

## Derived design requirements from literature issues

Reference	Identified Literature Issues	Derived Desing Requirements
Cherif et al., 2023 Zhang et al., 2020 Xie et al., 2023	Traditional fraud detection methods struggle to accurately describe card users' transaction behaviours and adapt to both long- and short-term behavioural changes. <b>(LI1)</b>	Ensure the capability to learn from and adapt to the evolving transactional behaviours of individual card users. <b>(DR1)</b>
Turksen et al., 2024	Implementing systems for fraud detection can be expensive and resource-intensive, considering the significant potential costs associated with system errors, including financial losses and damage to reputation. <b>(LI2)</b>	Enabling a balance between cost-effectiveness and enhanced operational efficiency. <b>(DR2)</b>
Cherif et al., 2023 Turksen et al., 2024 Zhang et al., 2020	Poor data quality and integrity can lead to errors and biases in fraud detection systems, compromising their reliability and effectiveness. <b>(LI3)</b>	Ensure high data quality and integrity through comprehensive preprocessing, effective feature engineering, and secure data handling. <b>(DR3)</b>
Cherif et al., 2023 Vorobyev & Krivitskaya, 2022 Xie et al., 2023 Zhang et al., 2020	Existing FDS suffer from inefficiencies, such as high false positive rates and delays in real-time detection, impacting their overall performance. <b>(LI4)</b>	Enhance fraud detection efficiency by accurately identifying fraud transactions in real-time, reducing false positives, and maintaining or improving key performance metrics. <b>(DR4)</b>
Cirqueira et al., 2021	Lack of interactive features in fraud detection systems limits experts' ability to dynamically explore data and explanations, reducing system usability and effectiveness. <b>(LI5)</b>	Enable dynamic exploration of data and explanations through interactive features. <b>(DR5)</b>
Turksen et al., 2024 Wolfsberg Group, 2022 Xie et al., 2023	Fraud detection systems often fail to continuously update and adapt to emerging risks, evolving fraud patterns, and changes in data patterns. This lack of iterative improvement results in decreased effectiveness over time. <b>(LI6)</b>	Enable constant updating, monitoring, and adaptation to address emerging risks, changes in data patterns, and evolving fraud patterns. <b>(DR6)</b>
Cherif et al., 2023 Vorobyev & Krivitskaya, 2022	Fraud detection systems may not scale effectively to handle increasing transaction volumes and the accompanying large data sets, limiting their long-term usability. <b>(LI7)</b>	Ensure scalability and flexibility to handle increasing transaction. <b>(DR7)</b>
Turksen et al., 2024 Cirqueira et al., 2021 Vorobyev & Krivitskaya, 2022 Wolfsberg Group, 2022 Xie et al., 2023	Lack of transparency and explainability in models for fraud detection can hinder compliant working, reduce trust, and make it difficult for users to interpret and validate the system's decisions. <b>(LI8)</b>	Ensure transparency and explainability by providing interpretable insights, clear reasoning paths, and confidence levels, aligned with expert tasks, to build trust and understanding. <b>(DR8)</b>