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Affiliated to DBATU, RTMNU & MSBTE Mumbai

Department of Artificial Intelligence

*"A Place to Learn, A Chance to Grow"*

Session: 2024-25



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**Progress Seminar No.-07**  
**Title: Implementation of Arthsutra for Smart Loan Management & Business Finance Solution.**

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**2025**

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# Introduction

- Financial Management is crucial for healthcare sector. This project represents a smart assistant that collects data, tracking expenses, calculate income and set financial targets to manage loans and operational costs. It generates insights that help business administrators to maintain financial stability.
- **Financial Management:** Specialized for healthcare sector to manage loans, expenses, and revenues effectively.
- **Automated Data Collection:** Collect data on salaries, operational costs, loan interest and reduces manual errors.
- **Target Setting:** Sets financial goals on basis of expenditures against earnings to meet obligations.
- **Actionable Insights:** Provides comprehensive financial to take financial decisions data and resource allocation.
- **Cash Flow Optimization:** Ensures timely loan repayments and smooth cash flow, avoiding penalties.

# Literature Review

Sr. No.	Paper Title	Author	Publication & Year	Key Points
1	Forecasting the Profit or Loss Status of Companies using Machine Learning.	Fatih Kazova, Muhammed Ahmet Alkan, Muhammet Kasım Yüksel	2024 8th International Symposium on Innovative Approaches in Smart Technologies (ISAS)	Uses XGBoost and Random Forest on financial data to predict future profit or loss status, supporting strategic decision-making.
2	Investigating the Advantages of AI-driven Predictive Analysis in Healthcare	Murtuza Ali Mohammed, Vazeer Ali Mohammed, Ashween Ganesh, T. Kiruthiga.	2024 IEEE 3rd World Conference on Applied Intelligence and Computing (AIC)	Demonstrates how predictive analysis using AI can improve decision-making—techniques applicable to financial risk prediction.
3	Navigating Financial Complexity: The Role of a Tailored Finance Tracker Application for Small Businesses	Kali Johari, Swati Das, M.Sai Anupama, Meghna, Debalina Saha, Raghunath Dey, Jayashree Piri.	2024 First International Conference on Pioneering Developments in Computer Science & Digital Technologies (IC2SDT)	Introduces a finance tracker with dashboards, projections, and tax tools for small businesses.

Sr. No.	Paper Title	Author	Publication & Year	Key Points
4	PROXY: Personal Revenue Organization & Xpense Yardstick	Prerana Singh, Sameer Rathi, Aditya Pratap Singh, Harish Kumar Mittal, Sonika Vasesi, Paramjeet.	2024 Second International Conference on Advanced Computing & Communication Technologies (ICACCTech)	A student-focused financial app with budget management, reminders, and gamification-user-friendly UI ideas.
5	Unlocking Success: How Indonesian SMEs' Revenue Shapes Digital Financial Adoption and Security	Banu Rinaldi, Maria Grace Herlina, Dewi Meisari Haryanti.	2024 4th International Conference on Innovative Research in Applied Science, Engineering and Technology (IRASET)	Shows how revenue impacts digital finance and security adoption among SMEs, highlighting the need for custom financial tools.
6	Revenue Prediction using Sequential Machine Learning	Vijay Mane, Rajat Patil,Swanand Patwardhan, Piyush Pethkar.	2024 8th International Conference on I-SMAC (IoT in Social, Mobile, Analytics and Cloud)	Compares LSTM and Prophet for revenue forecasting using daily data—LSTM found more accurate for business planning.

Sr. No.	Paper Title	Author	Publication & Year	Key Points
7	Loan Repayment Prediction Using Logistic Regression Ensemble Learning With Machine Learning Algorithms	Thuan Nguyen Dinh, Binh Pham Thanh	2022 9th International Conference on Soft Computing & Machine Intelligence (ISCMI)	Combines Logistic Regression with ML models (RF, ANN, SVM) to predict repayment; RF ensemble performs best.
8	Performance of a Loan Repayment Status Model Using Machine Learning	Anon Mueankoo, Mayuening Eso, Salang Musikasuwn.	2022 19th International Conference on ECTI-CON	Applies Decision Tree, RF, and Logistic Regression to assess loan repayment, identifying key factors like age and past loans.
9	Unveiling Financial Insights: The Daily Expense Tracker System Approach	Sanjay Singla, Amanpreet Kaur, Anju, Aditya Soni, Rajiv Dhaiya, Geet Kiran Kaur	2024 International Conference on Emerging Innovations and Advanced Computing (INNOCOMP)	Presents a secure, customizable expense tracking system with dashboards.The Daily Expense Tracker System, a safe and intuitive platform designed to satisfy the changing needs of people and businesses in handling daily expenses, is presented in this study.

# Research Gap

- **Integration of Financial Data Sources:** While the system collects data from various sources like operational costs, employee salaries, and loan details, there is a need to improve real-time integration from various financial databases and software, ensuring data accuracy and handling inconsistencies.
- **Development of Advanced Financial Analytics:** Although the system gathers financial data, there is a need to develop intelligent algorithms to provide predictive analytics, cash flow optimization, and forecast future financial challenges specific to medical sector.
- **User Experience and Interface Design:** The tool must be intuitive for hospital administrators with varying levels of technical expertise. Research is needed to design a user interface that is easy to navigate and minimizes the cognitive load during busy operational hours, ensuring critical financial decisions are made efficiently without distraction.

# Statement of the problem

- **Complex Financial Management:** Medical facilities face challenges in managing their finances due to the need to oversee operational expenses, repay loans, and pay staff salaries. Handling these multiple financial tasks can be complex, leading to tracking difficulties, increased risk of errors, and potential delays.
- **Absence of Integrated Financial Tools:** Administrators struggle because they do not have an integrated system that brings together all financial information, such as income from various healthcare services and all related expenditures. This gap prevents a comprehensive analysis of the financial status, making it challenging to assess performance and make data-driven decisions.
- **Difficulty in Meeting Financial Goals:** Without real-time insights and targeted strategies, medical facilities often face cash flow problems, delayed payments, and spending issues, which can result in financial strain and lower service quality.



# Objectives of the study

- **Collecting and analysing financial data:** Gathering information on salaries, expenses, loans, and various income sources to understand financial operations.
- **Calculating total expenditures:** Calculating total expenditures allows an organization to see the complete picture of its costs.
- **Comparing expenditures with earnings:** Assessing the financial health of the business by comparing its expenses to its income, identifying areas for improvement and potential profitability.
- **Setting financial targets:** Providing guidance to business owners on setting achievable financial goals based on their specific circumstances and business objectives.

# Scope

- **Loan Management:** Track loan details, calculate interest, manage repayments, and provide alerts for upcoming payments to effectively manage debt.
- **Financial Tracking and Analysis:** Enable businesses to track expenses, income, and generate financial reports, offering insights into profitability and financial performance.
- **Healthcare-Specific Features:** Provide specialized tools for hospitals, such as departmental tracking, surgery management, and integration with healthcare systems (e.g., EHR and HIS).
- **Data Integration:** Allow users to upload financial data from CSV or Excel files for easy consolidation and analysis.

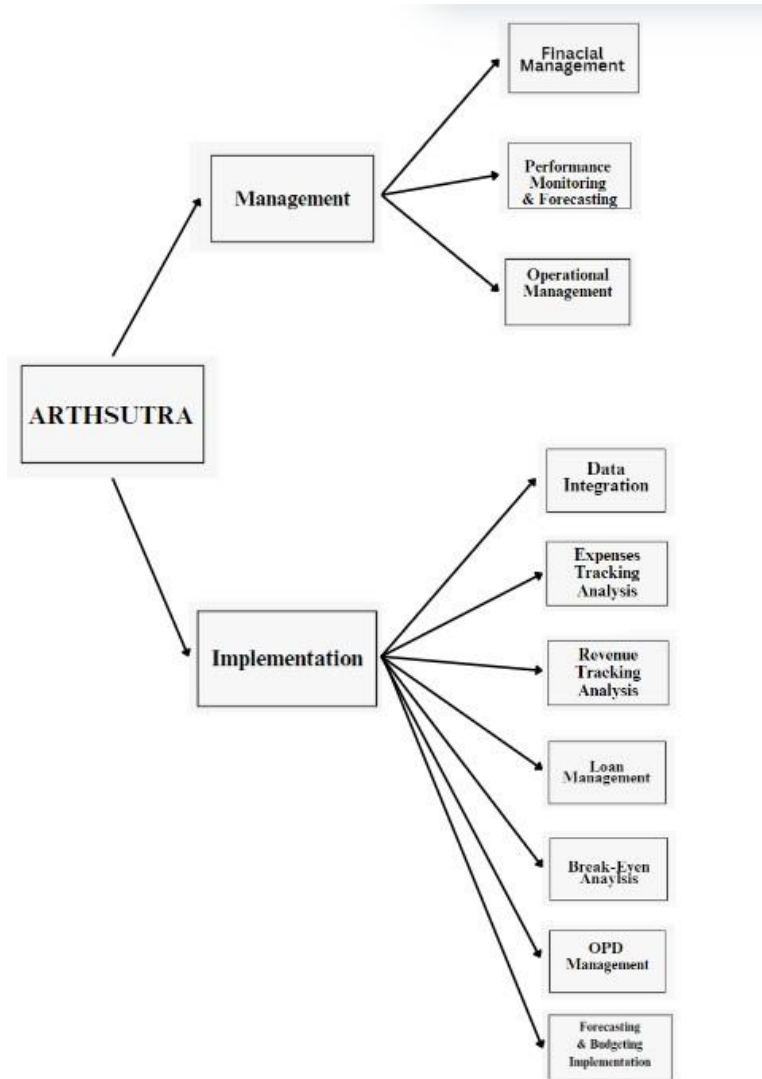
# Limitations

- **Sector-Specific Focus:** It is mainly designed for healthcare sector, limiting its use for non-healthcare businesses.
- **Basic Reporting in Initial Phase:** Early versions may offer only simple financial reports, with plans for advanced forecasting and custom reporting in future updates.
- **Data Quality Dependency:** The accuracy of financial insights, forecasts, and recommendations heavily depends on the quality and completeness of the data input by users.

# Methodology

- **Data Collection and Analysis:** Collect financial data including salaries, expenses, loan interest, and sector-specific income using both manual and automated methods; analyze this data to gain insights and support informed decision-making.
- **Target Setting and Financial Recommendations:** After analyzing the collected data, the system sets financial targets for business owners, providing actionable recommendations based on earnings and expenditures. This helps optimize financial management, ensuring loan payments are met while improving overall business efficiency.
- **Financial Analysis and Comparison:** After data collection, perform detailed comparison of expenditures against earnings to assess financial health, identify inefficiencies, and guide improvements.

# Block Chart



## Management

### 1. Financial Management

Controls hospital income, expenses, and cash flow.

### 2. Performance Monitoring & Forecasting

Tracks progress and predicts future financial trends.

### 3. Operational Management

Manages day-to-day hospital activities efficiently.

## Implementation

### 1. Data Integration

Connects with hospital systems for real-time data.

### 2. Expenses Tracking Analysis

Monitors and controls departmental spending.

### 3. Revenue Tracking Analysis

Analyzes earnings from hospital services.

### 4. Loan Management

Tracks and manages hospital loan repayments.

### 5. Break-Even Analysis

Finds the point where revenue meets expenses.

### 6. OPD Management

Organizes outpatient services smoothly.

### 7. Forecasting & Budgeting Implementation

Plans future finances and sets budgets.

# Tools

## Frontend Development:

- **HTML, CSS, JavaScript:** For building the user interface.
- **Bootstrap or Foundation:** Frameworks for creating a responsive, user-friendly design with pre-built UI components.

## Backend Development:

- **Python:** For backend rationale and preparing, advertising effortlessness and versatility.
- **Flask:** A lightweight Python web framework for building and deploying the application.

## Database:

- **SQLite:** A simple, self-contained database to store user data, financial records, and loan details.
- **Pandas:** A Python library for data processing, cleaning, and financial analysis.

## Data Integration:

- **CSV/Excel File Handling:** Tools to upload and process financial data from CSV or Excel files for easy integration.

# Techniques

- **Data Consolidation:** Using Pandas for data cleaning and preprocessing to ensure financial data from diverse sources (CSV, Excel) is accurate and consistent.
- **Loan Management Algorithms:** Applying interest calculations and amortization schedules to track repayments and send alerts for upcoming payments.
- **Predictive Analytics:** Use statistical modeling and time-series forecasting to predict future expenses, revenues, and loan obligations, helping users with financial planning.
- **Data Visualization:** Utilizing libraries like Matplotlib or Plotly to create charts and graphs that visualize financial trends, forecasts, and departmental performance.

# Work Plan

Developing an efficient financial assistant tailored to assist business owners with managing loans and business finances involves various stages. This multidisciplinary project requires comprehensive planning and execution across phases like identifying gaps in current financial management tools, gathering requirements, designing the solution, development, testing, and continuous improvement. The taking after diagrams the timeline and high-level tasks:

- Problem identification: 24/07/2024
- Requirements gathering: 25/07/2024
- Design: Ongoing
- Development and testing: Ongoing
- Implementation and deployment: Ongoing
- Monitoring and evaluation: Ongoing



# Implications

- Technology can greatly improve financial management for business owners by delivering data-driven insights, optimizing loan repayments, and reducing financial mismanagement risks through real-time analysis and tailored recommendations.
- However, there are also concerns related to the accuracy and reliability of automated financial tools, as well as the potential over-reliance on technology for critical financial decisions. Additionally, ensuring data security and privacy in handling sensitive business information is crucial.
- Collaborative development involving financial experts, business owners, and stakeholders is essential to build systems that effectively address real-world financial management challenges and foster trust and usability.

# Conclusions (Expected)

Developing an efficient financial assistant like Arthsutra for business owners can lead to several potential conclusions, including:

- Enhanced financial management
- Improved loan repayment strategies
- Increased decision-making accuracy
- Time and cost savings for business operations

Overall, the development of Arthsutra has the potential to significantly improve the financial health of businesses, streamline operations, and provide actionable insights that enable better long-term planning and growth, benefiting business owners and financial institutions.

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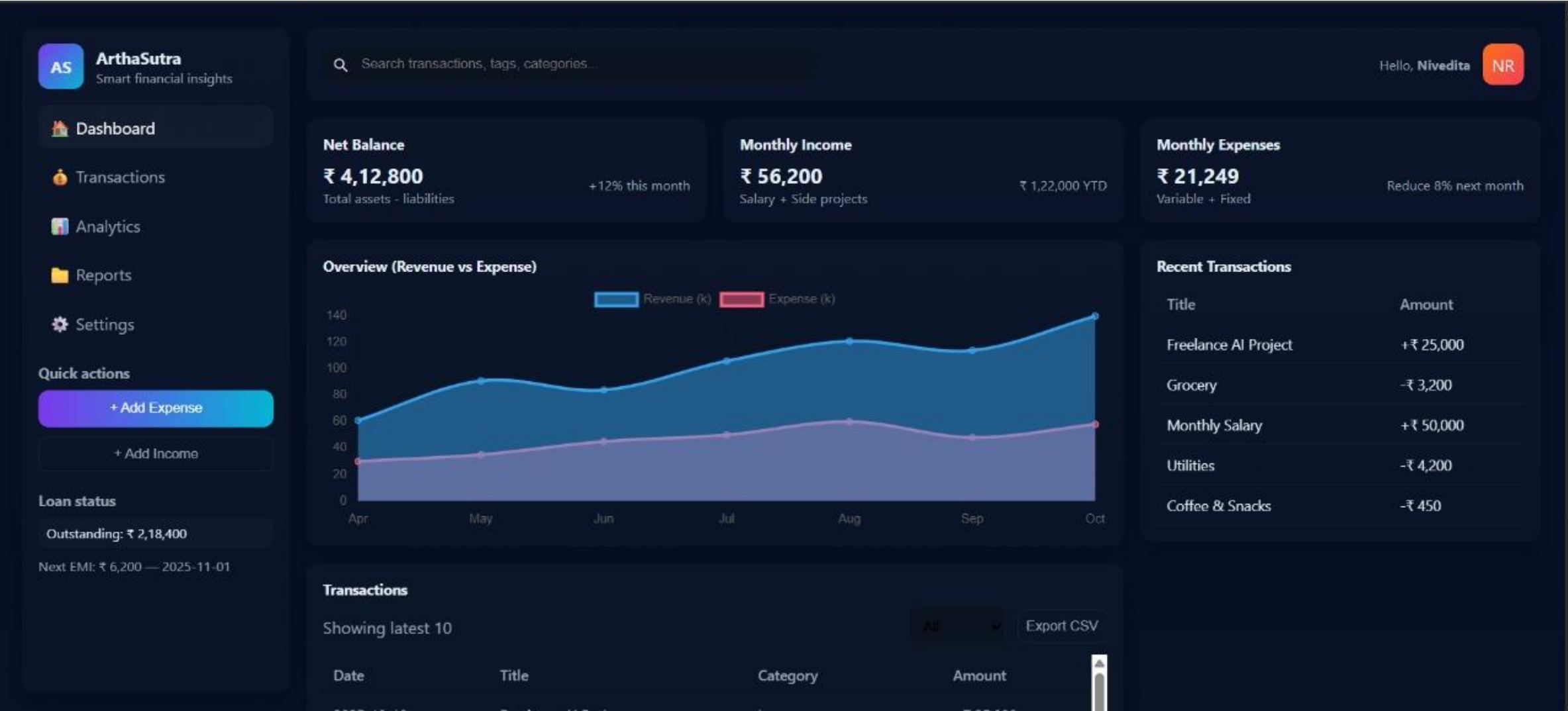


# Welcome to **Arthsutra**

Your personal financial assistant with smart dashboards for Admin & Employees.  
Manage budgets, track expenses, and make informed financial decisions — all in  
one place.

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