

# iRM: An explainable AI-based approach for environmental, social and governance risk management.



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## ESG PROBLEM STATEMENT

Risks arising out of Environment, Social and Governance (ESG) are currently vibrant topics for corporate boardroom discussion. For corporate leadership, there are various risks mired by pandemic, geo-political volatile environment, coupled with an enhanced regulatory load. There are various commercially available tools that benchmark various ESG related initiatives of a company. A couple of interesting challenges that arise in developing ESG software tools that we attempt to address in our integrated Risk Management solution, iRM, based on explainable AI (XAI) research. Two such aspects are the explainability of machine learning predictions and the ethical use of data on a multi-tenant cloud (software-as-a-service or SaaS) solution.



Environment & Development - Explain ML Demand Forecasts?

## OPEN QUESTIONS

- The first challenge lies in the evaluation of the explanations, due to the lack of ground truth explanations, which is an open research question in the explainable AI community.
- We attempt to address the problem of evaluation of explanations, by capturing user inputs and presenting the statistics transparently to users.
- The evaluation of explainable AI brings the related second research question on the ethics of data usage on cloud-based shared software applications (SaaS): Can we learn machine learning weights (e.g., regression or neural network parameters) from the data of company X and use it for Y, even after obfuscating the personally identifiable features and adhering to laws like EU GDPR.
- For identifying and mitigating risks, such as security role violations, fraud transactions and ESG anomalies, it would be beneficial if companies collaborate. Especially, the public sector ones run by taxpayer money can be expected to collaborate as a community when it helps a common cause such as fraud detection, audit anomalies and ESG related

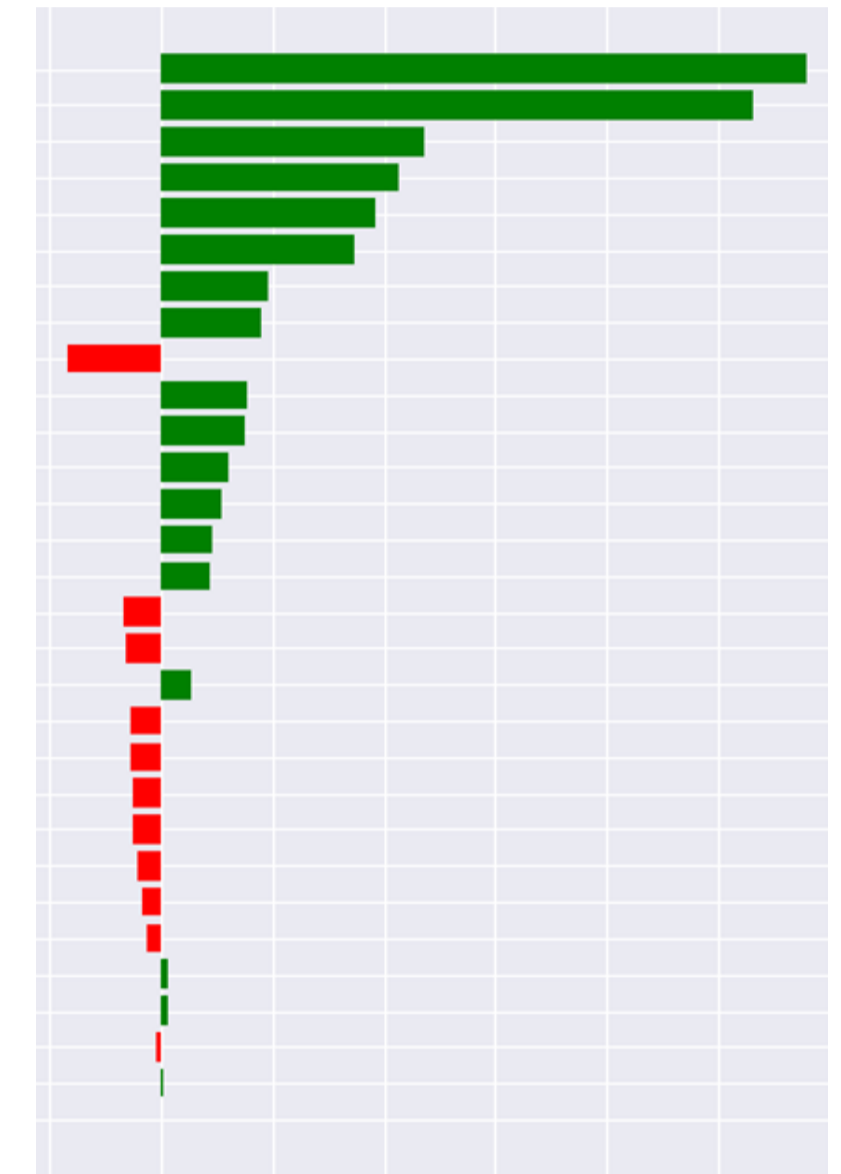
causes like climate change. Hence in iRM, we propose a transparent feature where companies can volunteer to opt for contributing selected parts of data, to leverage the machine learning weights on a bigger data volume, contributed by others. Otherwise, each entity can decide to use machine-learned weights limited to their data.

## XAI EVALUATION FOR ESG

Evaluation of XAI is an open research question without a clear consensus in the community. One idea is to focus on the audience that will consume the explanations - which can range from data scientists, regulators and domain users. Our recent research on text and images used strategies for extracting features that are understandable and post-processing the output. We employ this technique in the case of ESG explanations for forecasts, clustering and classification of risks. We propose high level textual and visual explanations. Textual explanations such as “the demand increased by X% due to Y with a confidence score of Z%”. Visual explanations will compare instances of risk elements and attempt to explain why certain clusters are similar.

## CONTRIBUTIONS

1. A rich library of KPIs for ESG use cases per industry
2. Extend the current toolkits of XAI classification methods like LRP, LIME adapted to ESG use cases wherein data is often time stamped (energy consumption, demand etc.)
3. A methodology to share features of data in a community driven framework with a reward-penalty scheme, whereby companies volunteering to share model parameters can gain from each other.



Feature Contributions (POS & NEG)

## COMPANY PORTRAIT

Technology Risk Limited (TRL) is a UK based startup founded in 2018, specializing in enterprise risk management. iRM Cloud is a wholly-owned subsidiary of TRL. The company provides boutique risk consulting services driven by in-house AI products to ensure that risks are mitigated in complex Digital Transformation projects. Currently, the company has over 30 employees in Europe, Africa, Asia, USA and serves customers across the globe, such as a leading global telecom player, the world's largest shipping and logistics company. The founders have advised FTSE 100 companies and Governments across the globe.

## SOLUTION APPROACH

There are various commercially available tools that benchmark various ESG related initiatives of a company. Often such tools help in tracking, estimating and forecasting carbon footprint and resource utilization efficiency risks.

Risk management key performance indicators are used along with industry benchmarks, rules and expert knowledge. We employ various SOTA explainable AI-based methods that attempt to explore causal relationships between the features. Managing unstructured social data, regulatory reports and documents bring an Information Retrieval (IR) task.

We employ recent explainable AI-driven research on text to build a retrieval based chatbot that draws out the evidence to support the users in understanding how the retrieved items are relevant.