MODEL ARTIFICIAL INTELLIGENCE GOVERNANCE FRAMEWORK
SECOND EDITION

UCARE.AI: ACCOUNTABLE AI FOR ACCURATE HEALTHCARE COSTS

UCARE.AI is a Singapore-based start-up that specialises in providing predictive insights with its online AI and machine learning platform. Among the various solutions the platform provides, UCARE.AI's AI-powered Cost Predictor works with hospitals to deliver accurate estimations of hospital bills to patients.

One of these hospitals was Parkway Pantai (Parkway). Prior to deploying UCARE.AI's Cost Predictor, Parkway used traditional statistical methods to provide bill estimates. The statistical models generated were expensive to update and therefore not refreshed frequently, exacerbating error rates. To tackle this, Parkway deployed the Cost Predictor in all four Singapore hospitals in November 2018 and saw significant improvements. Since deployment, there have been no customer complaints and the Cost Predictor has achieved an average aggregate accuracy of 82%.

Armed with the confidence of the Cost Predictor's high accuracy, Parkway launched the Price Guarantee Programme for six hospital procedures, namely the removal of piles, breast lumps, ovarian cysts, gallbladder, thyroid and tonsils. The Programme checked and confirmed charges for these procedures against the Cost Predictor's price estimates, verifying the accuracy of the Cost Predictor. The hospital guaranteed that patients will be charged according to the initial price quoted by the Cost Predictor, regardless of whether additional treatments were included later on. Before or during the day of admission, financial counsellors also worked with patients to review their estimated medical bill. These sessions made sure that the patient had a clear estimate of the eventual medical bill, helping them make ample preparations for finances.

In its commitment to help patients make well-informed decisions with accurate cost estimations, UCARE.AI understood that trust was essential in driving adoption of its AI solutions. To achieve this, the company turned to the Model AI Governance Framework, aligning its practices in AI governance to those in the Framework to ensure reliability in its AI solutions. Besides assigning clear roles for ethical AI development and deployment, UCARE.AI concentrated efforts in good data accountability practices and treated the use of AI with openness and transparency. This provided tremendous benefits to patients in terms of seamless experiences in hospitals, greater certainty over their medical expenses and less re-financial counselling.
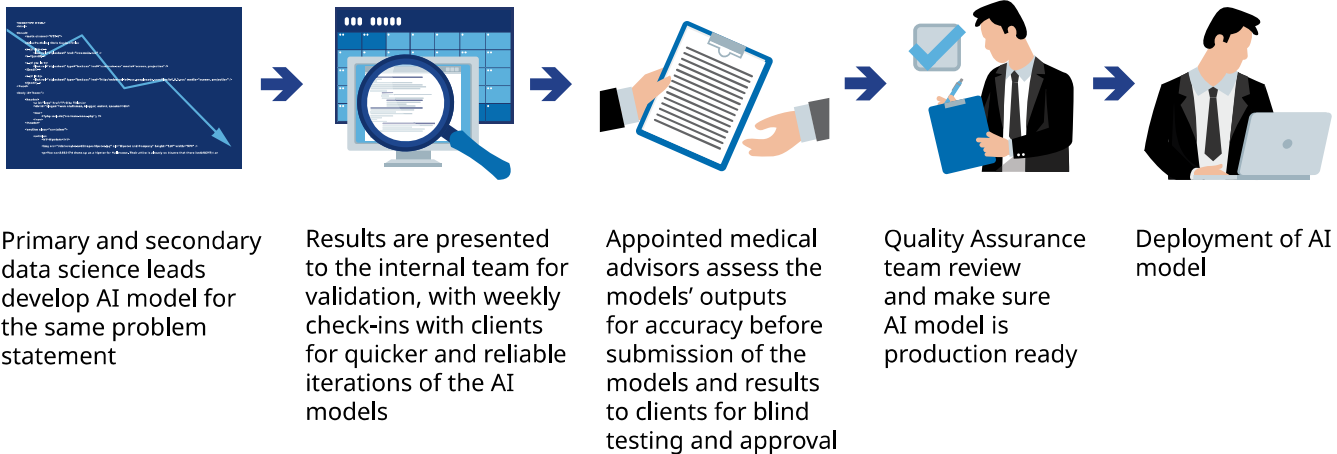
ASSIGNING CLEAR ROLES FOR AI OVERSIGHT

A critical part of AI governance is the need for oversight of the company's use of data and AI. For this, UCARE.AI put in place certain internal governance measures for its company and client projects. One of which involved **assigning clear roles and responsibilities for the ethical development and deployment of AI**.

The approach UCARE.AI took was to have all projects include primary and secondary data science leads to concurrently develop AI models for the same problem statement. Once completed, the data science leads would then present their results to UCARE.AI's internal team, which consists of the Chief Executive Officer, Chief Technology Officer, Chief Security Officer, project managers and the client services team for validation. During the course of the project, UCARE.AI also conducted weekly check-ins with its clients to ensure quicker and more reliable iterations of its AI models. A final step before submission of the models to the client was to have UCARE.AI's appointed medical advisors assess the models' outputsfor accuracy.

After the models and its results have been submitted to the client for blind testing and approval, UCARE.AI's Quality Assurance team would then be brought in to review and ensure that the model was production-ready before deployment.

| Primary and secondary data science leads develop AI model for the same problem statement | Results are presented to the internal team for validation, with weekly check-ins with clients for quicker and reliable iterations of the AI models | Appointed medical advisors assess the models' outputs for accuracy before submission of the models and results to clients for blind testing and approval | Quality Assurance team review and make sure AI model is production ready | Deployment of AI model |

MINIMISING RISKS WITH ROBUST VALIDATION FRAMEWORKS AND FEEDBACK

UCARE.AI also conducted rigorous feasibility studies before developing the Cost Predictor. These studies helped address potential risks such as reduced accuracy in forecasted healthcare costs. With the studies, UCARE.AI then worked with its clients to create a validation framework to strengthen the AI model's accuracy, making sure to obtain patients' feedback on the framework for further fine-tuning. The Cost Predictor's AI model then underwent User Acceptance Testing, where the end business users from each hospital were invited to test the solution and provide feedback on various predictions.

ENSURING SAFEGUARDS ARE IN PLACE

Accountability in its data management practices saw UCARE.AI taking proactive measures for data safeguards to ensure the Cost Predictor's functionality and effectiveness after deployment.

As a first step, when handling personal data for AI model development, UCARE.AI adhered to the requirements of various personal data protection laws and draft bills in its operating regions. Singapore's Personal Data Protection Act (2012) was one such law UCARE.AI kept in mind. Besides obtaining consent prior to any collection and use of personal data, UCARE.AI also made efforts to securely encrypt sensitive data. Its connectors– software components that can extract and transform original data sources into standardised formats – were also designed to automatically detect such sensitive data and where possible, the algorithm was trained to minimise the use of this data in developing the AI model.

To further boost efforts in data protection, UCARE.AI anonymised client data at source before using it for development, thereby minimising the risk of inappropriate access to personal data. This also ensured that in the unlikely event of a breach, personal information could not be easily used to trace back to an individual.

Obtaining consent before collection and use of personal data

Encrypting sensitive data and minimising use of this data during AI model development

Anonymising client data at source

Understanding the lineage of data was also central in the accountable use of AI. Knowing this, UCARE.AI logged data consistently across multiple components and collected data in a secure and centralised log storage. In ensuring data quality, the company was also careful to transform its data into a usable format so that the properly formatted data could be used to build AI models. The company also prioritised creating AI models that were unique to clients, obtaining reliable datasets from the client to build models instead of using third-party datasets. Such a practice provided distinctions between patients' profiles and the eventual features selected for each AI model differed for each hospital, contributing to greater accuracy in the bill estimations for patients that visited the hospitals.

Another pertinent part of AI model development was **minimising the risk of bias**. For this, the objective and consistent machine predictions gave patients customised, data-driven predictions of their hospital bills instead of those subjected to human biases in algorithm development.

After the deployment of the Cost Predictor, UCARE.AI **continuously monitored and iterated the algorithm**, improving the data and simplifying the process for better accuracy. This continual training of the AI models ensured that the algorithms remained up-to-date and functioned with more precision after each data input. More importantly, the methodology of continuous validation of the AI models with client inputs helped to boost confidence in the accuracy of the platform's predictive insights.

TRANSPARENT IN THE USE OF AI AND DATA

To build greater confidence and trust in the use of AI, UCARE.AI was mindful to be transparent in its use of AI with various stakeholders. UCARE.AI not only disclosed the exact parameters used in developing the AI model to its clients, but also provided detailed explanations on all algorithms that had any foreseeable impact on operations, revenue or customer base. Understanding that the accuracy of bill projection is highly regarded by hospitals and patients, UCARE.AI made a conscious decision to **declare the use of AI** in its analysis and prediction of bill amounts to Parkway's data managers and its patients.

The company also actively reinforced its commitment to data protection, painstakingly cataloguing and evaluating every use of data that could be accessed by clients. Clients with concerns about bill predictions were also encouraged to highlight them through UCARE.AI's communication channels. For instance, Parkway's admission staff can easily provide feedback on bill predictions to UCARE.AI via its business owners and IT departments. The feedback would then be forwarded to UCARE.AI for review. This gave clients and external auditors the necessary assurance on UCARE.AI's policies and processes for responsible AI use.

Disclosing exact parameters to its clients

Providing detailed explanations on algorithms with foreseeable impact on operations, revenue or customer base
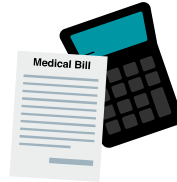
Declaring the use of AI in its analysis and prediction of bill amounts

CONCLUSION

As a company that employs heavy use of personal data for AI model development, UCARE.AI is vigilant and committed to data protection. This is especially important, given that the nature of its work is in healthcare and the call for ethical and responsible use of data is paramount.

Educating clients on the importance of implementing the Model AI Governance Framework so that patients are given the assurance that their data is safe remains one of UCARE.AI's top priorities. With the company's well-tested approach in handling personal and sensitive data, UCARE.AI was able to demonstrate its experience in this field and gain the confidence of its clients. The shared professional trust and respect between UCARE.AI and its clients in turn helped to build the recognition of the company as a reliable and trusted partner in data management and developer of AI models.