

TRENDALYZE

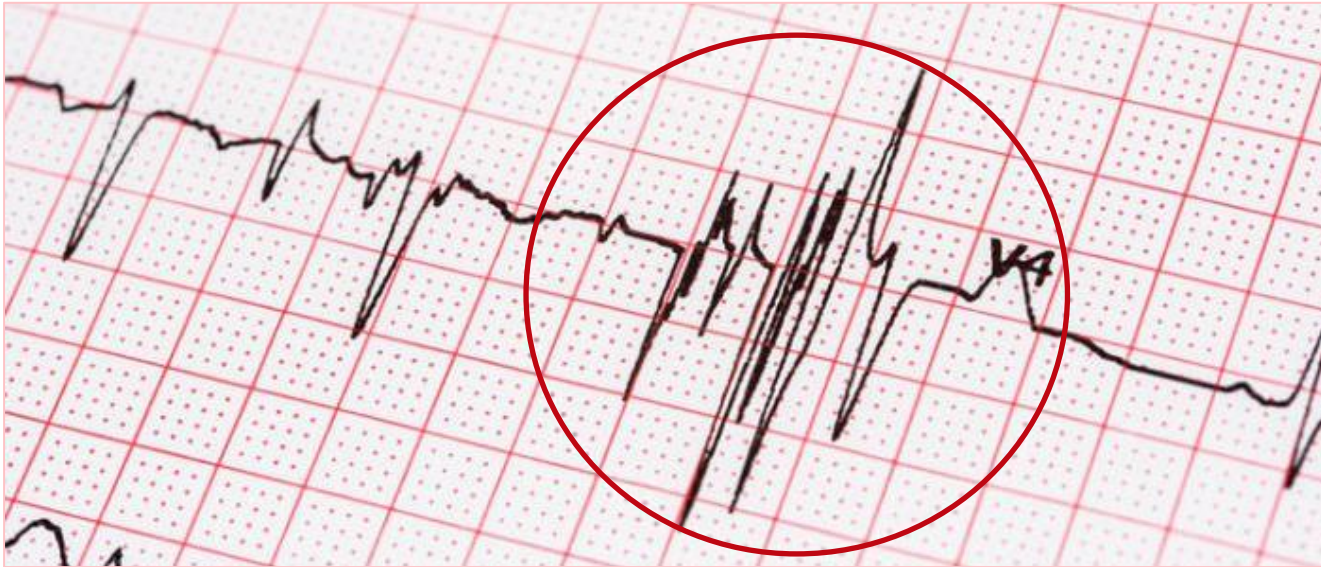
Shaping the Future of Intelligence and
Management in the Digital Economy

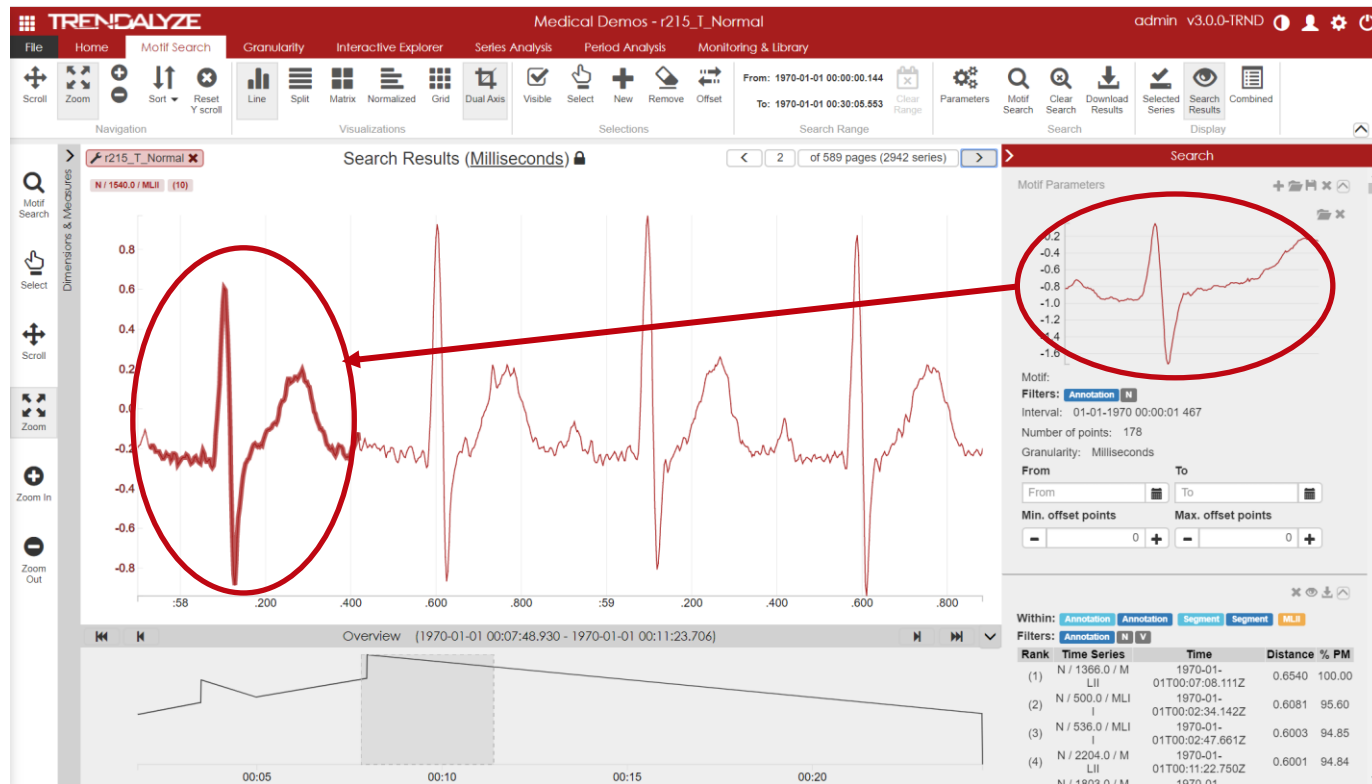




In the Digital Economy the pay-per-visit model will change to subscription-based health care. Wearable devices deliver 24/7 monitoring, vital changes are algorithmically detected, and healthcare specialists are alerted for instantaneous action.

Every digital/digitized businesses runs on time-series (continuous) data. As it streams, it creates a heartbeat. Just like an ECG, shapes in data contain vital insights.





- Search for similar patterns (pathologies) within large number of patients.
- Search for unusual anomalies (i.e., have I missed something)
- Create and share with other professionals libraries of meaningful patterns.
- Use known patterns to annotate device data.
- Monitor patterns in real time.

A Personalized ECG Monitoring Model based on Motif Discovery

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SAGE

Abstract

Introduction: The demand for remote patient electrocardiogram (ECG) monitoring has increased dramatically especially because of COVID-19. It has been driven historically by the desire to release patients from hospitals as soon as possible both to reduce hospital costs and because of the comfort of recovering at home. But the risks of sudden death without Remote Patient Monitoring (RPM) were significant. How to reliably and efficiently read ECG signals and send alerts to healthcare professionals is an urgent problem to be addressed. Many researchers are focused on developing deep learning models. However, it requires very large samples of labeled data and consumes a lot of time. In addition, the deep learning models are generalized and cannot be built for each individual separately as this is too expensive and the data may be insufficient. But most heartbeats are unique on a patient level. Hence accuracy will be an issue for deep learning models.

Method: In this paper, we propose a Personalized Monitoring Model (PMM) for ECG data based on motif discovery to address this challenge. The main strategy here is to individually extract personalized motifs for each individual patient and then use motifs to predict the rest of readings of that patient by artificial logical network.

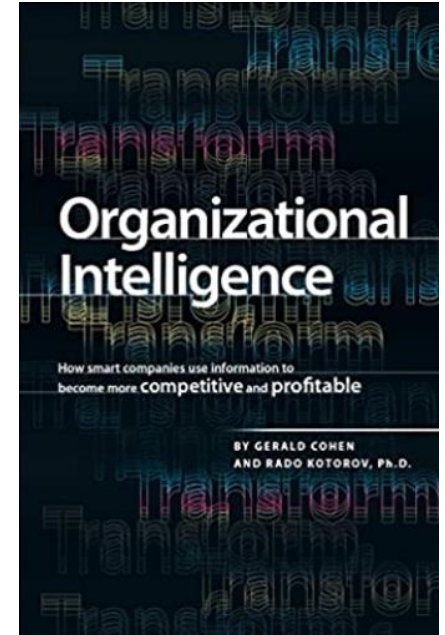
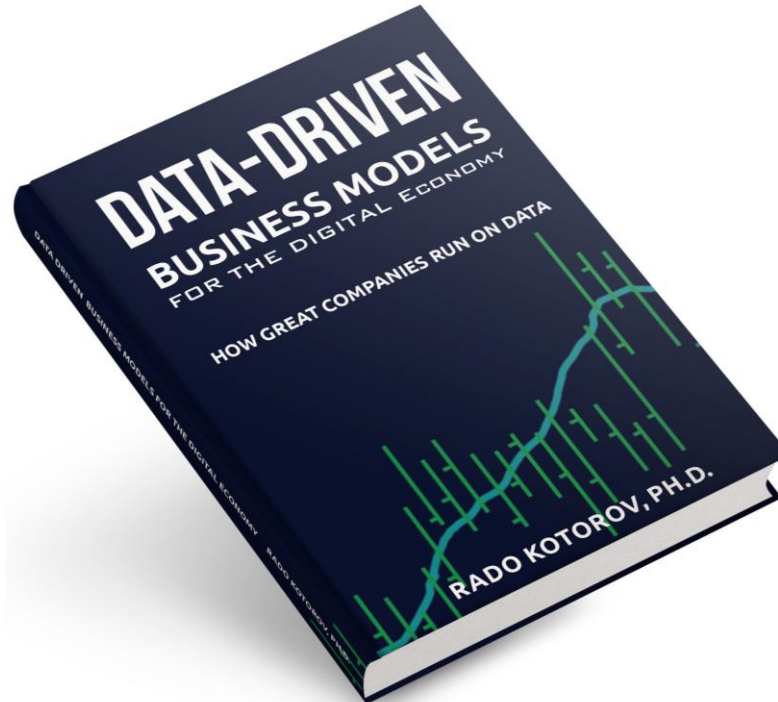
Results: The proposed model substantially speeds up the ECG prediction and effectively avoid interference data in ECG motif discovery. Experiments on real-world data demonstrate that our model significantly outperforms the generalized models in both classification accuracy and time efficiency.

Conclusion: Our proposed PMM almost eliminates much training and small sample issues, and is completely understandable and configurable by a doctor or a nurse.

Keywords

Personalized Monitoring Model, ECG, Motif Discovery, COVID-19

HBR states that data creates competitive advantage. But it also disrupts and changes the business models, physician/patient relationships, and the competition in healthcare.



Trendalyze was awarded R&D grants to apply its technology in key healthcare projects.

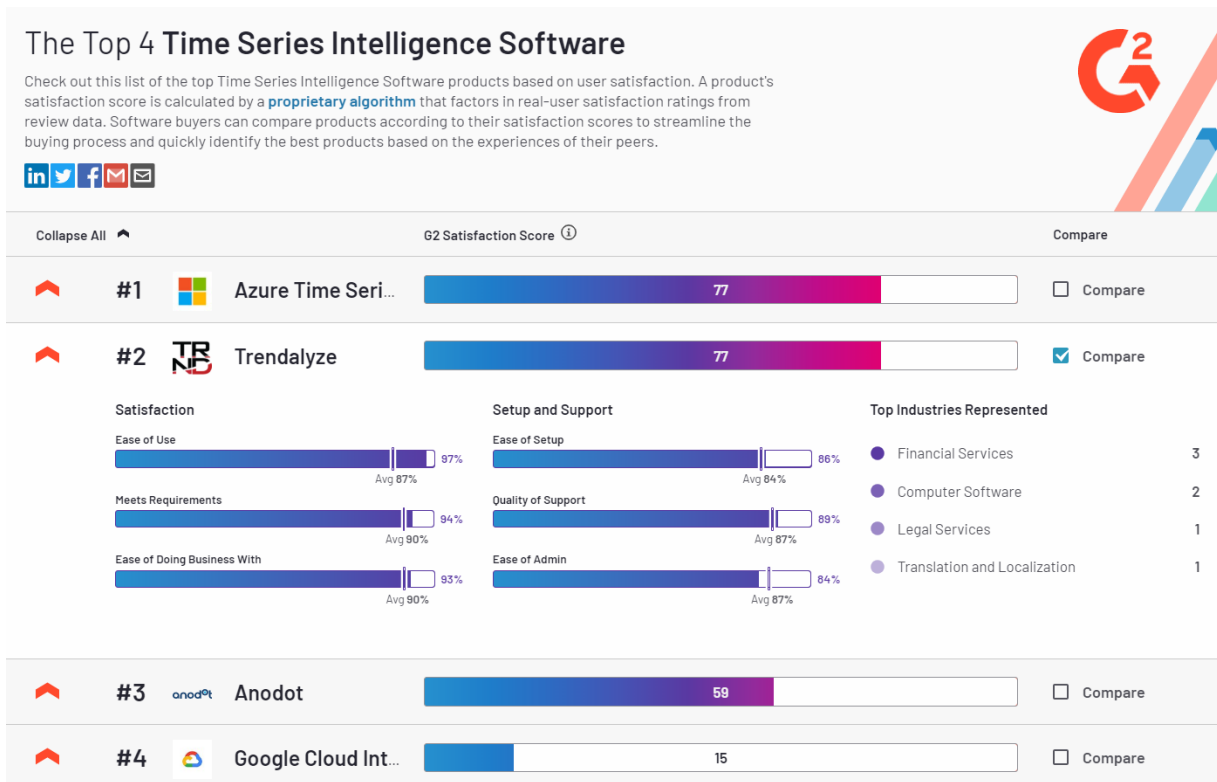


- Chronic pain management solutions
- Monitoring of prescription patterns



Joint R&D project with University College London for robotic surgery gesture detection and optimization

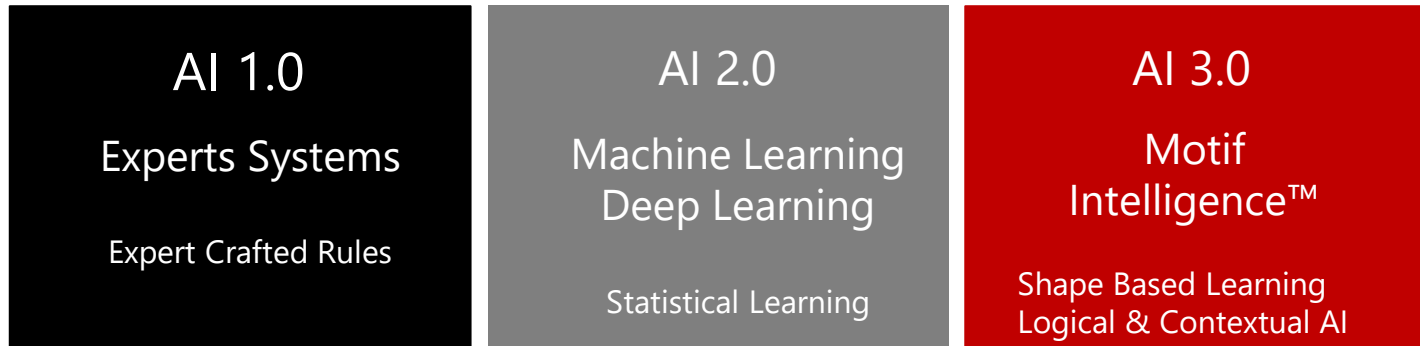
TRND Is Rated #2 Time Series Intelligence Software by G2.com (business software and services reviews).





Analytics Approach and Algorithms

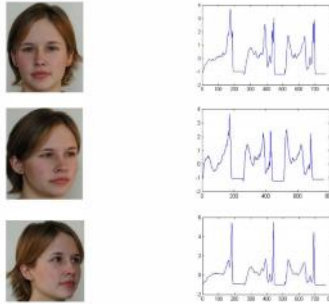
New developments in AI are focused on logical algorithms that learn faster and with less data as the human brain does.



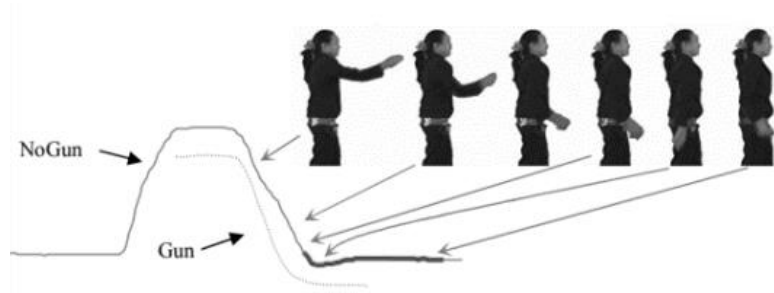
"Past DARPA AI investments facilitated the advancement of "first wave" (rule based) and "second wave" (statistical learning based) AI technologies. DARPA is now interested in researching and developing "third wave" AI theory and applications that address the limitations of first and second wave technologies."

Shape learning is an alternative approach to AI. It is growing in popularity because it can solve many problems.

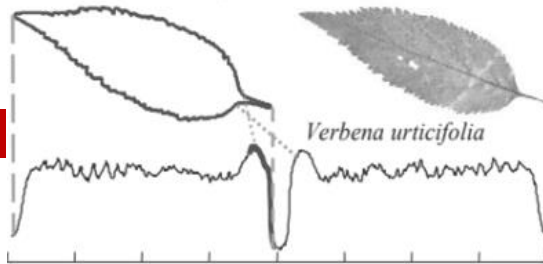
Face Detection



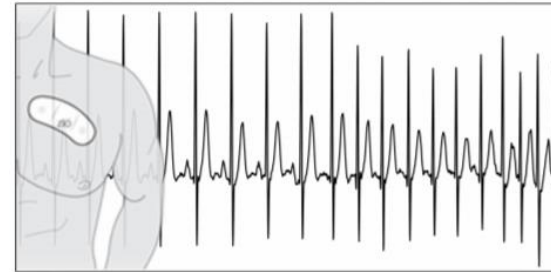
Gesture Detection



Object Detection

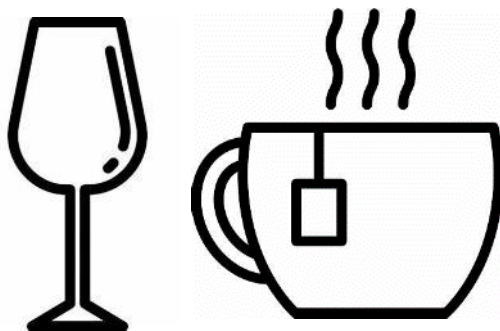


Process Monitoring



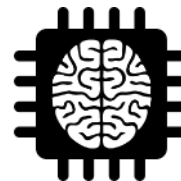
Shape learning works like the human brain. It learns fast from just a few examples unlike how machine learning works.

How do humans and machines learn the differences between these two shapes?



Human Learning:

- Recognize shape differences immediately
- Learn the differences from a few examples
- Identify known shapes instantly

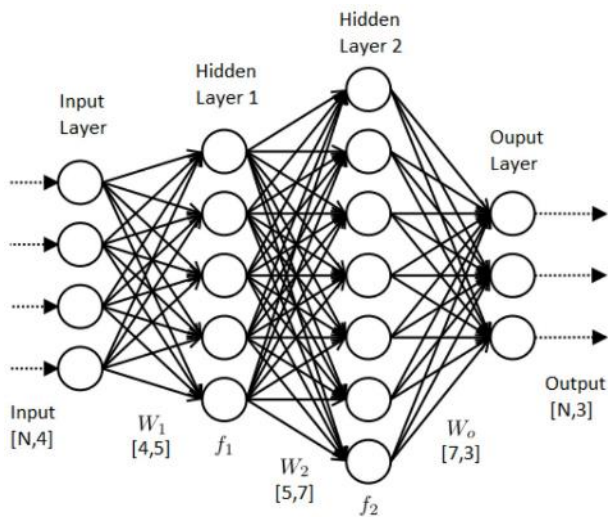


Machine Learning:

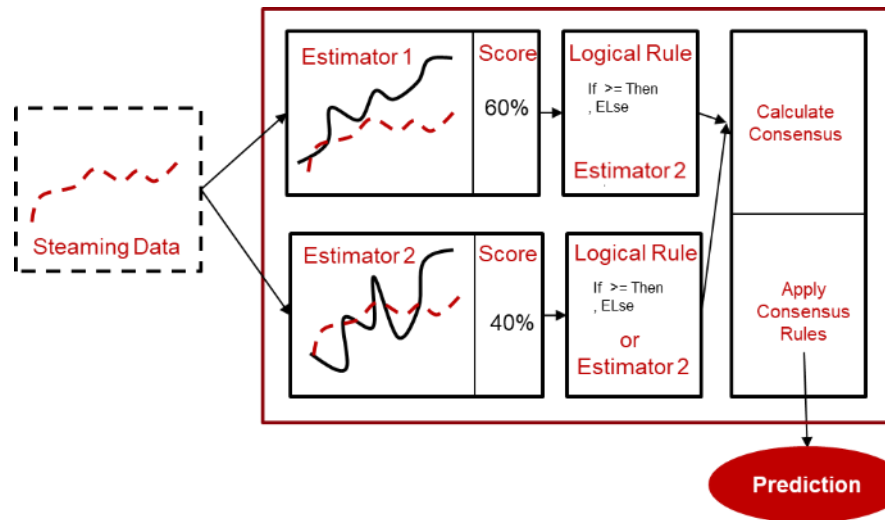
- Requires thousands of pictures to train the model
- All pictures have to be labeled precisely by humans
- Small shape differences confuse machines

Unlike Neural Networks, Trendalyze logical networks are easy to configure and deliver highly accurate results.

Neural Network



Logical Network (patent pending)



Trendalyze delivers fast time to market with a simpler, business-friendly approach that eliminates model complexities.

	Motif Intelligence	Machine Learning	Deep Learning
	Trendalyze	DataRobot, Datameer, Dataiku, DataScience, Trendminer, Seeq, Anodot, Microsoft, IBM Watson, Amazon	
Self-Service	Yes	No	No
Data Science/ Statistical Knowledge Required	No	Yes	Yes
Step 1: Data Engineering	No	Yes	Yes
Step 2: Feature Engineering	No	Yes	Yes
Step 3: Parameter Setting	One	Multiple	Multiple
Step 4: Model Training	No	Yes	Yes
Step 5: Model Testing	No (Tested vs ML and DL)	Yes	Yes
Step 6: Model Refresh	No	Yes	Yes
Model Is Explainable	Yes	Yes	No

We help companies understand
the pulse of their business.

Thank you.

