



Nature-Inspired AI for a Better World

Ethical - Explainable - Greener - Human Centric
Insurance - Healthcare - Sustainability - and More



MATHFICAST SOFTWARE SERVICES LIMITED

BUTTERFLY AI ©

An Overview

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At Mathficast Software Services UK Limited (<https://mathficast.co.uk/>), our breakthrough Butterfly AI, a new breed of AI as an always-on AIaaS (AI as a Service) platform currently live on Google Cloud Platform (GCP), is on a mission to help humans solve some of the biggest challenges faced by world today, including those in healthcare and sustainability. Predict anomaly in heart signals, predict the output power of wind turbines, classify the soil based on its fertility level, diagnose cancer at early stages, predict imminent battery failure in electric cars, decide if an insurance claim is fraudulent and more. All our twenty AI-powered services are found on the bottom of our homepage. The services are available globally on any device and at any time.

Butterfly AI produces accurate predictions in just couple of clicks or few API calls (although you may still require some DS work to prepare and label the data). It helps you avoid up to 80% of the time and costs associated with today's conventional predictive AI MLOps. You can deploy and run Butterfly AI with or without an AI and ML infrastructure. AI for everyone with no DS or AI skills: Analysts, executives, and many other personas can use it in addition to Data Scientists or developers.

Within the companies with large AI infrastructures, it provides the fastest way for Data Scientists to qualify a set of labelled training data features as useful or not useful. Quickly benchmark or sanity check their exiting predictions or classifications against those generated by Butterfly AI. Combine their existing predictions with Butterfly AI predictions to potentially get more accurate results. Easy and fast API integration.

Our current heavy focus is on healthcare and insurance. Butterfly AI is using labelled tabular data to perform data preparation and training and then prediction with unseen data. You can either perform all those stages by uploading training data manually to our platform or through three programmatic calls to our API endpoint. On demand and on a paid contract, we are also able to provide the capability to run Butterfly AI in your premises so your data will not leave your organisation. An example of one of our focus areas, the full end-to-end process of detection of anomaly within ECG labelled signals (including all three stages) is presented in the first vision video (video references at the end of this document). Please watch the video to see Butterfly AI in live action.

Butterfly AIaaS platform consists of six underlying super-AI independent and novel algorithmic pipelines as classifiers and predictors (three binary and three multi-class) which are in ever going competition with each other. Each layer includes multiple sub-layers of algorithmic logic and model building capability that follow different logic and attack the problem from a different perspective. There is also another sophisticated selection layer which is running on top of those six super-AI layers to always choose the best performing layer.

Butterfly AI is a problem-agnostic solution. It is not customised for any specific prediction or classification problem. While as a transformative and multi-tasking AI, it can solve tens of different problems across different business and life domains. For example, while it successfully solves the problem of ECG anomaly detection with a labelled time series ECG data, with no change to algorithmic pipeline or backend, it can also predict epileptic seizures using a Wavelet Transforms based labelled EEG frequency data. For both problems it achieves a prediction accuracy above 95%, not knowing what problem it is solving.

As it indicated in <https://mathficast.co.uk/mathfi-health> Butterfly AI is also capable of classifying patients by identifying the exact health condition or disease they suffer from. For example, in the first video, our binary classifiers managed to detect the anomaly of ECG signals. As a follow-up, another layer of our multi-class classifiers can detect what exact underlying heart problem (say

for example out of ten possible heart diseases) that patient with confirmed ECG anomaly is suffering from (provided that the required multi-class labelled training data is available).

Greener AI: Green AI is a major current industry trend as the article in <https://www.bbc.co.uk/news/technology-66465230> indicates. Butterfly AI's learning-training time is far shorter than those of today's predictive AI including Neural Networks and Deep Learning (minutes rather than hours). It also saves tens of hours of Data Science research and engineering work and as such consumes less energy i.e., an environmentally friendly AI. Butterfly AI doesn't use the traditional Neuron or layers or architecture found in today's Neural Network or Deep Learning, as such it doesn't require an energy-hungry and expensive GPU. For example, right now we are running Butterfly AI on four-core CPUs on GCP cloud, found in today's ordinary laptops.

Fair and Ethical AI: Most of today's predictive AI are usually biased towards larger classes while missing small classes and anomalies. That may lead to significant problems for example failing to diagnose a cancer at very early stages. Butterfly AI tries its best to be a fair ethical AI because of employing unique Cellular Balanced Learning Technology©. Consequently, every class matters to Butterfly AI even if it is small and therefore it avoids bias towards large classes (i.e., simultaneous optimization of accuracy, precision, recall and F1 score).

Human-Centric AI: We believe the best AI is a human-centric AI even if it is fully automated. Butterfly AI cooperates with human in saying when to stop by introducing Advanced Optimization Threshold Technology©. It shares the control of depth of its optimization with human.

Explainable AI: It tries its best to be an explainable AI by taking a different approach and architecture from the conventional Neural Networks and Deep Learning. Every stage of learning, evolution or success of the AI is explainable across our codebase.

Butterfly AI can be seen as a Predictive AI Operating System, allowing Data Science teams to focus more on data quality (labelling, preparation, and other stages), leaving the primitives of training and prediction to the Engine. This platform also allows multiple ways of integrating it your existing workflow: from full SaaS webapp to REST API to CLI app running in your desktop or Jupiter Notebook. Butterfly AI is a low-entry bar service to start building predictive AI applications, already packaged with 20+ most known critical problem spaces faced by world today (within 20+ business verticals) where it excels. Its flexibility makes it an all-in-one solution to quickly run training and predictions for prepared tabular data, going from months of research and deployment time for AI models required by today's AI to few days. Watch the linked videos for a quick overview and don't hesitate to book a demo with us to explore the full potential of the platform.

Video Links:

1. **Mathficast Vision: ECG Anomaly Detection with Butterfly AI (5 min):**
<https://www.loom.com/share/2db7c408bfa54c239455c19aec713192?sid=d1a66333-f464-44d7-b62f-e6b42aae065b>
2. **Company Overview, Greener and Sustainability Super-AI (5 min):**
<https://www.youtube.com/watch?v=1iJaCi7zUoo>
3. **Generative AI? (1:30 min)** <https://www.youtube.com/watch?v=IMpAq8-bm5E>
4. **AI and World Hunger (2 min):** <https://www.youtube.com/watch?v=-OooAPL-Dek>
5. **Butterfly AI: A Predictive AI Operating System, Insurance Services (22 min):**
<https://www.youtube.com/watch?v=g7mVAheZvwc>
6. **Butterfly AI: A Predictive AI Operating System, Health Services (30 min):**
<https://www.youtube.com/watch?v=um4zeFTCb8>