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A Systematic Approach to Accurately Measure Various Taxes Imposed on Individuals: Tax Net

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ABSTRACT: In today's tax management environment, it is crucial to precisely calculate the different taxes applied to individuals. The introduction of digital technologies has facilitated the development of novel methods to tackle this issue. This paper introduces Tax net, a structured method formulated to accurately assess taxes imposed on individuals, covering various types such as income tax, property tax, capital gains tax, and sales tax. By utilizing advanced technologies and techniques, Tax net provides a detailed solution that guarantees accuracy, efficiency, and adherence to regulatory standards.

KEYWORDS : Real-time updates, tracking technologies, multi- carrier support, mail analytics, integration, efficiency, data protection, and security.

I. INTRODUCTION

Tax Net is a cutting-edge system designed to streamline the calculation of Goods and Services Tax (GST) for both sales and purchases across various business sectors. As tax regulations continue to evolve and become more complex, the need for an automated and efficient method to handle tax calculations becomes crucial for businesses of all sizes. Tax Net rises to this challenge by offering a solution that not only performs monthly and yearly GST calculations but also maintains an accurate, real- time database of all sales and purchase tax data in MongoDB. Developed using contemporary web technologies, Tax Net employs ReactJS and Next JS for its frontend development. This choice ensures that the system is not only responsive and fast but also capable as a Progressive Web App (PWA). This feature allows users to download the application directly onto mobile or desktop devices, providing flexibility and ease of access which is paramount in today's fast-paced business environments. The backend of Tax Net is powered by Node.js, a choice that guarantees scalability and efficient data handling, crucial for processing large volumes of financial data. Express.js is used to manage API requests, ensuring that the system can handle numerous transactions simultaneously without any decline in performance. Furthermore, MongoDB is utilized as the database solution, renowned for its high performance, reliability, and flexibility in handling large datasets and complex queries. This NoSQL database is integral to Taxnet's ability to provide real- time data updates and retrieval, enabling businesses to make informed decisions quickly.

Tax Net comprehensive approach not only simplifies the GST calculation process but also ensures compliance with tax laws, thereby reducing the potential for errors and the risk of non- compliance penalties. It transforms the cumbersome task of tax management into a streamlined process, enabling businesses to focus more on growth and less on administrative burdens.

In essence, Taxnet serves as a vital tool for modern businesses, addressing the critical needs for accuracy, efficiency, and accessibility in tax management. It embodies the integration of advanced technology with practical functionality, making it an indispensable asset for businesses aiming to navigate the complexities of GST compliance with confidence and ease.

II. RELATED WORK

Here is a survey of some related works and their key aspects in the field of online mail tracking services:

A. *Corecon*

It calculates average (ATR) and marginal (MTR) income tax rates from the Cognitive Economics Study (Cogecon). The survey data are seen as perceptions of tax rates, which help adjust for survey inaccuracies when estimating actual rates, and also to identify variations in misunderstandings [1].

B. *APPLICATION ANALYSIS*

It centers on enhancing the informational quality of tax collection and management, while streamlining the related procedures. Utilizing theories from AI intelligent technology and core tax principles, it explores the efficiency of tax management processes. The study demonstrates that AI can significantly refine the complexity of tax management and improve the service responsiveness of tax departments. Moreover, as AI fosters the development of a contemporary financial system, it also confronts numerous challenges [2].

C. *Data Mining*

This presents the first exhaustive review and analysis of tax risk detection methods used globally. It begins by examining the origins and adverse effects of tax risk behaviors, as well as advancements in tax risk detection techniques. The discussion then shifts to data-mining approaches to tax risk detection employed worldwide. These methods are categorized into two main types based on the principles of the algorithms used: relationship-based and non-relationship-based. Fourteen distinct risk detection methods are identified and each is detailed and evaluated extensively.

D. *Big Data*

Introduction of a more effective tax process by analyzing tax data, conducting econometric studies of taxation, and examining clandestine tax evasion, particularly focusing on the disproportionate burden faced by poorer rural taxpayers. Experimental findings support the development of optimal tax collection and management practices, aimed at facilitating faster and more convenient tax payments for taxpayers.

Enhancements in the tax collection and administration system have led to more comprehensive taxpayer information, which is crucial for boosting efficiency in the 21st century and represents a significant advancement in tax administration. Consequently, this study highlights the need for a more extensive application of algorithms within the tax supervision system to decrease the number of tax evaders and increase compliance among active taxpayers [4].

In comparison to the Manual and Digital works, the Systematic Approach to Accurately Measure Various Taxes Imposed on Individuals described in this project offers a more comprehensive and accurate approach. It combines the conventional feature of Proper Measurement with the unique capability of allowing users to measure their taxes properly. This empowers users to measure day to day tax, including the indirect tax, and detailed information such as their total returns, all while respecting user needs. It takes a user-centric approach, offering customization options through its dashboard, making it an all-encompassing solution for both personal and business Taxation tracking needs.

This service stands out due to its focus on user privacy, real-time data, and customization through the dashboard making it an all-encompassing solution for personal and business tax needs. It addresses the limitations of existing services by offering a more comprehensive and secure approach while maintaining a user-centric design.

III. SYSTEM COMPONENTS AND ARCHITECTURE

The online mail-tracking web service continues to provide users with a comprehensive and secure solution for tracking emails and packages.

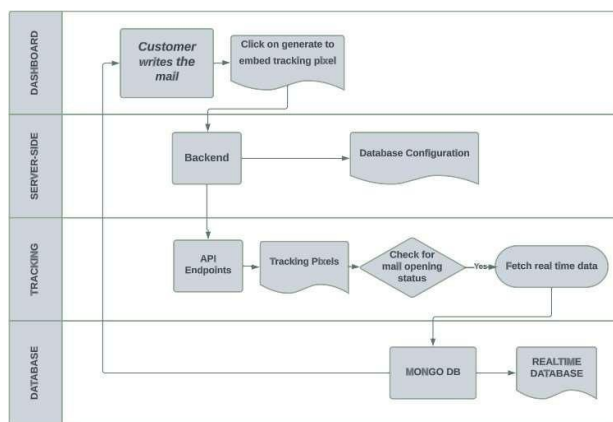


Fig. 1 System Architecture depicting the key components in the development.

The system utilizes a tech stack consisting of Next.js for the frontend and Node.js for the backend, with the central component being MongoDB as the database for storing user data, email tracking information, and tracking pixel records as you can see in Table. 1. The MongoDB database offers the flexibility required to handle structured and unstructured data, making it an ideal choice for a service that collects diverse email tracking information. Users can embed tracking pixels into their emails, enabling real-time data collection on email interactions, recipient details, and open times. This data is processed, stored, and presented to users via the custom dashboard and analytics module shown in Fig. 1. The system maintains a strong focus on user privacy and data security [8] through authentication and encryption measures. Mobile accessibility is also provided through iOS [2] and Android applications, ensuring users can track their emails on the go.

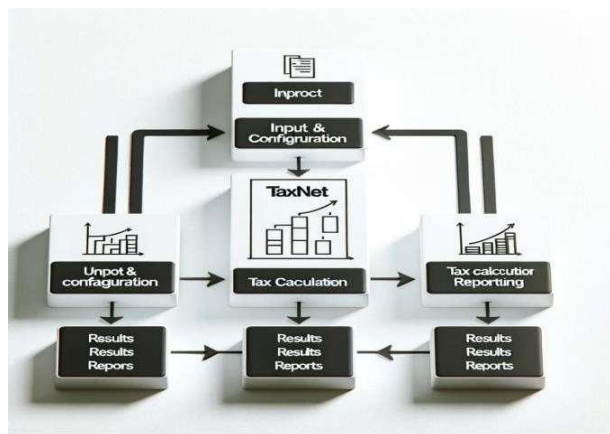


Fig. 2 Data Flow Diagram depicting how data flows at each step.

Fig.2 shows the data flow through The sequence diagram for the enhanced Tax Net system begins with the user logging into the system. Once authenticated, the user accesses the configuration settings to adjust GST parameters according to specific business needs. This setup phase is crucial as it customizes the system's tax calculation engine



Following configuration, the user inputs transaction data, which triggers the backend processing. Here, Tax Net applies the customized GST calculations, ensuring each transaction is processed according to the configured settings. This phase is critical for accuracy and compliance. Once calculations are complete, the system validates the data to ensure all transactions are correct and comply with tax laws. Validated data is then securely stored in MongoDB, ready for retrieval.

Table.1 This table shows the technologies used at the various stages in the development of the Tax Net service.

Areas	Technologies
Frontend	Next.js – For the UI creation
Backend	Node.js Express.js – To handle backend requests.
Database	MongoDB – Realtime database

IV. PROBLEM STATEMENT

The Tax Net system was developed in response to significant challenges faced by businesses in managing and accurately calculating Goods and Services Tax (GST). The complexities of GST legislation require businesses to meticulously track and calculate taxes for sales and purchases, often on both monthly and yearly bases. Historically, this process has been fraught with potential for human error, especially when handled manually. Such errors can lead not only to financial discrepancies but also to issues with compliance, potentially resulting in substantial fines and legal consequences.

Furthermore, the dynamic nature of tax regulations, which may change frequently, compounds these challenges, making it imperative for businesses to maintain flexibility and stay updated with the latest tax laws. This need has become particularly pressing as businesses grow and scale, increasing the volume and complexity of transactions that need to be tracked and analyzed.

V. PROPOSED SYSTEM

Tax Net system, since its launch, has significantly redefined how businesses manage and calculate Goods and Services Tax (GST). As it stands, Tax Net offers a robust solution that not only simplifies GST calculations but also enhances compliance through its integrated, real-time data management system. However, in a landscape where tax regulations and technological advancements continuously evolve, there exists a perpetual need to enhance and expand Tax Net's capabilities to maintain its relevance and efficiency. Moving forward, Tax Net is set to undergo a series of strategic enhancements aimed at cementing its position as a market leader in tax management solutions. The focus will be on developing advanced features that cater to a broader spectrum of business needs while improving user experience and system performance. As businesses grow and diversify, the demand for a system that can adapt to varying tax structures and compliance requirements becomes increasingly crucial. Tax Net plans to address this by introducing more sophisticated customization options that will allow users to modify the system according to specific industry needs and tax regulations. This flexibility is intended to make Tax Net a universally appealing choice for businesses across various sectors. The Tax Net system is poised to redefine how businesses manage and calculate Goods and Services Tax (GST) through its proposed algorithm, which offers a sophisticated approach to handling tax calculations across a variety of sales and purchase transactions. This innovative algorithm has been designed with the needs of modern businesses in mind, particularly those seeking efficiency, accuracy, and compliance in their tax affairs. Central to the Tax Net system's proposed algorithm is a highly adaptive calculation engine that dynamically adjusts to the diverse and often complex tax regulations that can vary by jurisdiction. The algorithm's strength lies in its robust handling of multiple GST scenarios, ensuring that businesses can navigate the complexities of tax laws with ease. This adaptability is crucial for businesses that operate across different regions, each with its own set of tax rules and

regulations. At its core, the Tax Net algorithm integrates seamlessly with the system’s user- friendly interface, where users input their transaction data.

The integration extends to real-time data processing, a feature that significantly enhances the responsiveness of the system. As users enter their data, the algorithm immediately processes GST calculations, providing instant feedback and allowing for corrections on the fly. This real-time processing capability ensures that businesses can maintain continual compliance with tax laws, reducing the risk of errors that could lead to penalties or audits. The algorithm also

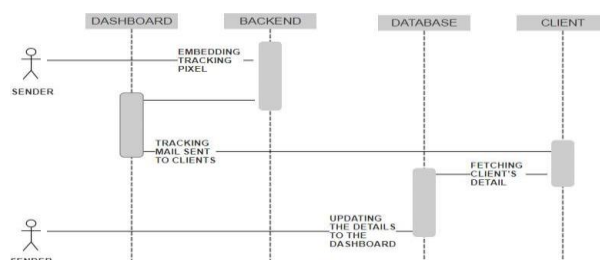


Fig. 3 Sequence diagram depicting the life cycle of the mail tracking system.

incorporates advanced data validation techniques to ensure the accuracy of each transaction entered into the system. By employing sophisticated validation rules, the algorithm checks for common errors in data entry and tax calculations, prompting users to correct any discrepancies before finalizing the transaction. This proactive approach not only saves time but also safeguards businesses against potential compliance issues. Another remarkable aspect of the Tax Net algorithm is its ability to generate detailed reports based on the processed tax data. These reports are invaluable for businesses as they provide insights into tax liabilities, enabling better financial planning and decision-making. The algorithm’s reporting tool draws on historical data to compile comprehensive summaries of GST paid and owed, which can be crucial during financial audits or when strategizing for future tax obligations. Moreover, the algorithm is designed to be scalable, catering to the needs of both small businesses and large corporations. This scalability is reflected in the system's ability to handle a vast amount of transaction data without degradation in performance. Whether a small enterprise or a multinational corporation, users can rely on the Tax Net system to perform consistently under varying loads. Security is another cornerstone of the Tax Net algorithm. With financial data being highly sensitive, the algorithm incorporates state-of-the-art security measures to protect user data from unauthorized access and breaches. Encryption, secure data storage, and rigorous access controls are all integral components of the algorithm, ensuring that all user data remains confidential and secure

In summary, this proposed solution aims to modernize the Tax ratio by giving customers real-time insights into their taxes and packages, consequently increasing operational efficiency and reducing related expenses. It offers a complete solution for accurately and conveniently taxing things while upholding the highest standards of privacy and data security. In an increasingly technologically-dependent world, this system aims to be a helpful resource for individuals, businesses, and organizations providing Tax Net services

VI. METHODOLOGY

The development of the Tax-net Service involves a meticulous and structured methodology to ensure a secure, efficient, and user-friendly system. The following detailed steps outline the process:

A. Project Initiation and Requirement Analysis

The project begins with an in-depth analysis phase. The team collects and scrutinizes user needs, business requirements, and the intended scope of the system. Clear objectives, project goals, and constraints are established. A comprehensive project plan is created, encompassing timelines, resource allocation, and budgeting considerations.



B. Technology Selection

Selecting the right technology stack is pivotal for the success of Tax Net. For the frontend, ReactJS is chosen for its responsive design capabilities and Next JS for server-side rendering, enhancing SEO and performance. The backend technology selection includes Node.js for its non-blocking I/O and event-driven architecture, which ensures scalability, paired with Express.js to handle API requests efficiently. MongoDB is chosen for the database because of its schema flexibility, high performance, and strong support for large data volumes. This technology stack is evaluated for compatibility, performance, future scalability, and ease of maintenance, aligning with the overall system requirements.

C. System Architecture Design

The architecture of Tax Net is designed to be robust and scalable, accommodating growth and ensuring high availability. The system uses a multi-tier architecture, separating concerns among client-side, server-side, and database management. Load balancers distribute client requests efficiently to prevent any single server from becoming a bottleneck. The database architecture is designed for replication and sharing, which enhances data accessibility and fault tolerance. Backup solutions and disaster recovery plans are integral to the architecture design, ensuring data integrity and system resilience.

D. User Interface Development

User Interface (UI) development for Tax Net focuses on creating an intuitive and engaging user experience. The design principles are centered around simplicity and efficiency, ensuring that users can navigate the system effortlessly. The UI is developed using ReactJS, which facilitates the creation of an interactive and dynamic interface. Next JS is utilized to render views on the server, improving load times and performance. The development process includes prototyping, user feedback sessions, and iterative design enhancements, aiming to meet the specific needs of different user personas, from accountants to business managers.

E. Backend Development

Backend development for Tax Net involves setting up the server, application, and database environments that support the core functionalities of the system. Node.js is used to build a lightweight, efficient backend capable of handling concurrent requests without straining server resources. Express.js frameworks are implemented to manage routes, requests, and security. The backend also integrates business logic for GST calculations, user management, and data validation, ensuring that the system operates according to the defined business rules and workflows.

F. MongoDB Database Integration

MongoDB is integrated as the core database. Collections and documents are meticulously designed to optimize data storage and retrieval. This NoSQL database is well-suited to handle the diverse and dynamic email tracking data generated by the system.

Fig. 4 below shows the pseudocode to get access to the MongoDB server. The connections to the server can be seen in Fig. 5, where exception handling is done using try-and- catch statements. [4]

```
const mongoose = require('mongoose');
const mongoURI = 'mongodb://localhost/database-name';
const options = {
  useNewUrlParser: true,
  useUnifiedTopology: true,
};
```

Fig. 4 Getting started with MongoDB

```
// Connect to MongoDB
mongoose.connect(mongoURI, options)
  .then(() => {
    // Connection successful
    console.log('Connected to MongoDB');
  })
  .catch((error) => {
    // Connection failed
    console.error('Error connecting to MongoDB: ' + error);
  });
```

Fig. 5 Connecting to MongoDB server for getting access to real-time database to store Tax Net details.

G. PWA Development

Developing a Progressive Web App (PWA) version of Tax Net ensures that users have a seamless and consistent experience across all devices. PWA technology makes the application accessible offline and enhances mobile access, crucial for users who need to manage GST compliance on-the-go. The development includes service workers for caching essential app shells and content, manifest files for home screen installation, and responsive design techniques to ensure the app is functional and aesthetically pleasing on any screen size.

H. Security Implementation

Ensuring data security and user privacy is paramount. Stringent security protocols are introduced to encrypt data during transmission and storage. User authentication mechanisms are put in place to control access to tracking data, preventing unauthorized use.

I. Mobile App Development

The mobile version of Tax Net is developed to provide users with flexibility and convenience, aligning with modern usage patterns. The mobile app supports all core functionalities available in the web version, ensuring users can perform critical tasks from anywhere. The development focuses on optimizing performance and user interface for smaller screens, incorporating features like push notifications and mobile-specific navigation.

J. Testing and quality assurance

This phase ensures that all components of Tax Net function as intended. Rigorous testing methods, including unit testing, integration testing, system testing, and user acceptance testing, are employed. Quality assurance processes are in place to monitor every phase of development, ensuring adherence to software development best practices and business requirements. Automated tests are run regularly, along with manual testing, to cover various user scenarios and edge cases.

K. Mobile App Development

The mobile version of Tax Net is developed to provide users with flexibility and convenience, aligning with modern usage patterns. The mobile app supports all core functionalities available in the web version; ensuring users can perform critical tasks from anywhere. The development focuses on optimizing performance and user interface for smaller screens, incorporating features like push notifications and mobile-specific navigation.

This comprehensive methodology ensures the systematic and effective development of the Tax Net Service. It covers every aspect of the project, from its inception and technological foundations to user interface design, security implementation, and ongoing maintenance. The result is a secure and user-centric system that meets the demands of modern Tax requirements.



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Invoice	Date	GST %	Total Amount	GST
27897	2024-04-30	18%	₹78,90,753.00	₹14,20,333.54

Fig. 8 Process to Add new Sales Record to the Database.

On this sales tracking panel, client have the ability to view and monitor sales taxes collected on a daily, monthly, and yearly basis. Additionally, they can track the amount of GST applied to each specific product, providing a comprehensive overview of their tax obligations.

IV. RESULTS AND DISCUSSIONS

The journey begins when the user navigates to the Tax Net website, either through a web browser on their desktop/laptop or via a mobile browser on their smartphone or tablet.

Fig. 6 Tax Net Home Page.

This is a sales page where Client can add sales tax information on a monthly or yearly basis.

Fig.7 Tax Net Sales Tax Page.

On this Sales Dashboard, client can add product invoice numbers, sale dates (day and year), and specify the GST rate they wish to apply to a particular product. They can also enter the total amount for each product.

Fig. 9 Sales Tracking Panel to display the slaes records added by the user.

This is a purchase page where client can add purchase tax information on a monthly or yearly basis.

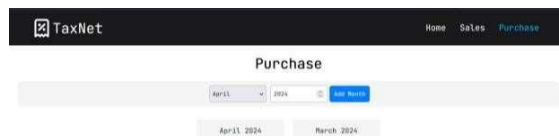


Fig. 10 The Purchase Tax Page to see details monthly or yearly.

On this Dashboard, client can add product invoice numbers, purchase dates (day and year), and specify the GST rate they wish to apply to a particular product. They can also enter the total amount for each product.

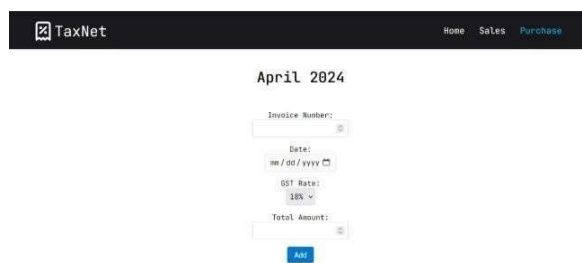


Fig. 11 Dashboard depicting the details of the sales include invoice number, date, GST and Total amount.

On this page, client have the ability to view and monitor sales taxes collected on a daily, monthly, and yearly basis. Additionally, they can track the amount of GST applied to each specific product, providing a comprehensive overview of their tax obligations.



Fig. 12 Tracking Panel to display the details of the records added by the user.

In real-time updates, everything is added to the database as soon as the owner inputs data related to sales and purchase taxes. This ensures safe data storage in the database. Owners can conveniently access and review daily, monthly, or yearly data on sales and purchase taxes whenever necessary, enabling them to keep track of their financial transactions efficiently and accurately. This system provides a secure and reliable method for managing and retrieving financial data.

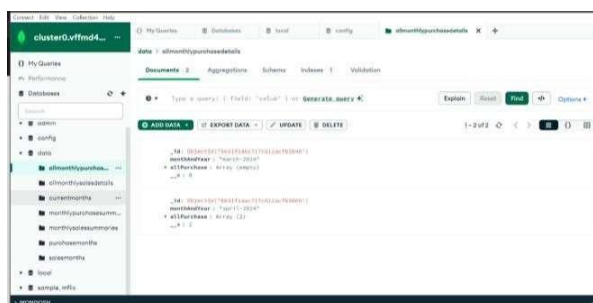


Fig. 13 MongoDB database to store the owners data efficiently.

The tracking mechanism allows users to easily monitor sales and purchase GST taxes on a monthly or yearly basis, based on data previously entered daily for each product. This feature ensures accurate and systematic tax tracking.

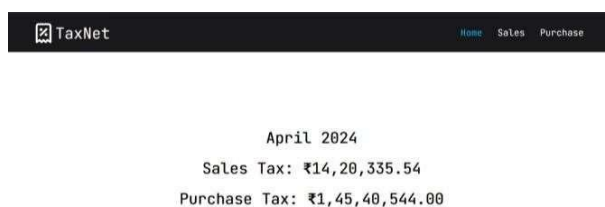


Fig. 14 Systematic and Accurate tax tracking using a monitoring system.

V. CONCLUSION AND FUTURE WORK

Tax Net represents a significant advancement in tax administration. By incorporating cutting-edge technologies and innovative strategies, Tax Net improves the accuracy of individual tax evaluations and enhances operational efficiency, while maintaining compliance with legal standards. This systematic approach adeptly handles the complexities of various tax types including income, property, capital gains, and sales taxes, providing a reliable and comprehensive

solution for modern tax management challenges. Moving forward, Taxnet is set to redefine industry standards, illustrating the critical role of technology in the evolving landscape of tax management systems. This service stands out by merging the advantages of existing solutions with new, innovative features, thus ensuring secure and efficient management of communications in the digital age. Future developments aim to offer a more scalable service operationally. Considerations for further development include improved analytics and reporting to expand these capabilities in future versions. This scalability prepares our service for future growth and enhanced user engagement. As data privacy laws change, it will be necessary to continuously update the system to comply with data protection regulations. Future updates may include better encryption, user consent management, and data retention policies. Additionally, efforts could involve creating detailed user guides and training materials to help users fully utilize the system's features.

Empowering users in this way could improve their overall experience and the benefits they gain from the service. Our dedication to data security is steadfast. As the system evolves, ongoing efforts will focus on adhering to the latest data protection laws. This commitment includes continuous improvements in encryption techniques, user authentication processes, and data retention policies, ensuring the highest security standards. This document outlines the tax collection and management strategy discussed, which enables taxpayers to meet their tax responsibilities more effectively and quickly, and suggests enhancements to the tax collection and management system. Although the tax oversight system can be optimized, it may still lack direct answers, indicating that we should consider more human-centric issues as we strive to enhance the thoroughness of these systems.



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