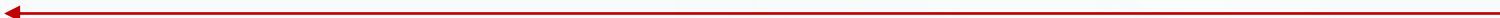


MASTER OF SCIENCE IN ARTIFICIAL INTELLIGENCE — MIDOCEAN UNIVERSITY, UAE

AI-BASED SMART ACCOUNTING SYSTEM



to Automate Accounting and Fraud Detection in SMEs

Prepared by: Jihad Abdullh Najee Alhuraiby ID No.: 253002789

**Supervisor: Dr. Amjed Qutaish — College of Informatics,
Midocean University, Comoros**

Initial Overview of the Project

ACCOUNTING SYSTEM with AI ACCOUNTANT

Smart Analytics... Precise Recording... Decisive Action

Integrated system for mastering your accounts and making confident decisions.

SMART ACCOUNTANT
Understand and analyze your numbers to provide the best decisions for your business growth.

Profit Increase

Time & Effort

Data Accuracy

Continuous support

Smart Real-time Reports

Thinking AI Accountant

Smart Alerts & Suggestions

Access from Anywhere

Ultimate Safety & Protection

Integrated Management

Ease of Use

Integration & Flexibility

AI-Powered Decisions

YOUR SMART STEP TOWARDS BETTER FINANCIAL MANAGEMENT

Dashboard Sales Purchases Inventory Customers Suppliers Banks Reports Settings

Home

Total Revenue 1,250,000
+15.8%

Total Expenses 850,000
-5.2%

Net Profit 400,000
+18.7%

Cash Balance 320,000
+12.5%

Revenue Over 6 Months

Expense Distribution

- Operating (45%)
- Administrative (55%)
- Marketing (30%)
- Other (10%)

AI Accountant Recommendations

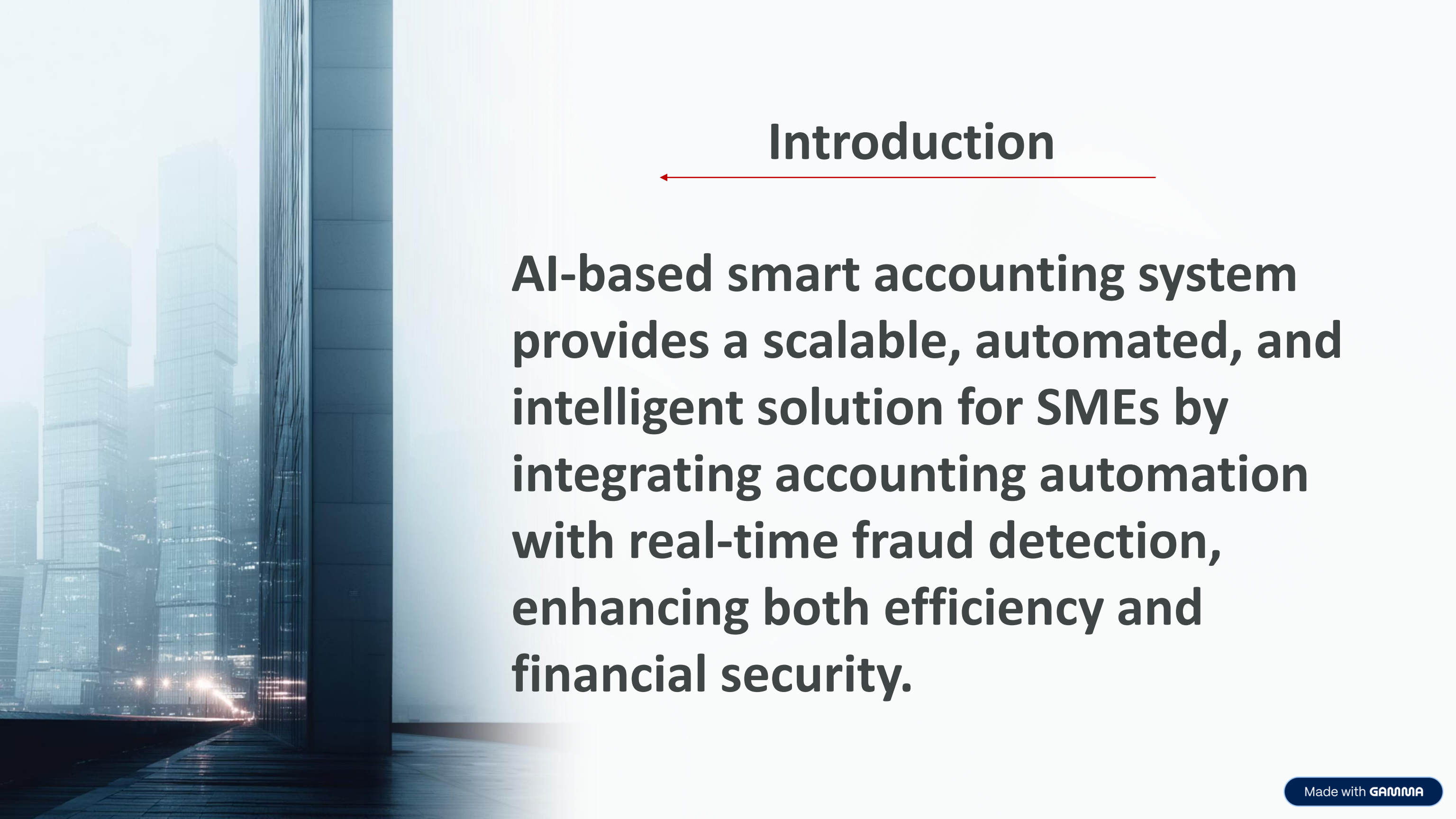
- Noticed a 20% increase in marketing expenses from last month.
- There are 3 pending invoices to pay in the coming days.
- Opportunity to reduce administrative costs by 15%.

AI recommendation: expenses will be enclosed.

Acknowledgements

Special thanks to Dr. Amjad Qutaish, who contributed to the success of this project through his support and guidance, which were instrumental in completing this work. We also thank the entire staff of MedOcean University, including all the doctors and teachers.





Introduction

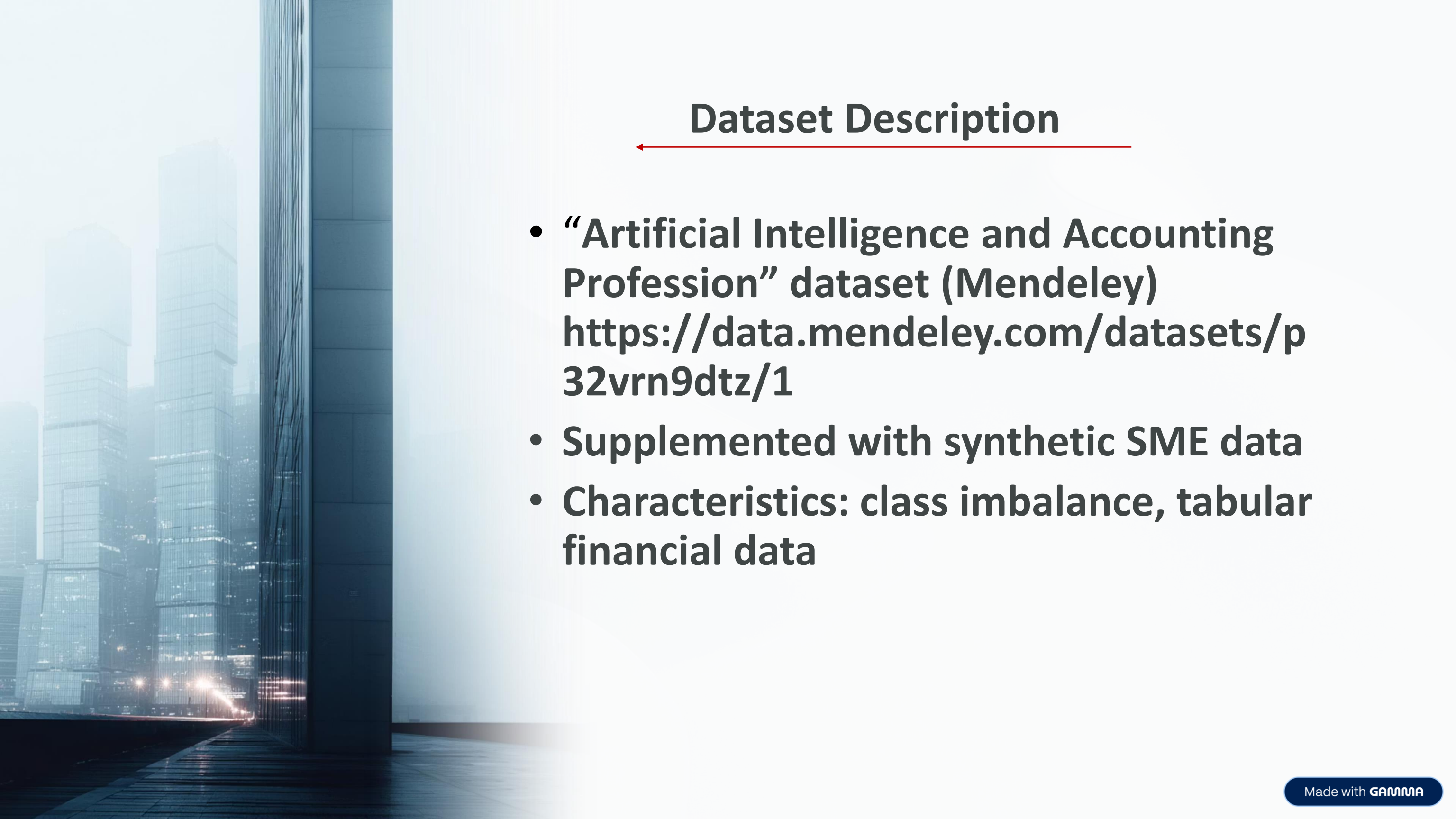
AI-based smart accounting system provides a scalable, automated, and intelligent solution for SMEs by integrating accounting automation with real-time fraud detection, enhancing both efficiency and financial security.

Problem Definition



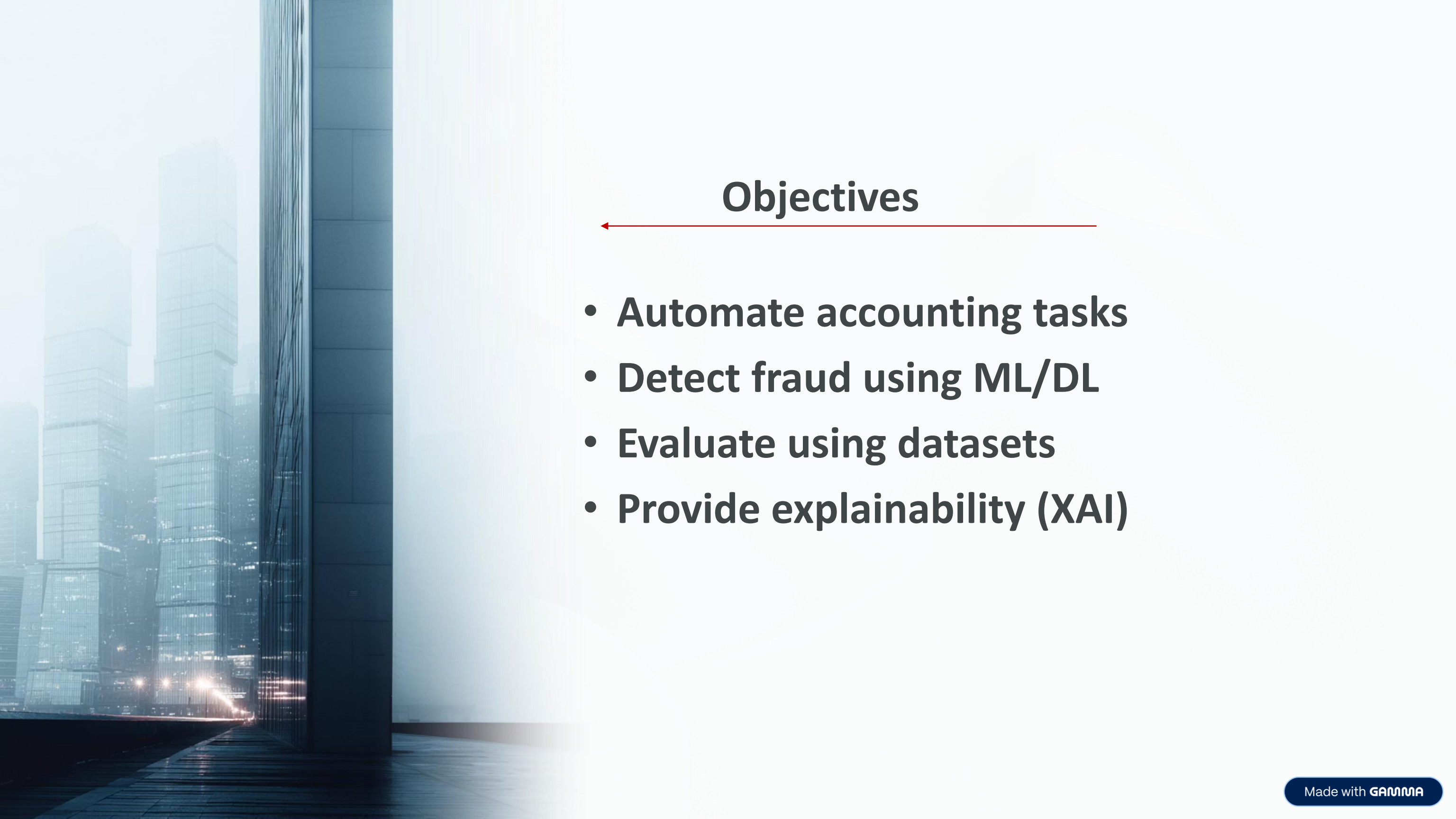
- **Manual accounting is error-prone**
- **SMEs vulnerable to fraud**
- **Traditional methods fail in real-time detection**





Dataset Description

- **“Artificial Intelligence and Accounting Profession” dataset (Mendeley)**
<https://data.mendeley.com/datasets/p32vrn9dtz/1>
- **Supplemented with synthetic SME data**
- **Characteristics: class imbalance, tabular financial data**



Objectives

- Automate accounting tasks
- Detect fraud using ML/DL
- Evaluate using datasets
- Provide explainability (XAI)



Background

- **AI transforms accounting**
- **Automation + fraud detection**
- **Improves accuracy & efficiency**



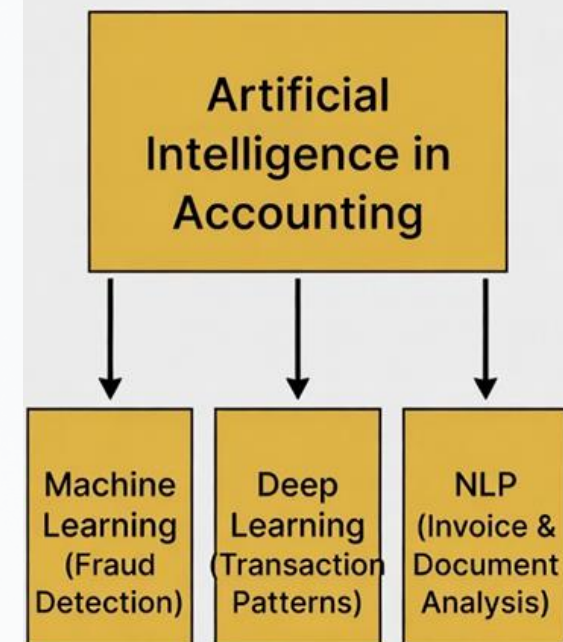
Fraud in SMEs

- 5% revenue loss annually
- Weak controls
- Manual systems ineffective

AI Techniques

- **ML, DL, NLP**
- **Anomaly Detection**
- **Ensemble Learning**

Fig. 2.1 AI in Accounting and Fraud Detection



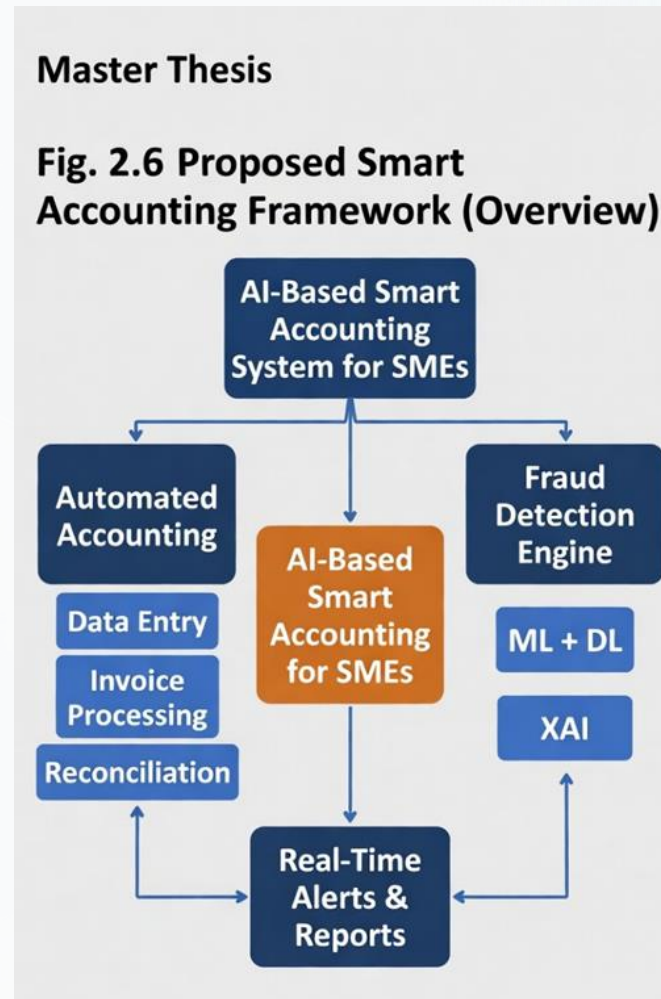


Challenges

- **Data imbalance**
- **Limited SME datasets**
- **Privacy issues**
- **Explainability needed**

Proposed System

- AI-based smart accounting system
- Automation + fraud detection + XAI



RELATED STUDIES & LITERATURE REVIEW (2021–2026)

Ref (author) year	Paper Title	Description	Dataset	Methods	Results	Advantage	Disadvantage
Yang, H. et al. (2026)	Study of Artificial Intelligence for Financial Fraud Detection: Datasets, Methods, and Challenges	Comprehensive review of AI methods, datasets, and challenges in financial fraud detection	Public fraud datasets	Systematic literature review	Comparative metrics (Accuracy, AUC, F1)	Broad coverage of current trends	Limited focus on SME accounting data
Abdo-Salloum, A.M. et al. (2026)	The Role of Artificial Intelligence in Transforming Accounting Practices	Systematic review on AI in accounting automation and fraud prevention	Literature review	Thematic analysis	Qualitative benefits	Strong emphasis on SME benefits	No empirical model testing
Attaufiq, A.Y. et al. (2026)	Design and Development of an AI-Based Smart Accounting System	Case study on AI smart accounting for internal control and fraud prevention	Company case data (Indonesia)	ML models + case study	Confusion Matrix	Practical real-world SME implementation	Limited generalizability (single case)
Chen, Y. (2025)	Deep Learning in Financial Fraud Detection: Innovations, Challenges, and Applications	Systematic review of 108 studies on DL in fraud detection	Various public datasets	Systematic review + DL models	AUC, Accuracy, F1-score	Deep technical insights on DL	No new proposed model

Almalki, F. et al. (2025)	Financial Fraud Detection Using Explainable AI and Stacking Ensemble Methods	Stacking ensemble with SHAP & LIME for fraud detection	IEEE-CIS Fraud Detection (590k transactions)	Stacking (XGBoost, LightGBM, CatBoost) + XAI	99% Accuracy, 0.99 AUC	High performance + excellent explainability	Focused mainly on credit card data
Siam, A.M. et al. (2025)	Hybrid feature selection framework for enhanced credit card fraud detection	Hybrid filter + embedded feature selection framework	Credit card datasets	Hybrid FS + ML classifiers	Improved accuracy & reduced features	Efficient feature reduction	Not tested on SME accounting data
Cai, M. (2025)	Research on the automation of intelligent accounting information processing based on deep learning	NeuroLedger-Net for automated accounting and anomaly detection	Kaggle financial datasets	LSTM + Autoencoders + MLP	96.3% Accuracy	Strong in accounting automation	Limited use of XAI
Alruwaili, T.F. et al. (2025)	The impact of artificial intelligence on accounting practices	Impact of AI on efficiency and fraud detection in SMEs	Literature review	Systematic review	Qualitative improvements	Good SME relevance	Purely theoretical
Jin, J. et al. (2025)	The analysis of fraud detection in financial market under stacking ensemble	Stacking ensemble with dynamic weighting	Real financial market data	Stacking (LR, DT, RF, SVM, NN)	High accuracy, low false alarm rate	Innovative dynamic weighting	Lacks explainable AI

RELATED STUDIES & LITERATURE REVIEW (2021–2026)

Kibriya, M.G. et al. (2025)	Explainable AI (XAI) Transparency for Financial Fraud Detection	Application of SHAP and LIME for model transparency	Public fraud datasets	ML models + SHAP + LIME	Good interpretability metrics	High transparency	No automation module
Moura, L. et al. (2025)	AI and Financial Fraud Prevention : Mapping the Trends and Institutional Implications	Bibliometric mapping of AI trends in fraud prevention	Literature	Bibliometric + literature review	Trend analysis	Identifies institutional gaps	No technical implementation
Mienye, I.D. et al. (2023)	A Machine Learning Method with Hybrid Feature Selection for Credit Card Fraud Detection	Hybrid filter-wrapper feature selection	Credit card datasets	Information Gain + Genetic Algorithm	Improved model performance	Effective hybrid FS technique	Not adapted for SME tabular data
Zhang, Z. et al. (2022)	Financial Fraud Identification Based on Stacking Ensemble Learning Algorithm	Stacking using textual + financial data	Financial reports + transaction data	Stacking ensemble	Superior to baselines	Integration of unstructured data	Not real-time SME focused
Hamal, S., & Senvar, O. (2021)	Comparing the performance of ML classifiers in detecting financial accounting	Performance comparison of 7 ML classifiers on Turkish SMEs	341 Turkish SMEs financial data	ML classifiers (RF best)	Best results with ensembles	Highly relevant to SMEs	Old (2021), no DL or XAI

	fraud for SMEs						
Zhu, X. et al. (2021)	Intelligent financial fraud detection practices in post-pandemic era	Systematic review of post-pandemic fraud detection practices	Various	Systematic literature review	Qualitative + model comparison	Highlights real-time needs	No new proposed system

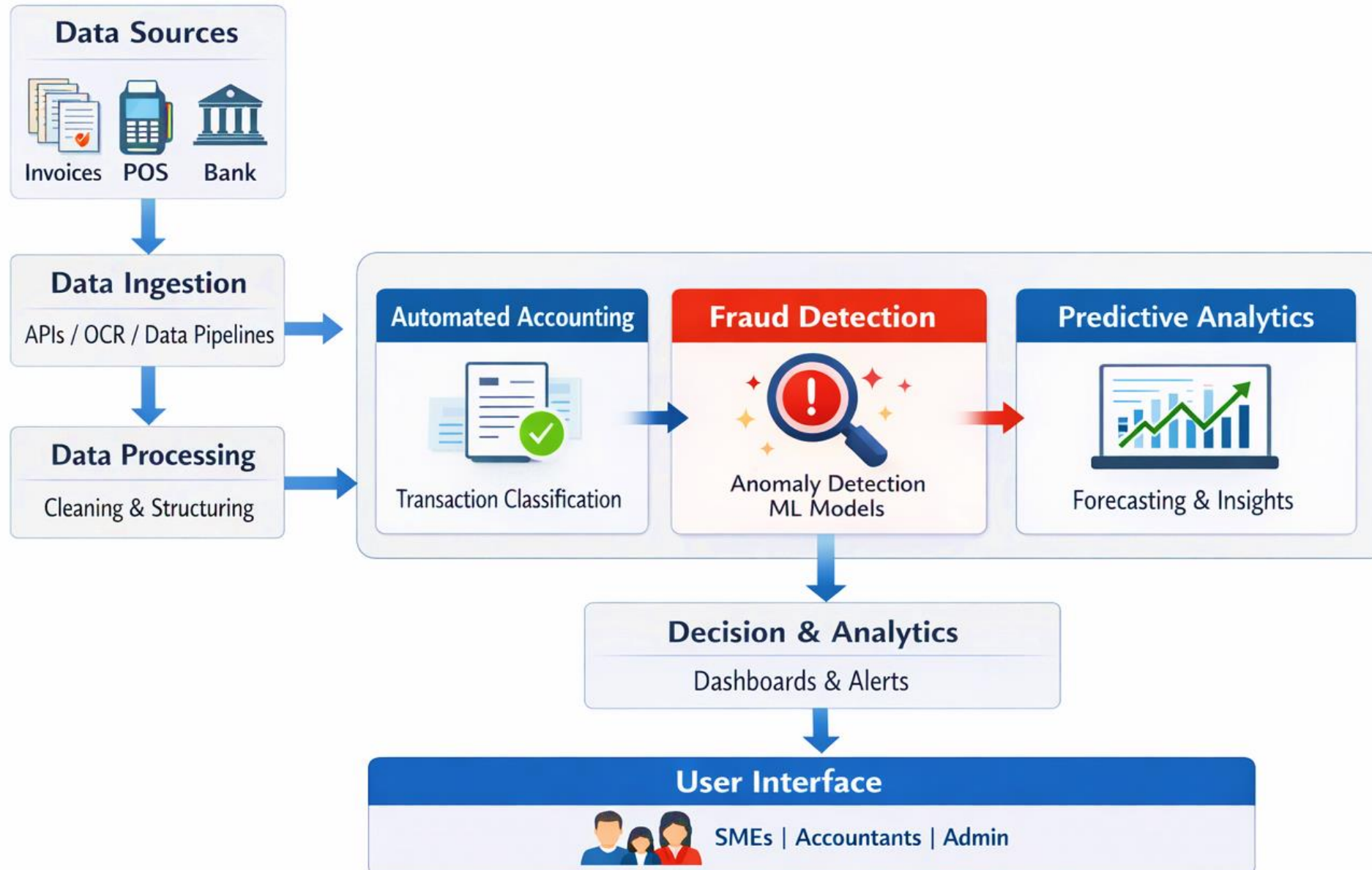
- **System Architecture**

- **Data Collection**
- **Processing**
- **Automation**
- **Fraud Detection**
- **Dashboard**

Architectural plan for the project's construction steps

AI-Based Smart Accounting System

Automate Accounting & Fraud Detection in SMEs



- **Data Ingestion Layer Collects data from:**

- Accounting systems (ERP)
- Bank transactions
- Uses APIs and automation tools

- **Data Processing Layer**

- Data cleaning and normalization
- Feature engineering for AI models
- Converts raw data into structured financial records

- **Automated Accounting Module**

- Uses Machine Learning**

- classification models to:**

- Categorize transactions (expenses, revenue, assets)
 - Automate journal entries
 - Reduces manual bookkeeping errors

- **Fraud Detection Module**

- Applies:**Anomaly Detection

- Algorithms** Supervised Learning (classification) Detects:

- Duplicate invoices
 - Unusual transactions
 - Suspicious patterns

- **Predictive Analytics Module**

- Cash flow
- Revenue trends
 - Supports decision-making

- **Decision Layer (Dashboard)**

- Real-time alerts for fraud
- Financial KPIs visualization
- Reports for management

- **AI Techniques Used**

- **Machine Learning (Classification & Regression)**

- Deep Learning (optional for complex patterns)
- Natural Language Processing (for invoice text)
- Anomaly Detection (Isolation Forest, Autoencoders).

- **Workflow Summary**

- Data collected from multiple sources
- Cleaned and structured
- Automatically classified into accounts
- Fraud patterns analyzed in parallel
- Insights displayed on dashboards
- **Benefits for SMEs**
- Reduce manual accounting workload
- Improve accuracy and compliance
- Early fraud detection
- Better financial insights
- Cost-effective automation

HYBRID FEATURE SELECTION

MLP as meta-learner

Filter then wrapper strategy reduces dimensionality

hardware

FULL ACCOUNTING AUTOMATION

reliable fraud alerts that non-technical

Invoice processing, expense classification

one scalable SME system

Project vision details in Arabic Language

نظام محاسبي

مع محاسب بالذكاء الاصطناعي

ذكاء يحل .. دقة تسجل .. قرارات تنجح

نظام متكامل لإدارة حساباتك واتخاذ قراراتك بثقة وكفاءة

محاسب ذكي
يفهم أرقامك ويحللها
ويقدم لك أفضل القرارات
لنمو أعمالك

زيادة الأرباح
تحليل دقيق يساعدك على
اكتشاف فرص النمو

توفير الوقت والجهد
أتمتة المهام المحاسبية
المتكررة بدقة وسرعة

دقة في البيانات
تقليل الأخطاء وضمان
توافق التقارير

دعم فني متواصل
فريق دعم جاهز لمساعدتك
على مدار الساعة

تقارير ذكية لحظية
تقارير مالية دقيقة وواضحة
في الوقت الحقيقي

محاسب ذكي يفكر معك
تحليل تلفاني للبيانات واكتشاف
الفرص والمخاطر

تنبيهات واقتراحات ذكية
تنبيهات بالمواعيد والتجاوزات
ومقترحات للتحسين

الوصول من أي مكان
على جميع الأجهزة
وفي أي وقت

أمان وحماية فائقة
حماية بياناتك ومعاملاتك
بأعلى معايير الأمان

إدارة متكاملة
كافة جوانب العمل
المحاسبي في مكان واحد

سهولة الاستخدام
واجهة بسيطة وسهلة
تناسب الجميع

تكامل ومرونة
يتكامل مع أنظمتك الحالية
وينمو مع أعمالك

قرارات مدعومة بالذكاء
تقارير وتحليلات تساعدك
على اتخاذ قرارات أفضل

خطوتك الذكية نحو إدارة مالية أفضل
نظام محاسبي مع محاسب بالذكاء الاصطناعي

الرئيسية

المبيعات

المشتريات

المصروفات

العملاء

الموردون

البنوك

التقارير

الإعدادات

إجمالي الإيرادات
1,250,000
+15.8%

إجمالي المصروفات
850,000
+8.3%

صافي الربح
400,000
+18.7%

الرصيد النقدي
320,000
+12.5%

الإيرادات خلال 6 أشهر

توزيع المصروفات

مصرفات تشغيلية 45%

مصرفات إدارية 25%

مصرفات تسويقية 20%

أخرى 10%

توصيات المحاسب الذكي

تم ملاحظة ارتفاع في مصروفات التسويق بنسبة 20% عن الشهر الماضي.

يوجد 3 فواتير مستحقة خلال الأيام القادمة.

فرصة لتقليل المصروفات الإدارية بنسبة 15%.

عرض نعمن التوصيات

المحاسب الذكي

أهلاً بك، كيف يمكنني مساعدتك اليوم؟