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Automation in Canal Irrigation Using Machine Learning

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ABSTRACT: There have been numerous improvements made to the irrigation industry as a result of technological innovation. Safe and simple irrigation development applications are growing every day. In India, a large number of irrigation projects were built after independence at a cost of enormous resources. Irrigation potential created (IPC) and irrigation potential used, however, differ (IPU). This study describes a problem in the canal irrigation system (CIS); thoroughly. The issues surrounding CIS have never been the centre of attention. The system designed to solve these problems is described in this report. It has all the system characteristics that would make it easier for beneficiaries to use their amenities. This research makes the case that the implementation of a system can address several CIS-related issues.

KEYWORDS- Machine Learning, Canal, Data analysis, Image Processing.

I. INTRODUCTION

A canal is a man-made channel built to carry water to irrigated areas.The water is drawn from reservoirs, tanks, or rivers. Concrete, stone, brick, or any other flexible membrane that addresses durability issues like seepage and erosion can be used to build the canals.

The general layout of a canal distribution system is depicted in the image below, which also displays the many canal networks that make up a canal irrigation system. Any irrigation plan, whether it be for direct irrigation using a weir or for barrage and storage irrigation using dams or reservoirs, requires a network of irrigation canals with varying capacities and diameters. As a result, the canal system consists of:

1. Main Canal
2. Branch Canal
3. Distributaries or major distributaries
4. Minors or minor distributaries
5. Watercourses

The primary goals of putting this system in place are to control water circulation, increase canal water supply iteration, and maintain canals. Additional goals include assisting governments with technical issues, controlling manually caused water losses in the system, and preventing seepage, leakage, overtopping, and canal erosion.

In this project we are going to develop an application, wherein the beneficiaries who have opted for the usage of canal water can do the bill payments regarding the same and can also register a complaint if they find out that the water is illegally being used by the people who have not opted for the same. Our application will be designed in such a way that it will be easy for local farmers to use.They must register by providing all the necessary information.They can register this complaint through our application by uploading the geo-tagged images, which are then checked by the administration, and they can take necessary action against people who use water illegally.

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Further, when water is released from any dam, all the canal villages are informed about it ie. time and amount of water with this application.They can then predict the time when water will reach their villages. And if the water doesn't reach, they can register the complaint regarding the same on our online website.

II. RELATED WORK

Canal irrigation is a widely used source of water for irrigation. Water management of irrigation canals is therefore a decisive factor in the general development of irrigation. In the traditional method, water is supplied in a circular manner by water users (farmers) as needed. The traditional system has many weaknesses, including forecasting and actual flow or discharge. Errors can occur in flow measurement and water content in reservoirs, and the traditional system does not take into account the imbalances caused by man and nature. Therefore, heavy users suffer from water retention or lack of water. Canal automation plays an important role in irrigation to ensure efficient delivery and avoid imbalances.

Most researchers have worked on delivery and flow control. Mahesh Nandania discussed some of the practical issues in using ports. The system controls the channel port with PLC (Programmable Logic Controller) and VFD (Variable Frequency Drive) systems and monitors with a Supervisory Control and Data Acquisition (SCADA) system. Mandavia discussed the management structure of India, the methods used for water distribution, the need for an ERP system, the upgrading of the canal automation system, and the state of affairs.Magad et al. mentioned that the system was implemented on the Grand Canal of the Nile in Egypt using an Allen Bradley PLC. This included remote monitoring and control at all locations through a central control panel. Bautista et al. mentioned that the Salt River Project's canal automat system was based on demand and service. The main strategy of this system was to keep the water levels close to the target levels. Most of the gates were manually operated, but some were automated. Planned changes are efficiently handled by a combination of feedforward and feedback control logic. Ding et al. used a combination of PID (Proportional Integral Derivative) controller with fuzzy control for channel automation. the automatic channel function is performed by Deshmukh et al. by programming. using Crouzet PLC. Manuel Rijo developed two local PI (Proportional Integral) automatic modes namely upstream and downstream using PLC. Donia proposed a computerized control system for fresh water and wastewater that can be used to successfully monitor and control flow.

In this paper we have proposed a system for solving the problem related to leakages in the canal system. Machine learning, a subset of Artificial Intelligence, is used for training the model to identify and classify the geo-tagged pictures that will be uploaded by the beneficiaries.In this project we are going to develop an application, wherein the beneficiaries who have opted for the usage of canal water can do the bill payments regarding the same and can also register a complaint if they find out that the water is illegally being used by the people who have not opted for the same. Our application will be designed in such a way that it will be easy for local farmers to use. They have to register by filling all the required details.By submitting geotagged photographs, they may file a complaint using our programme, which will then be confirmed by the administration, who will then be able to take the appropriate action against those who are using water unlawfully.

III. PROPOSED ALGORITHM

We are making significant progress through this effort to reduce water waste because it is one of the non-renewable resources on Earth. By allowing the majority of farmers to use the Canal Irrigation System in a sophisticated way, we hope to lessen the challenges that these farmers face. This problem hasn't gotten much notice yet. minimising issues to maximise the advantages of canal irrigation.

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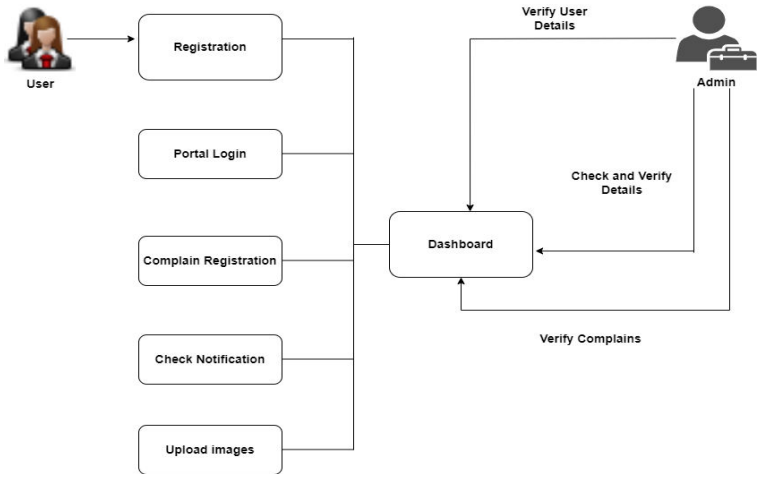
Figure 1 - System Architecture



Advantages

- Predict the losses through the walls of canals via machine learning.
- Automate this process of Canal Irrigation System
- To increase accuracy and efficiency of the project using appropriate algorithm for machine learning.
- To check whether all the beneficiaries along the canal are getting benefitted.
- To commercialise the project by creating an application for the same and handing over the administration to the Government.

IV. RESULTS AND OUTPUTS

Figure 2 – Home Page

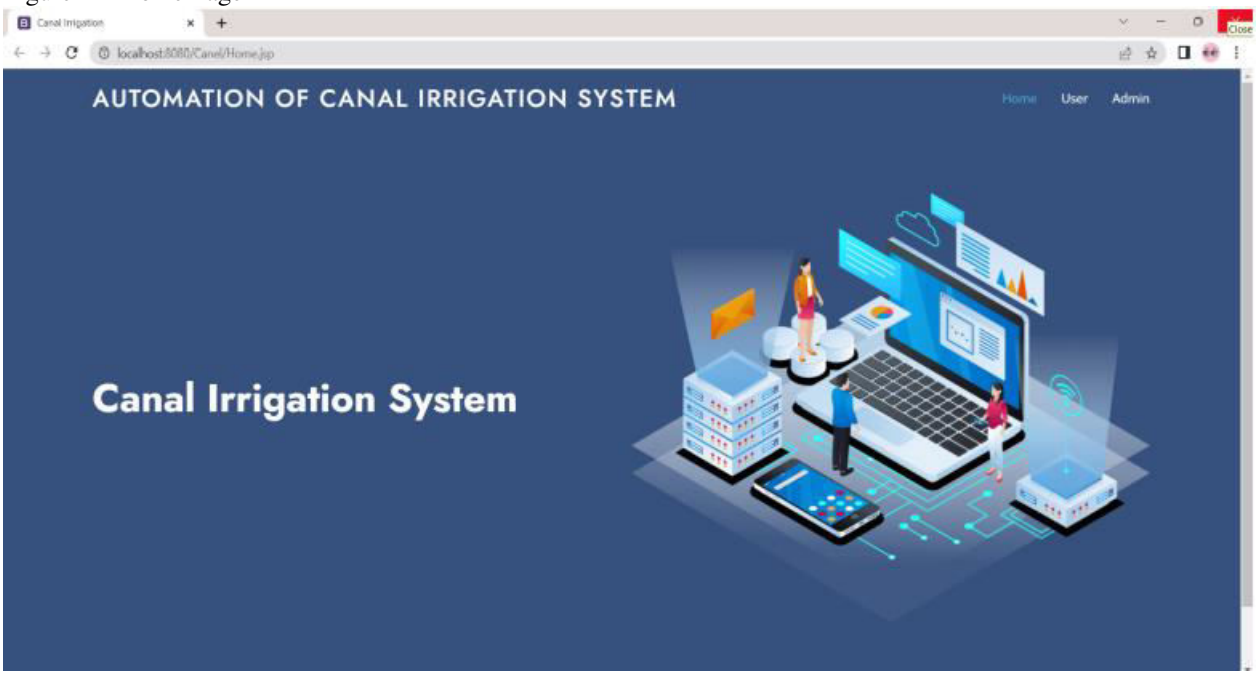


Figure 3 – User Login

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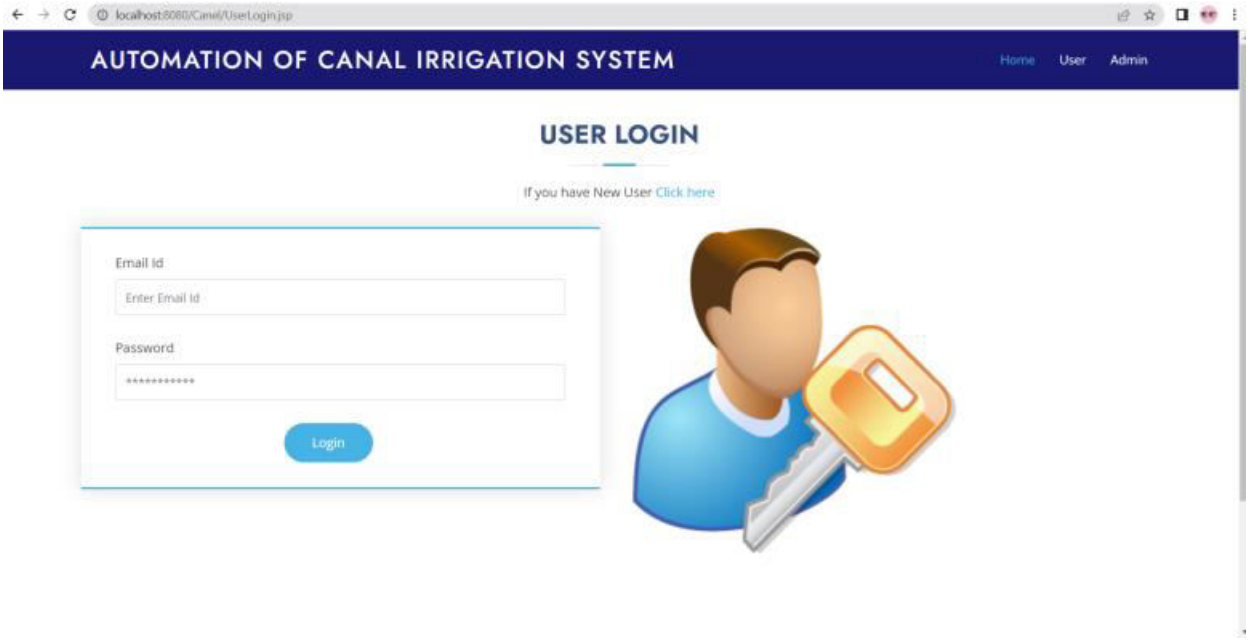

Figure 4 – User Registration

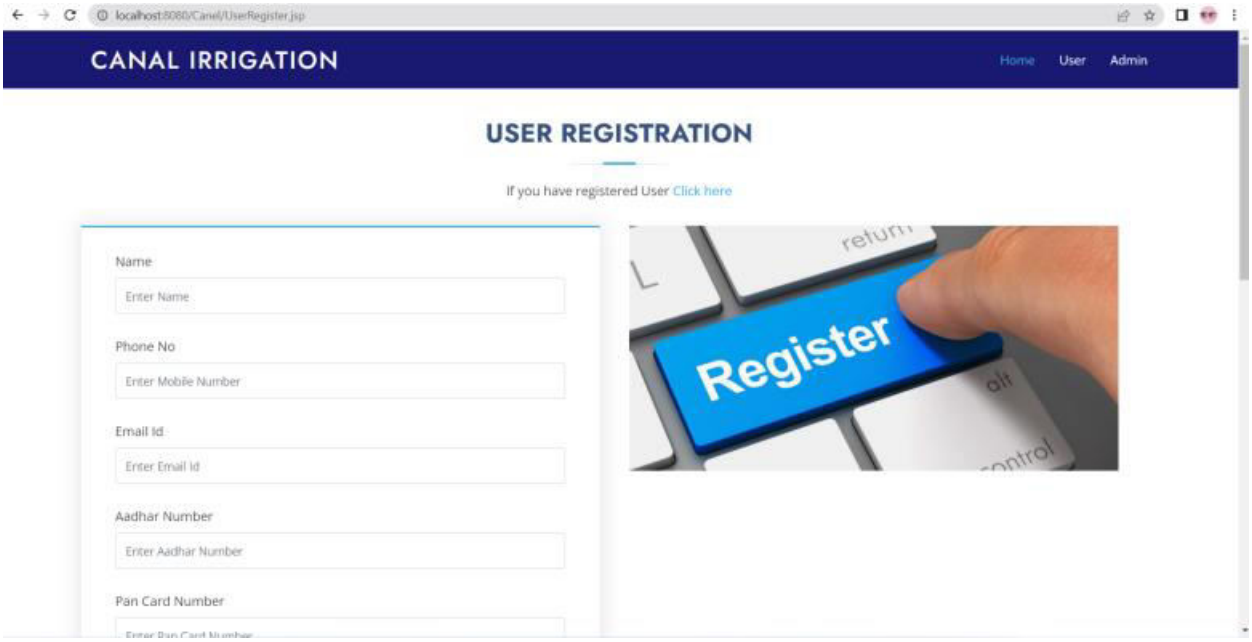

Figure 5 Complaint Registration

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Figure 6 – Admin Login

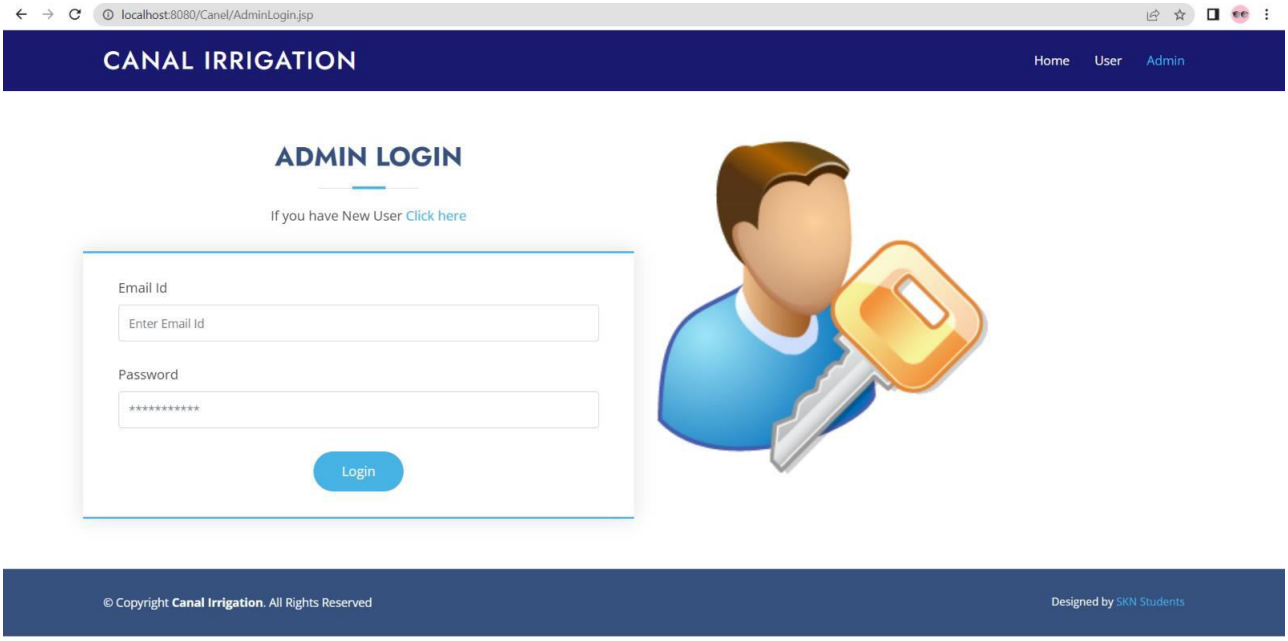

Figure 7 – Admin Registration

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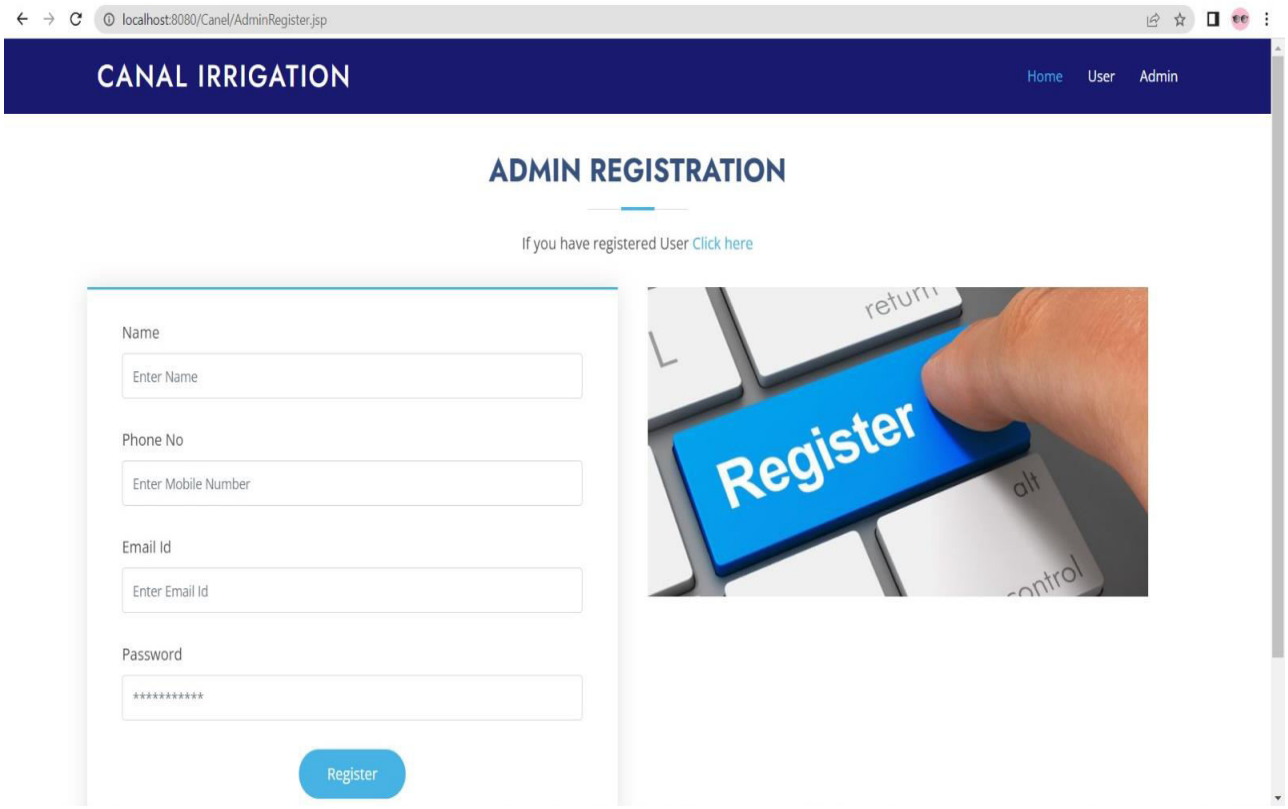
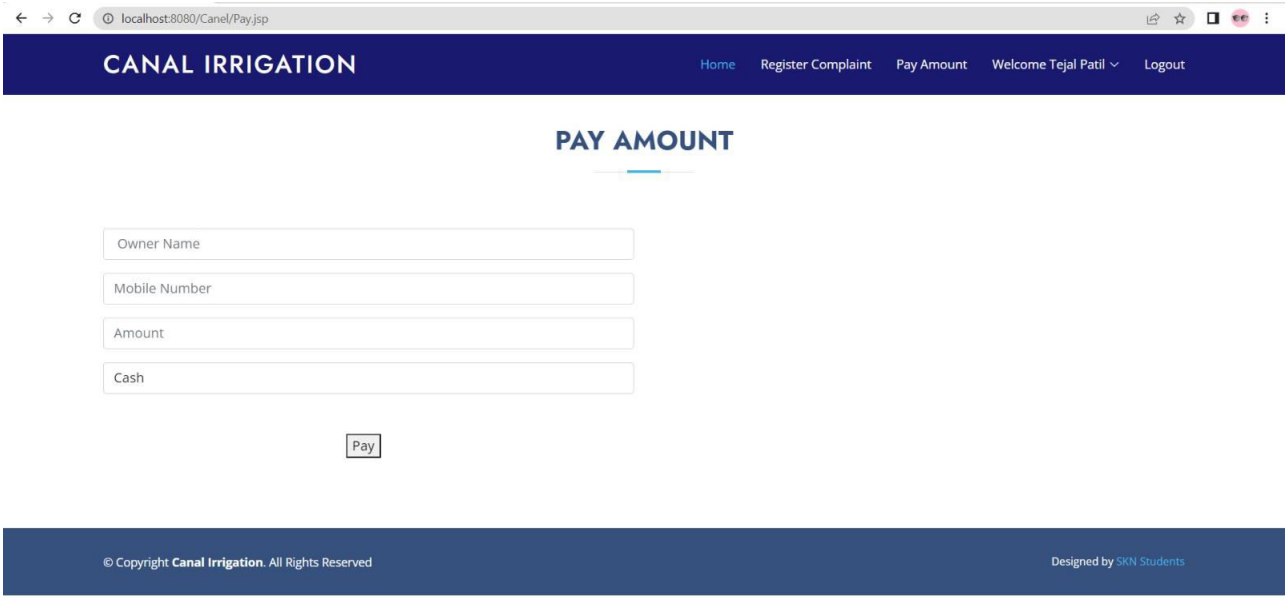


Figure 8 – Payment gateway



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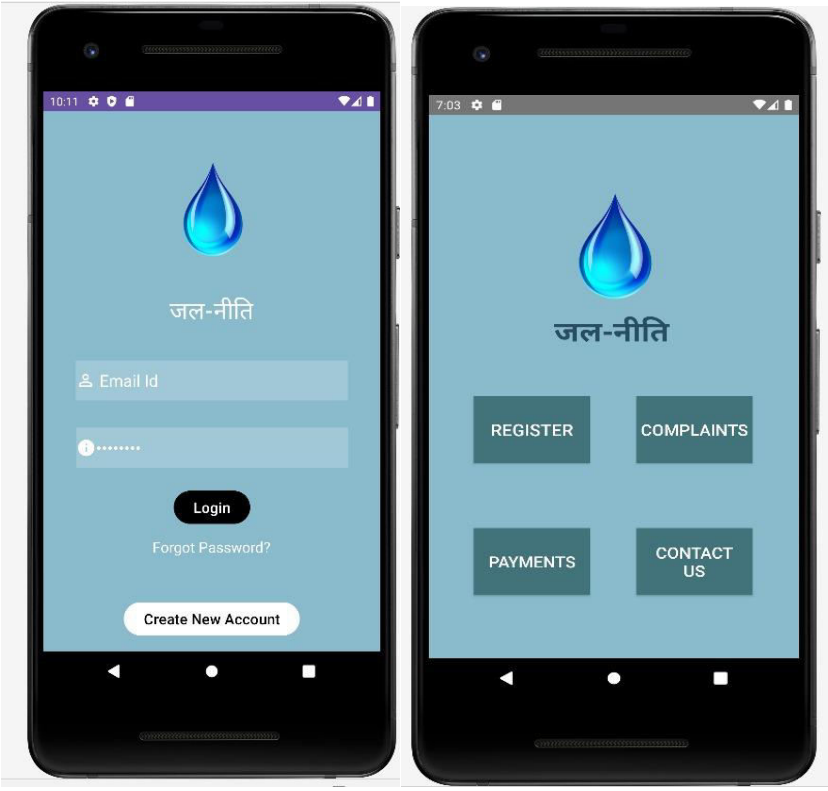

Figure 9- Screenshots of Application.

V. CONCLUSION AND FUTURE WORK

Through this application we aim to overcome the problems, we aim to develop an application which is beneficial for both the farmers and the Government authorities of water irrigation.
The main features of the system are as follows:

1. Administration System.
2. System for beneficiaries.
3. Online payment system.
4. Water release notification for every benefit.
5. Geotagged photos for registering complaints.
6. Direct contact of landowners with higher authorities..

This application can be enhanced and integrated in the future. The system is based on the previous training data but in the future, it is possible to make changes to software, which can accept new testing data and should also take part in training data. Also in the future we may be involved in creating a Mac application. In the future if it is observed that the application is working properly for our region, we can also help the Government of Maharashtra and Government of India to use this app and design it in a big way. This will help us solve the water scarcity problems in India.

REFERENCES

1. Automation in Canal Irrigation System, International Journal of Innovative Science and Research Technology ISSN No: -2456 –2165, Volume 3, Issue 2, February – 2020.
2. Mahesh Nandania, “A Review Paper of Automatic Canal Gate Control of 3-Phase Induction Motor with PLC and VFD, Powered by Solar System and Monitoring by SCADA,” International Journal of Emerging Trends in Electrical and Electronic, Vol. 1, Issue. 1, March - 2013.
3. Anil B. Mandavia, “Modernization of irrigation system operational management by way of canal automation in India,” Chief Engineer, Management Information System Sardar Saroar Narmada Nigam Limited, Gujrath, India.

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4. V. Rajendran, J. Shilpa, S. Veeravalavan, and M. Anbarasan, "Dam Automation Using Arduino" International Journal of Innovation and Scientific Research ISSN 23518014 Vol. 30 No. 3 May 2017, Pp. 364-369.
5. Prof. Mrs. S.K. Bhatia, Navale Ravindra, Gawade Ashwini, Shisode Raghuvansh, "Automatic Dam Gate Control System Using Raspberry Pi" International Engineering Research Journal (IERJ) Volume 2 Issue 1 Page 389-391, 30th March 2016, ISSN2395-1621.
6. Rajat R. Sorte, Rahul R. Sonwane, Nikhil L. Thakur, Swapnil A. Akhade, Shashwat N. Kawale, Nikhil R. Dusawar, Kapil K. Lalwani" PLC based Dam Automation System" International Journal of Engineering Research in Electronics and Communication Engineering (IJERECE)Vol 2, Issue 3, Mar2015.
7. Alejandra et al (2013) "Automated Irrigation System Using a Wireless Sensor Network and GPRS Module".
8. Miguel Ayala Botto (2013) "SCADA System with Predictive Controller Applied to Irrigation Canals", Journal of procedia environmental sciences, pp 870-886.
9. Ravazzani G (2013) "Real Time Drought Forecasting System for Irrigation Management", Journal of procedia environmental sciences, pp 776-784.
10. Syed Muhammad Umar Talha, Syed SherazMohani, Syed Hassan Ahmed and Mansoor Ebrahim "Design for an Irrigation and Monitoring System of an Automated Dam" Proceedings of the International Multiconference of Engineers and Computer Scientists Vol II, IMECS March14 -16, 2012
11. Mahesh Nandaniya "A Review Paper of Automatic Canal Gate Control of 3-ø Induction Motor with PLC and VFD, Powered by Solar System and Monitoring by SCADA" International Journal of Emerging Trends in Electrical and Electronics (IJETEE) Vol. 1, Issue. 1, March 2013.

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