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Silk Assure: Cocoon Quality Assessment and Subsidy Production Tool

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ABSTRACT: The sericulture industry plays a pivotal role in many economies worldwide, providing livelihoods for millions of farmers and contributing significantly to the textile sector. In this context, the development of technology-driven solutions can enhance cocoon quality assessment, streamline subsidy management, and improve overall productivity and profitability in sericulture. This project aims to design and implement a web-based application for cocoon quality prediction and subsidy management in the sericulture sector. The system facilitates data collection, analysis, and decision-making processes, benefiting farmers, administrators, and other stakeholders involved in the sericulture value chain. Key features of the proposed system include user-friendly interfaces for farmer registration, cocoon quality assessment, subsidy application, and administrative management. Through image processing algorithms and data analytics techniques, the system accurately predicts cocoon quality based on parameters such as dimensions, color, and texture. Farmers can easily upload cocoon images and input relevant information, while administrators can efficiently review and process subsidy applications. The project also emphasizes user training and support, ensuring that farmers and administrators can effectively utilize the system to maximize its benefits. Integration with external systems, such as government databases and industry experts' platforms, enhances data exchange and collaboration, fostering a more robust and interconnected sericulture ecosystem. Overall, this project aims to contribute to the sustainable development of the sericulture industry by leveraging technology to improve cocoon quality, increase farmer incomes, and strengthen the sector's competitiveness in the global market.

KEYWORDS: Sericulture, Inpainting, Data collection, Analysis, and Decision-making processes.

I. INTRODUCTION

Sericulture has become the root for social and economic progress of India. Quality of raw material, reeling machinery, reeling process parameters, human skill involved in manual and mechanical operations and quality of water are the major factors that have direct bearing on the productivity and quality of raw silk. Among these, quality of cocoons plays a major role on raw silk yield and productivity. In order to achieve better reeling performance and quality raw silk the role of reeling technology is significant.

The prevalence of silk as a material fiber has been perceived from the prehistoric time. Silkworm is generally nurtured in different geological locales of India. Tasar cocoons are tougher than coverings of other types of sericigenous insects. The silk fiber delivered by the silkworm is a complex material shaped by fibroin protein and bounded by sericin protein. To get the silk thread from cocoons, removal of sericin is an essential step. As an essential to reeling practice, cooking of cocoon needs to be performed. In India, the production of tasar silk continued next to mulberry silk for eras, constituting about 4% of the total production of silk.

The cocoon cooking involves boiling of the cocoon in water that helps in the release of sericin protein and a continuous silk filament that is reeled to get a thick thread of silk. So, it is important to handle each stage of cocoon production in detailed study. Our system makes it easier to process from registering the farmer, information of the cocoon type and providing the subsidy for the good quality and amount of cocoon. Several factors influence the market for Silkworm Cocoon extract. There is a growing consumer preference for natural and organic ingredients in various industries, including cosmetics and skincare. As a natural ingredient, Silkworm Cocoon Extract aligns with this trend and attracts consumers seeking products with fewer synthetic chemicals.

II. RELATED WORK

The silkworms undergo crucial bodily changes that determine the quality as well as quantity of the silk produce, during this phase. Maintenance of optimum values of abiotic factors, like temperature, humidity etc. thus yields a dramatic change in quantity and quality of silk produce. An Intelligent Sericulture plant automation system, using zone-based cascade control of physical parameters can be one of the solutions. The system comprises of a data acquisition sub-system corresponding to the predetermined zones for the rearing unit, an intelligent master controller facility, data repository of past corrective actions, and cheap actuators like fans, bulbs in the zones. The master control facilitates the optimum corrective action and directs the decisions to the identified actuator sub-system based on abiotic data obtained from the respective data acquisition sub-system. Also, the zone-based implementation decreases production and maintenance cost making it suitable for rural usage.

In recent times due to dynamic and vast variations in environmental conditions over the seasons, they have impacted the overall health of silkworms leading to genetic alterations and embryonic developments leading to a reduction in the quality along with the quantity of the silk being produced according to a recent survey. Through our project we have enabled an automated monitoring of temperature, humidity, harmful gases and through image processing we were able to detect worms that are diseased. Later we use an automated medicine sprayer to help the diseased worms become healthy.

III. METHODOLOGY

The new Farmer will be register with their all mandatory details of the silk production with their land and area of the produced silk that details will be recorded accurately in the portal. After registering, the admin will be able to check the quality of the cocoon, depends on its height and width, to check whether it is healthy or unhealthy, good/bad/average. Here, we use the YOLO Algorithm makes easier to detect the objects.

Unhealthy cocoons will be discarded. The range of height and width for the good quality is about greater than 1.23 and 1.06 respectively, for average range lies between 1.2 to 1.23 and 1.03 to 1.06 respectively, for bad range is below the 1.2 and 1.03 respectively. Eligible farmers will be given a subsidy for the standardized production of cocoons fixed by the government.

IV. EXPERIMENTAL RESULTS

They first register the farmer by having all the mandatory details of the sericulture production in the respective field of the farmer.

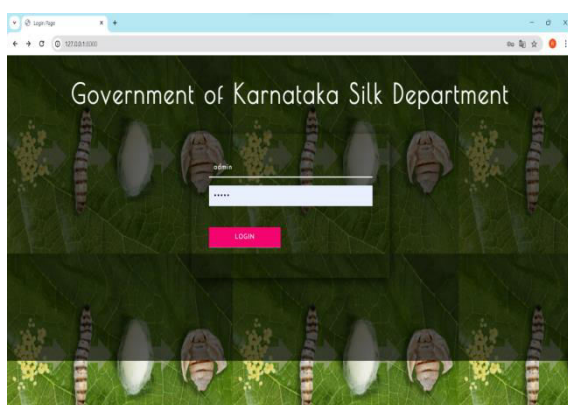


Fig. 1

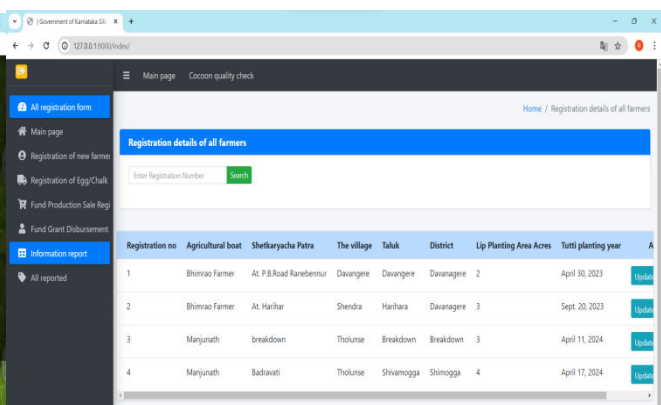


Fig. 2

Fig1 is the main page of Admin Login. This is the start point of the web application. Here the admin is going to login to the web application. Fig2 is the index page, where all the pages and forms are visible.

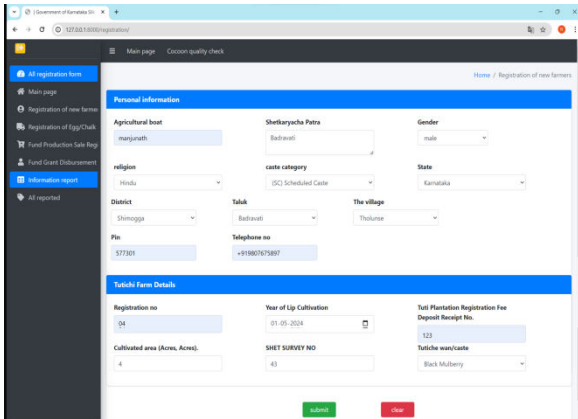


Fig.3

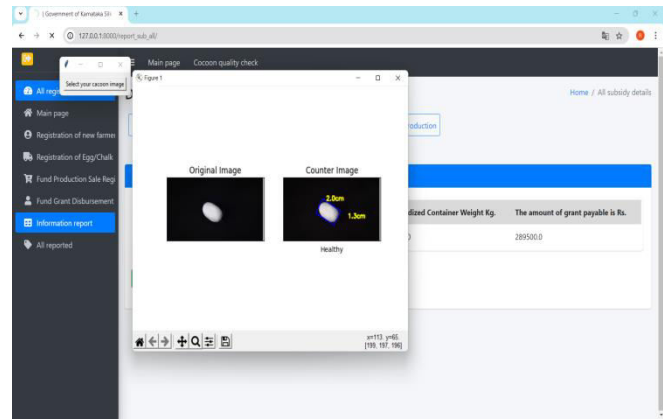


Fig.4

Fig 3. is the farmer registration page. Each farmer can get registered by giving the respective details of land and place of cultivation. Fig 4. is the cocoon quality check page where the uploaded image, it will generate a new image by calculating the width and height of the image, to check whether it is healthy or unhealthy, good/bad/average.

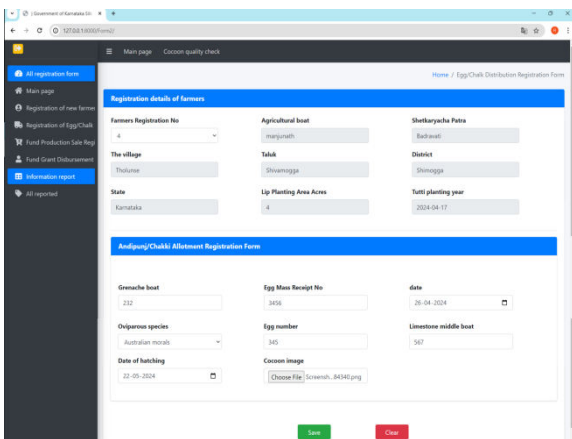


Fig. 5

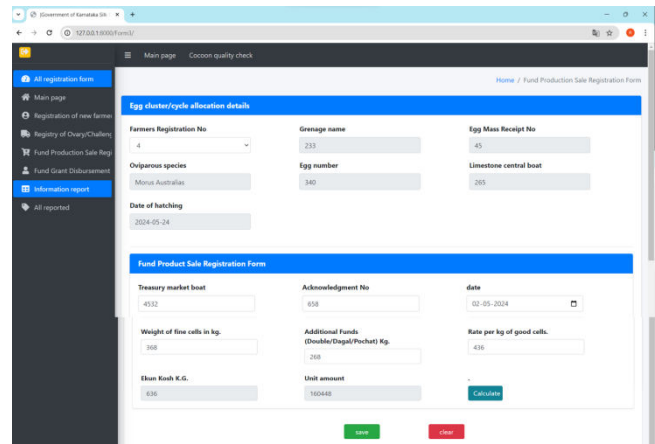


Fig.6

Fig5 :Egg Distribution And Land Details This is the egg distribution and land details on how much area the cocoon will be cultivated of the respective farmer. Fig .6:Production Sales Details the sales market price for the fixed amount of cocoon is decided, it will be added to the respective farmer according to the receipt number

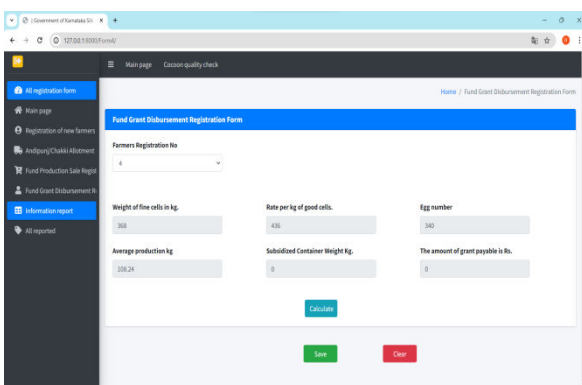


Fig. 7

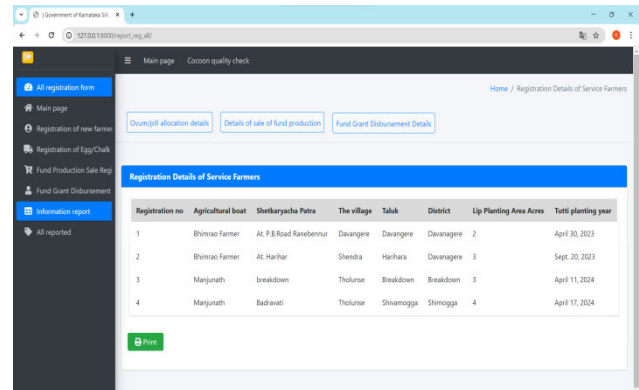


Fig. 8

Fig7: Subsidy Details Fig Here, only eligible farmers will be given a subsidy for the standardized production of cocoons fixed by the government. Fig8:Farmer Registered Details is the print view pages of all the registered details of farmers.

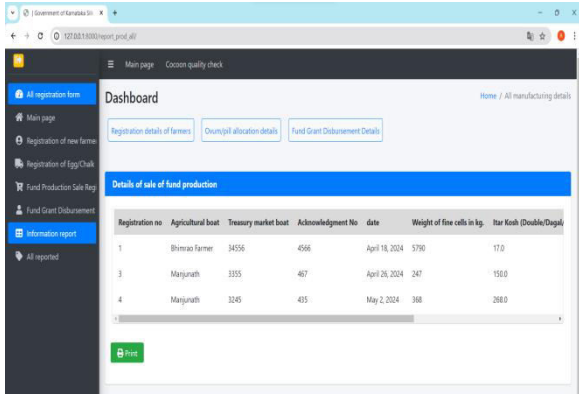


Fig. 9

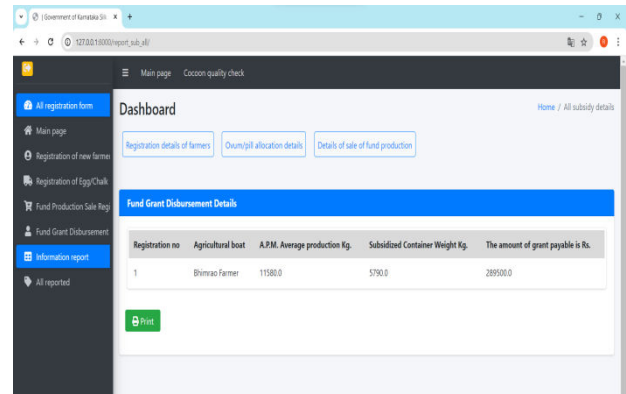


Fig 10

Fig 9:Production Sales Details print preview details of subsidy that farmer can avail based on the farmers cultivation. Fig 10 Subsidy Details Print preview details of subsidy that farmer can avail based on the farmers cultivation.

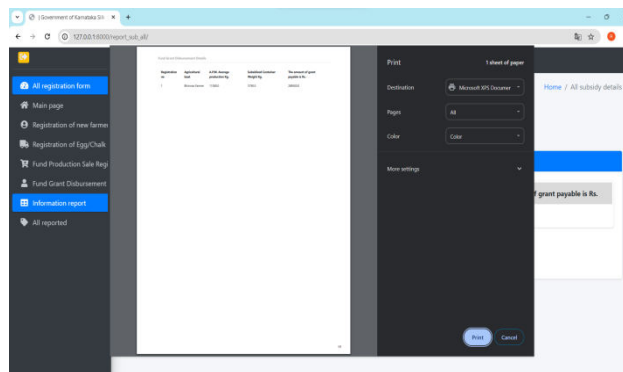


Fig. 11

Fig 11: Print this is the example figure of printing a page. Here we are printing the subsidy details that are provided for the particular farmer.

V. CONCLUSION

It's important to note that while these visual cues from the cocoon can provide some indications of silk quality, they are not definitive. The ultimate test for silk quality involves the processing and evaluation of the silk threads and the resulting fabric. This machine learning model predicts the quality of the cocoon based on the right factors to get the high quality and high yield silk. This approach could help maintain consistent quality in silk production and reduce waste associated with the traditional grading method.

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