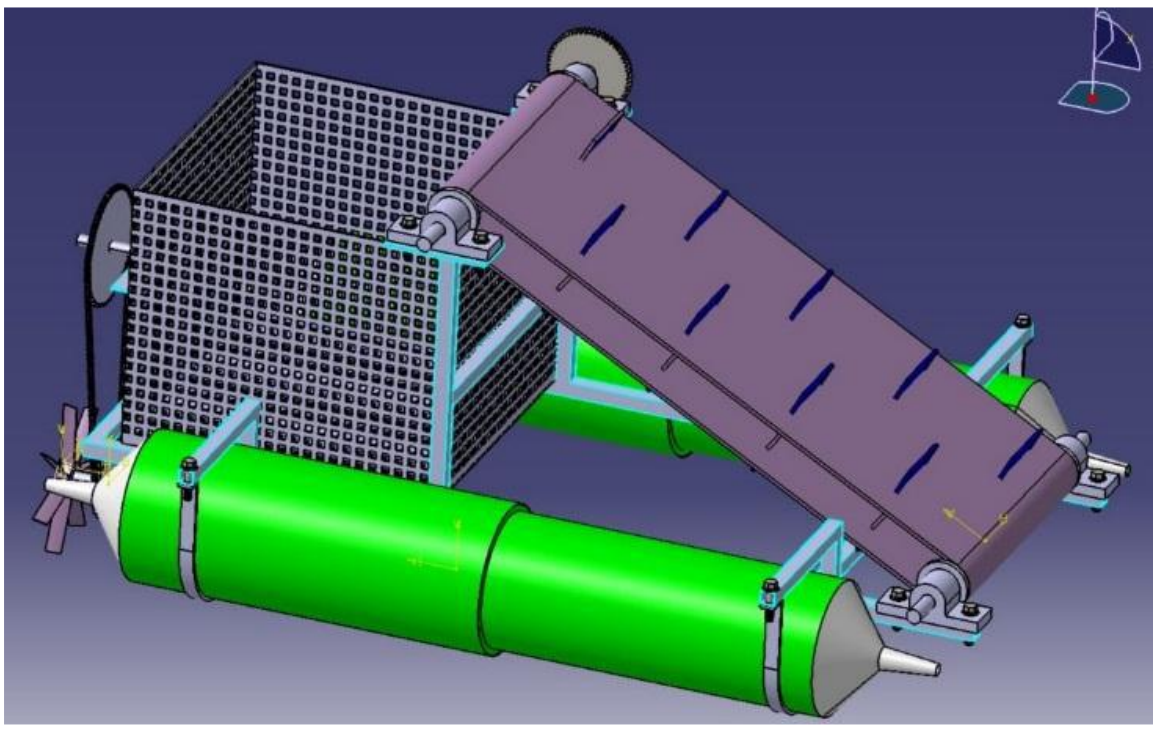

Fig4.1: Isometric view of the River Cleaning Machine

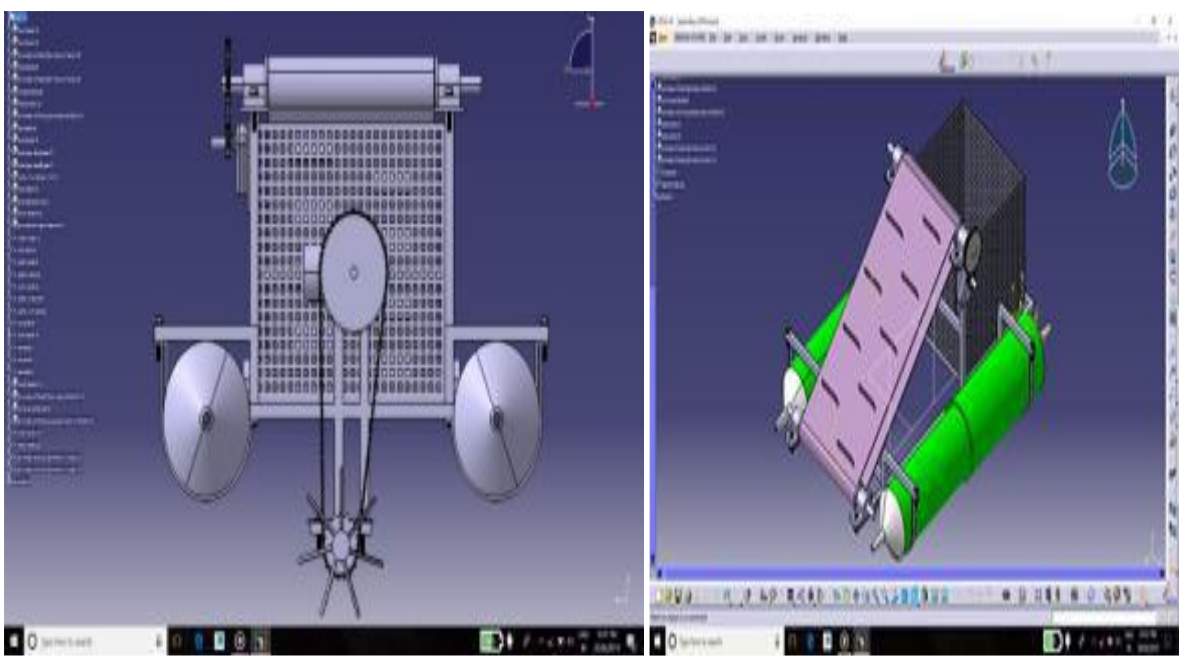

Fig-4.2: Back view and Isometric of the River Cleaning Machine

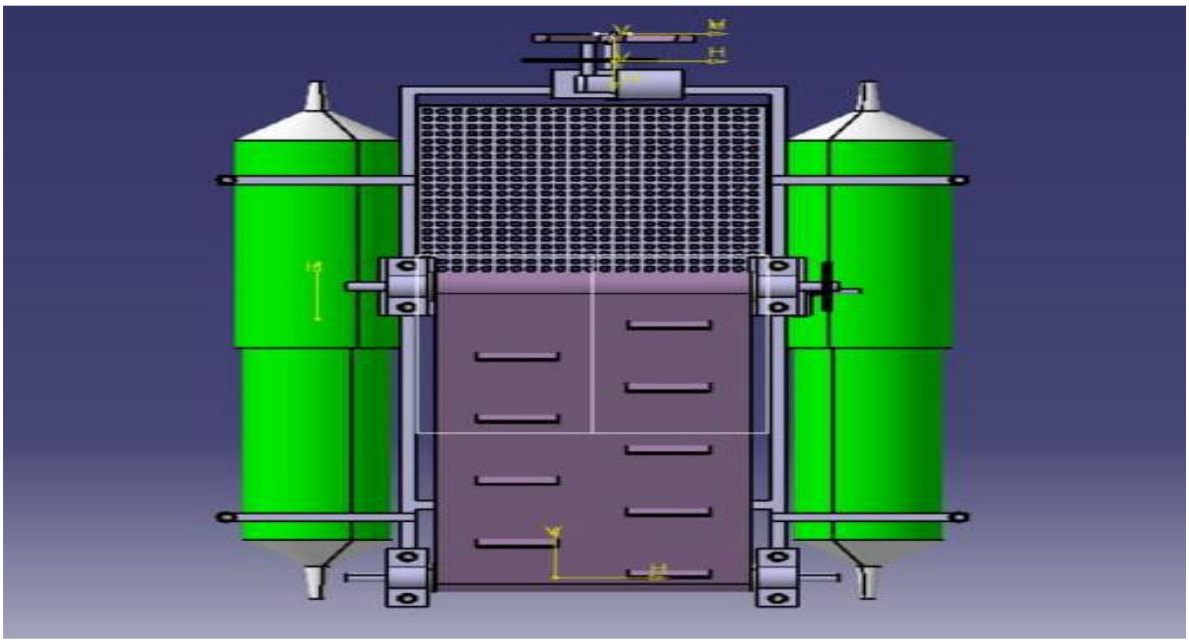

Fig-4.4: Top view of River Cleaning Machine

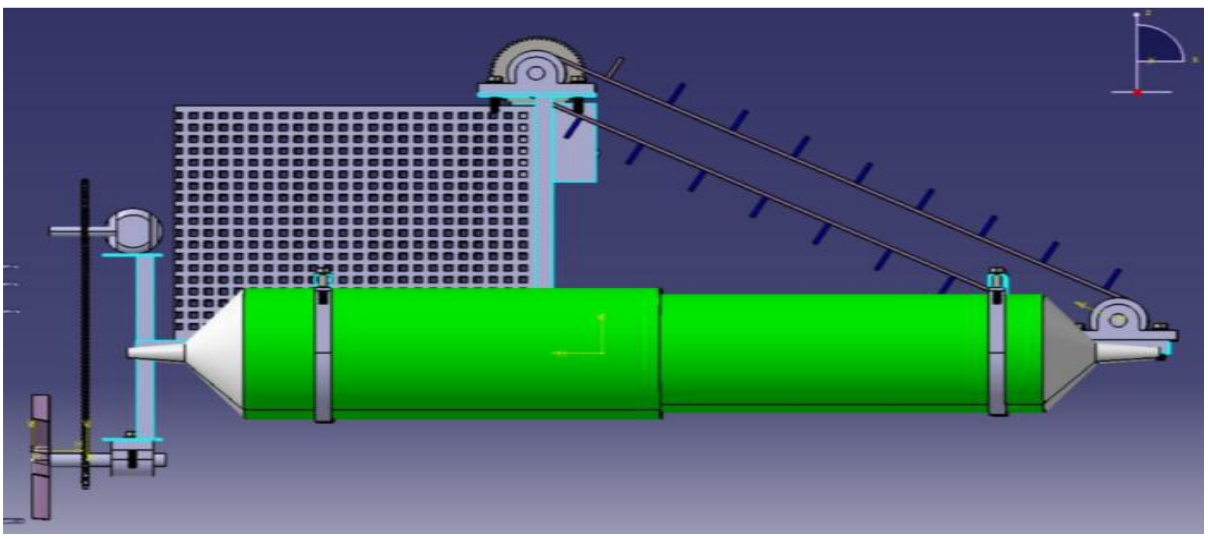

Fig-4.3: Side view of the River Cleaning Machine

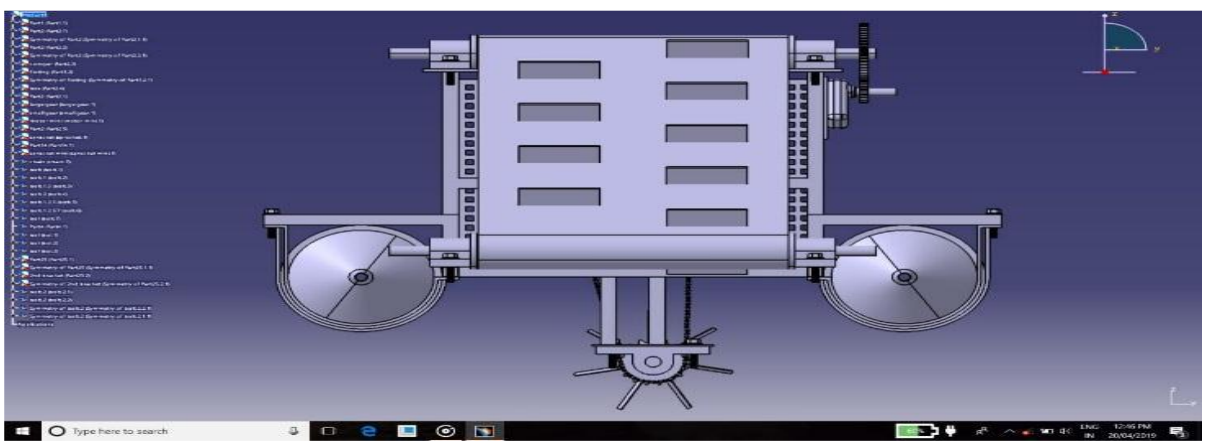

Fig-4.5: Back view of River Cleaning Machine

5.

APPLICATIONS

1. Pollutant level in water bodies is reduced.
2. Decrease the risk for aquatic life from the pollution.
3. Can also be helpful to collect organic waste from water bodies' impurities like dead aquatic animals etc.
4. The work of cleaning swimming pool or fountains is reduced as it can be done through remote control now.

6.

Problem Description

Biggest drawback of our waste management is dumping of waste and garbage in the water bodies. Though there are shortage of dumping grounds which leads to such steps. But dumping garbage in water bodies hinders and endangers aquatic life which also disturbs the ecological system and have harmful effects on environment.

Less human intervention: - The main idea of this project is to eliminate the user intervention. Which can be achieved by bring technology in use in the working site. Eliminating man space from the boat will accommodate more space for waste collection.

Easy dumping of waste: Another important thing is easy removal of debris which are collected in the container.

It must be steady: Calculation and proper design is required to achieve a stable product. It should be able to resist load and forces exerted on it as there would be waves of water and weight of the waste while collecting them.

Safety for the user: The product should safe and adjusted to the convenience of user.

Environmental friendly: Aquatic life should not be disturbed. Eco friendly product are helpful for betterment of the environment.

7.

7.1- Future Scope

Now day by day world is facing biggest problem of floating waste in the lakes and rivers and it is increasing at very high amount so it is very difficult to clean all this floating waste because of more requirement of manpower. So, to overcome this problem our water cleaning machine has more scope to remove the waste automatically as fast as possible. By making some more modifications in size and capacity this water cleaning machine cleaning can be used for removing waste from large lakes and rivers.

7.2 Conclusion

Cleaning of water bodies is always been a huge problem. Due to which the aquatic life of animals is destroying. So, to maintain a good balance between the aquatic life, this automatic water cleaning machine is introduced. This machine is easy in operations and its manufacturing cost is also low. Hence this water cleaning machine is very useful. Water cleaning machine is designed to make system very much economical and helpful to remove water impurities like plastic, trashes and other day to day waste which is floating on the surface

of water bodies. This machine provides a new life to the aquatic animals and it also helps in human living.

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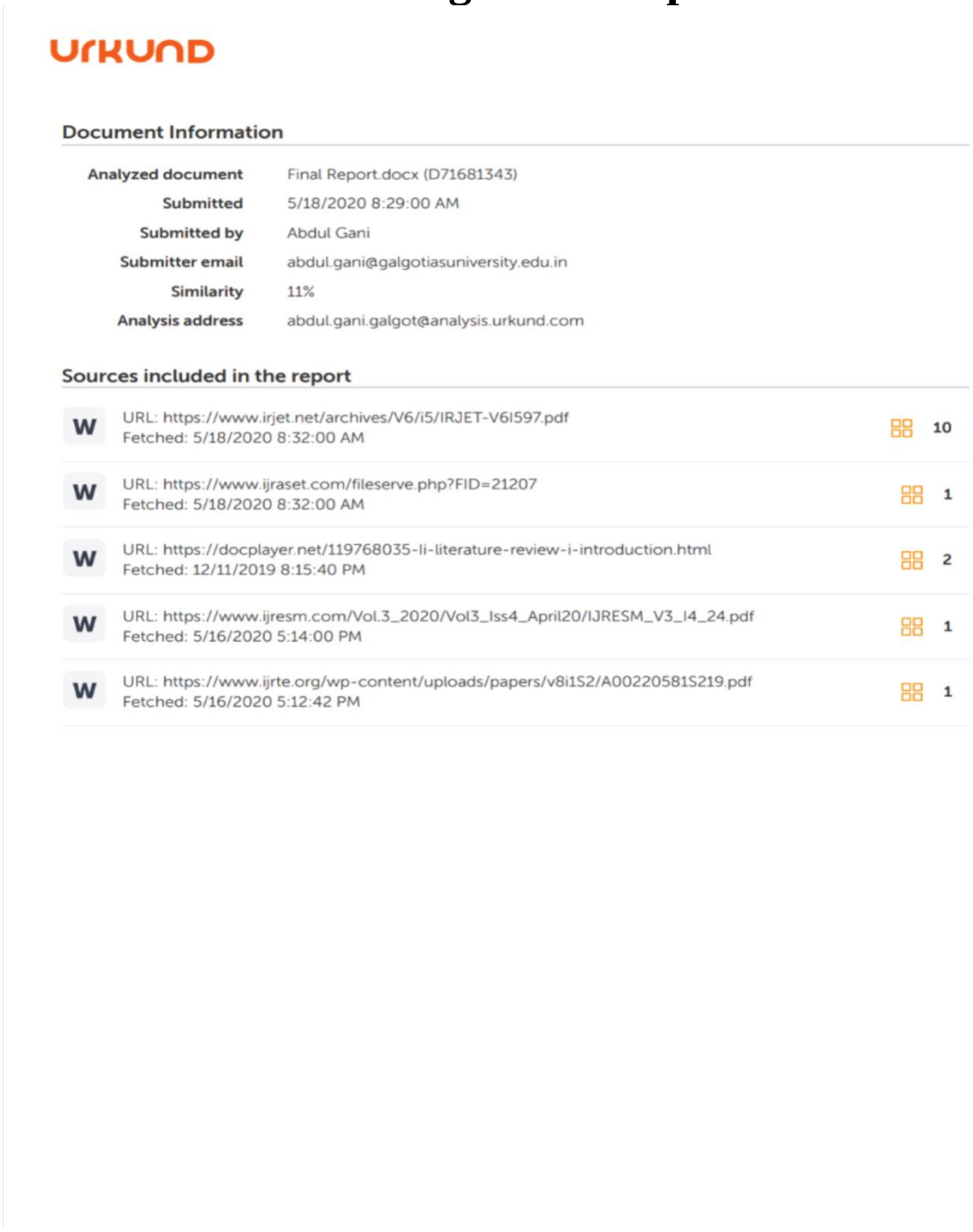

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