

AgriConnect – A Smart Marketplace Platform for Direct Farm-to-Consumer Trade

Pranav Yaligouda

MCA Final Year,
The Oxford College of Engineering,
Bommanahalli,
Bengaluru- 560068
pranavyaligouda7@gmail.com

Ashok B P

Associate Professor
Dept. of MCA
The Oxford College of Engineering,
Bommanahalli, Bengaluru- 560068
ashokbpmca82@theoxford.edu

ABSTRACT

In the world where virtually every activity of daily life is being transformed by digital technology, the agricultural cycle is still depended on long-standing, traditional practices-making farmers, vendors and consumers disconnected and adding more efforts. AgriConnect is a marketplace platform that connects farmer, vendor and consumers together in one place where farmers can register and list their produces like vegetables, fruits, grains, oilseeds or spices with details which include, harvested date, produced quantity, price, available quantity, minimum quantity to request, photos of product and location with state and district. Vendors and consumers can filter the products uploaded by farmer based on the state or district, category and can view what produces are near to them and can then make a contact request for the required product using the Contact-Request feature of the AgriConnect, vendors have a limit i.e. five

requests per day and the users have a limit of 3 requests per day. The contact requests made are quickly notified for the requests created and sent and when the requested farmer accepts the contact request that the farmer received for the particular product, both parties get each other's contact and location details to arrange a quick local trade for the product. After the sale both requester and accepted farmer confirm the trade with the quantity and price of trade and the trade is stored in database with complete details of both contact requester and the request receiver if they both confirms with same quantity and price of the trade. AgriConnect is a PWA Progressive Web Application that enables multiple local languages and user-friendly mobiles and desktop devices with supporting all the screen sizes with advanced UI UX.

Keywords: *Digital marketplace, farmer-to-consumer, farm-to-table, local produce, contact request, multilingual UI.*

INTRODUCTION

AgriConnect is latest digital marketplace that is developed to support and advance the existing agricultural cycle by bridging the gap and bringing together the three stakeholders that are the farmers, vendors, and the end user customers of the agricultural chain by eliminating the gap between the farmers, vendors, and customers with empowering with the digitalized marketplace of the AgriConnect.

The platform enables users to register and join as a farmer, vendor or user where each role users are connected through a marketplace, where the farmers upload their produce like vegetables, fruits, oilseeds, grains, pulses and spices which are referred as product in the AgriConnect marketplace where each product is uploaded by farmers with the details, that include the product's harvested date, quantity they have, location of the product, price per quantity, minimum request quantity and the available quantity. The uploaded products are available to browse with the filtering based on the location which allows the users and vendors to perfectly locate nearby available products and make a request for a particular required product where user role can send 3 and vendors 5 requests per day, each request is sent with the required quantity for the

product's farmer and notified to the farmer with the requested users or vendors name, location details and the requested quantity with accept and reject options available for farmer which after accepted by farmer the farmer's location and contact number of farmer is sent to the requested user or vendor who requested for the product, then with the received contact information the contact conversation happens between the requester and the accepted farmer through direct voice call for the trade conversation, after conversation a requester may buy the product with the direct trade as the both users have the location of each other which will be nearby for easy transport as the product by the user is filtered with the required location and both a request or a farmer on their convenience handle the product transport and the trade completes after each contact request accepted previously the trade will be prompted for the both requester user or vendor and the received farmer with the did you buy option with yes and no which on yes click opens the trade verification for both users to provide with traded quantity and price, the added inputs from both users are verified and the data of trade is stored with the details of the requester and the farmer.

EXISTING WORK

Across today's farm-to-market cycle, farmers, middlemen, and consumers are spread out across a messy network of old-school channels. Local farmers are mostly depended on the nearby local markets or mandis or brokers to sell their produces that makes difficult for selling produces they have grown and harvested. For many times, it is needed for them to loading up the produces they grown on trucks or vehicles to carry and driving long routes for the products delivery. This charges them extra costs or expenses. Both vendors and buyers have a hard work to do, they also need to travel to many places to see what's there and the prices available for the products, without a clear way to know within the time. A lot of the trades still happen on phone call or face-to-face, which slows the process of trade, loses opportunities, and most of the prices don't match what people want. Finding best price is not easy and different languages, units, and local regions makes trading of produces difficult. The end result is a messy system that makes the farmer's earning's low and makes buyers to spend more time and money to get fresh produces. Many farmers still go to local markets/mandis or contact traders to meet buyers. This makes them to invest more time for the selling of their products.

PROPOSED SYSTEM

AgriConnect makes everything simple by giving a simple, all-in-one-progressive web app that bridges all three users, farmers, vendors, and consumers together. After a farmer is registered, they can add their produces, like vegetables, fruits, grains, seeds, or spices. They also add harvested date, how much quantity they have, the price of the produce with unit they want to sell, the least trade quantity, photos of products, and the exact state and district they're at. Vendors and consumer users filter by location for the product by district or state wise, category, and with the support of multiple languages UI, and then submit contact requests for the required products' farmer, the contact request allows up to three requests per day for user role users and five for vendor role users. When a farmer accepts a request, both requester consumer/vendor and the receiver farmer instantly receive each other's contact details and locations with push notification in real-time, enabling a quick, local transaction without intermediates. After the sale, AgriConnect prompts both sides to confirm the traded quantity and final brought price, with automatically saving the completed trade details in the database.

METHODOLOGY

AgriConnect kicks off with a smart choice of tech and a detailed plan for its setup, all to create a fast, steady market for farmers. At the user end, React and TypeScript make the simple base for its look. React's component-driven model makes it straightforward to assemble reusable elements—such as listing forms, product galleries, and interactive sales charts—while TypeScript's static typing catches errors during development, reducing runtime surprises. Styling is handled by a utility-first CSS framework paired with a mature component library, ensuring that each screen—from the product-upload form to the transaction confirmation page—maintains a consistent, accessible appearance without extensive custom CSS work.

State management depends on a unidirectional dataflow enhanced by Redux, which centralizes application state in the factors such as user profiles, product inventories, live notification into a single source of truth for better data usage and access. This approach guarantees that the parts of the interface stay interconnected with each other when a new contact request arrives, the farmer's contact request section in profile page updates instantly; when a request is

accepted, the buyer's request list reflects the change without any requirement for manual refresh. A clean map guide allows the path routes, making it simple for to going right to pages required such as the marketplace, product details, dashboard and profile.

A RESTful API is built with Express on Node.js exposes all of the AgriConnect project's core operations' endpoints. Endpoints are created for registering and authenticating users, managing product listings, submitting and responding to contact requests, and formally confirming completed trades. Passwords are salted and are perfectly hashed with the usage of bcrypt, while JWTs (JSON Web Tokens) provide a safe, secure method of maintaining user sessions to be authenticated. The main collections present in the database i.e. the user, products, contactrequests, notifications, action logs and other. A geospatial index on product locations enables the location filtering with nearby location feature, so that buyers always see the freshest listings closest to them. Meanwhile, a compound index on request documents (user ID plus creation date) enforces daily request limits—three per customer, five per vendor—without any additional logic at query time.

EXPERIMENTAL RESULTS

One of the strengths summary of the AgriConnect's backend is its exceptionally thorough test coverage. Every critical code path—ranging from straightforward success scenarios to edge-case failures—has been put through its paces. This includes not only the —happy-path operations, such as creating and fetching products or handling standard user workflows, but also all of the possible validation errors, authorization checks, and unexpected runtime exceptions. By operations, tasks and the logics for the test cases were in detail depth created with the complete required matching to the backend and frontend with the required exact tests to be implemented and tested for the outmost and the robust working of all the functionalities to be intact.

Each and every endpoints that are being implemented on the server side or the backend side with the perfect required match with the frontend to support at its' best with optimal performance of the all the request and the response times for the accurate endpoints with the perfect match data and information required with the perfect type of the data to be sent and received or updated accordingly without any malfunctioning in the projects working and the functionalities for the all the API calls and responses to be perfect and each

and every endpoints to be rate limited for the prohibition of the abuse or the dos attacks and other malpractices done or tried to be executed for the bad intentions to be controlled and managed gracefully with perfection without any disturbance to the project functionalities with the securing of the users and the data to be safe and private with perfect user management..



Fig 1. Home Page

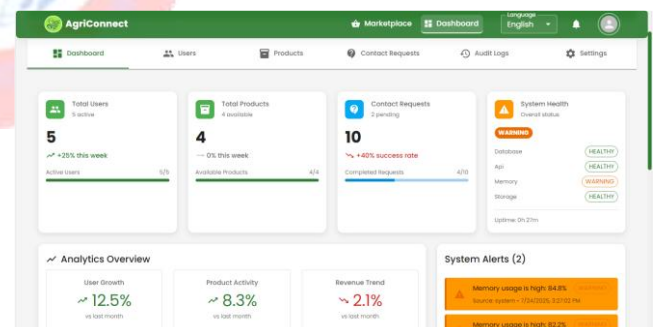


Fig 2 . Admin Dashboard

CONCLUSION

AgriConnect represents a meaningful leap forward for India's agricultural landscape, uniting farmers, vendors, and consumers on a single, intuitive platform. By the usage and the implementations of the modern advanced technologies the project is built for the perfect agricultural trades to be performed without any complications and reducing the efforts for the agricultural trades with in order to be more convenient and accessible by all the users and to be helped them with their required usage requirements of the AgriConnect project which helps in ease of the agricultural trade lifecycle with advancing the technologies and effectively using the functionalities that helps provide more convenient and consistent growth and sustainable agricultural marketplace with the usage of the advanced tech and services with engaging user interface and design which allows the trades to be implemented easily with ease to access the agricultural platform with the perfect and accurate data and information related to the produces with the location which makes it convenient for trades. From the technical side view of project the implementations are robust, consistent, accurate, and secure.

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