# Technical Breakthrough Paper

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**Title: IntualityAI: Prediction AI Breakthrough of Future Events by Simulating Human Behavior and Decision Making in Many Domains**

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Abstract:

Intuality Inc. introduces IntualityAI, a humanized general AI prediction system capable of predicting future events in many domains, including investment markets, health monitoring, sports game prediction, elections, website activity, and fund raising, among others. By incorporating Intuitive Rationality, a unique logic system, IntualityAI generates real-time dynamic terrains of future events, probabilities, and actionable alerts, allowing for higher level learning across applications. Unlike traditional AI systems, IntualityAI is compact, versatile, and demonstrates general AI characteristics, emphasizing the benefits of integrating human behavior and decision-making into AI.

## 1. Introduction

IntualityAI is a humanized general AI prediction system developed by Intuality Inc. By using Intuitive Rationality, the system's underlying logic, IntualityAI can produce successful results in a diverse range of applications, including investment markets, health monitoring, sports game prediction, elections, website activity, and fund raising, among others. This paper presents the key features and benefits of IntualityAI, highlighting its unique and efficient design.

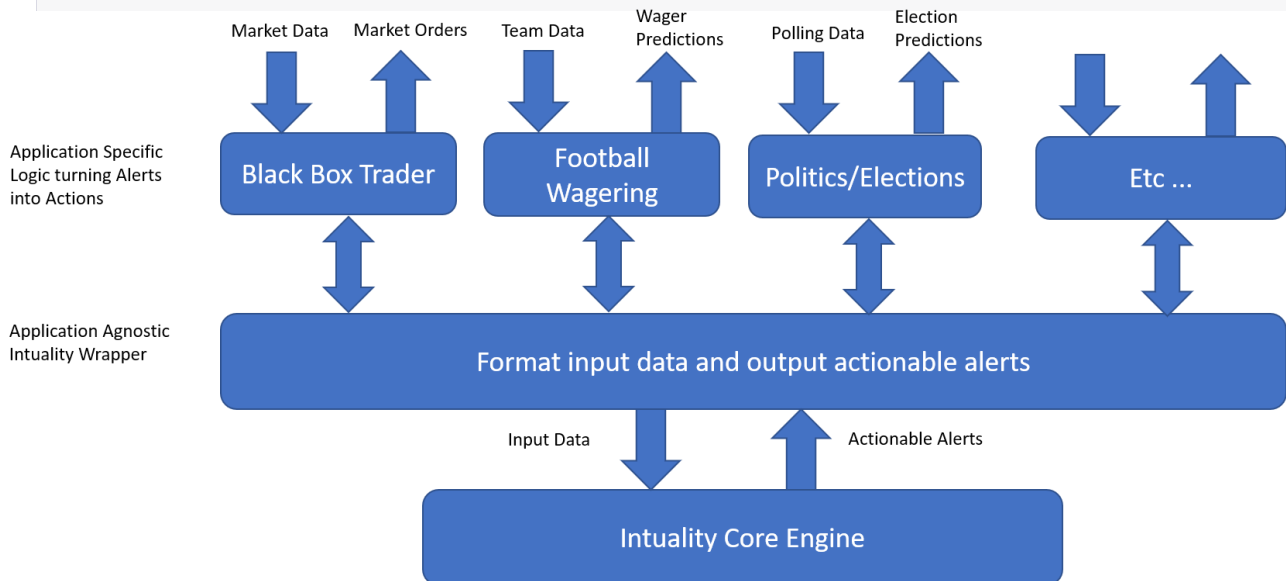## 2. Intuitive Rationality: A Novel Decision-Making Logic

IntualityAI's decision-making logic, Intuitive Rationality, is derived from a constantly evolving, input data-driven, intuition soup of cognitive biases from which intelligence emerges. This approach allows the system to create decision-making intuitions for every input data stream and their correlated environment. As a result, IntualityAI generates real-time dynamic terrains of 150 future events, their probabilities, and the periodic emergence of actionable alerts. These alerts can be translated into output instructions in the application's user narrative or input into additional IntualityAI instances for higher-level learning.

### 3. Compact, Mobile, and Versatile Design

Unlike traditional AI systems, which are large, complex, and heavily reliant on extensive databases and complex mathematical regression functions, IntualityAI small core code foot print makes it ideal for many mobile applications. Its singular, humanized, decision-making logic remains consistent across applications, demonstrating its general AI characteristics and the benefits of integrating human behavior and decision-making into AI.

### 4. From Theory to Implementation

Decades of research and application culminated in a more efficient redesign of IntualityAI in 2014. The existing code and algorithms were re-coded into a compact code library component that is application-agnostic and easily integrated into a wide range of prediction applications. A general schematic of IntualityAI's core engine and general application is provided to illustrate its

structure and functionality.

| Market Data | Market Orders | Team Data | Wager Predictions | Polling Data | Election Predictions | | |

Application Specific Logic turning Alerts into Actions

| Black Box Trader | Football Wagering | Politics/Elections | Etc ... |

Application Agnostic Intuality Wrapper

**Format input data and output actionable alerts**

Input Data          Actionable Alerts

**Intuality Core Engine**

### 5. Advancements in Core Code and Design

In late 2022, a second re-design of IntualityAI's core code further enhanced and streamlined its operation. Improvements encompassed internal and external event triggers, fractional prediction units, additional internal correlation functions, and more.

### 6. Multiple IntualityAI Instances and Middleware

One enhancement enabled the launch of multiple independent IntualityAI instances within a single processor, each utilizing separate signal sets and parameters. The application also manages the middleware required to map agnostic instances to specific applications.

### 7. IntualityAI Application Wrapper

A key feature of IntualityAI is its application wrapper, which provides a loose, real-time coupling between data sources supplying input signal data and the IntualityAI instances.
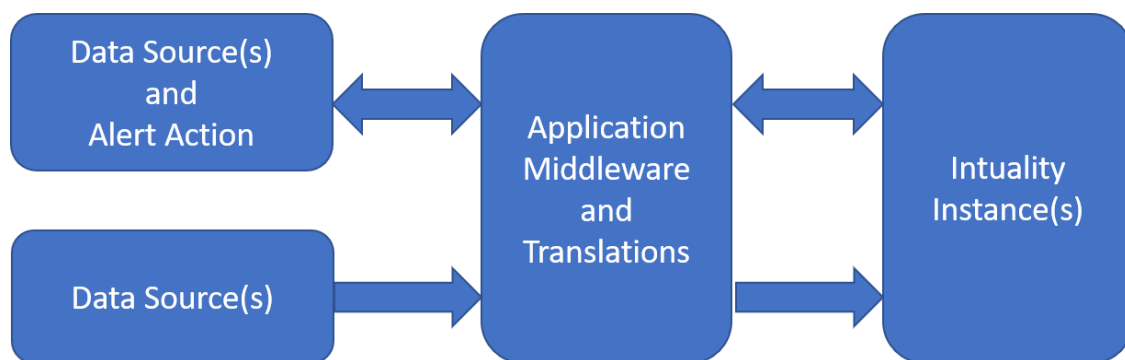


Data sources can be bidirectional, offering input data for signals and receiving actionable alerts translated into application-specific actions, such as 'Bet $X on this team', 'Buy this stock at the market', 'A heart arrhythmia is an 80% probability within 65 seconds', or 'This candidate will be leading his opponent in 2 weeks', among others.

### 8. Investment Markets Trading Integration

A prime example of IntualityAI's application wrapper is its integration with investment market trading systems. In this scenario, data sources connect to specific market backends, providing data for stocks and futures, generating actionable alerts that are translated into buy/sell orders. This seamless integration demonstrates the adaptability and flexibility of IntualityAI's core design and functionality.

### 9. Code Footprint and Performance

IntualityAI boasts a lightweight code footprint, one of its main benefits, which allows it to function as a prediction engine without requiring extensive memory banks or storage systems. The core design can handle many input signals, crunching high volumes of input data series quickly by utilizing its intuition soup of cognitive biases. This process determines relevancy without resorting to traditional computationally expensive regression functions, learning and correlating information similarly to human subconsciousness. Unimportant information is forgotten, while crucial decisions are saved for determining actionable alerts.

IntualityAI's small and nimble design makes it suitable for various implementations, including large server-side systems, embedded applications, mobile systems, and on-chip implementations. Unlike neural network approaches, IntualityAI does not necessitate initial training or retraining to provide relevant responses to stimuli. Theoretically, IntualityAI can produce actionable alerts after inputting the third data point in a series. Operating as a state machine, similar to human subconsciousness, the system quantifies future probabilities and predictions for each new event in real time.

## 10. Signal Types and Data Sources

Each input signal within IntualityAI correlates with other input data, enabling it to be continuously modified by its subconscious and conscious control systems. For example, the recently added "Hedge" data type provides unique processing behavior to offset "Up" directions of input data series from downside risk and vice versa. This feature has proven beneficial in applications such as the investment markets, NFL football and election campaigns.

Input data series are categorized as either "Objective" or "Influencer" signals. While all signals are included in event processing and correlation, only "Objective" signals can generate actionable alerts. "Influencer" signals produce varying effects on future probabilities of objectives during the correlation process and prior to generating actionable alerts.

## 11. Large Centralized System with Multiple Environments

IntualityAI wrapper applications connect database-driven application environments with outward web interfaces, linking users to specific IntualityAI instances. The general architecture, illustrated below, demonstrates the wrapper for large-scale, centralized applications running server-side and receiving input data from external sources through IntualityAI instances. These instances store alerts, probabilities, and other data for further processing and user delivery.
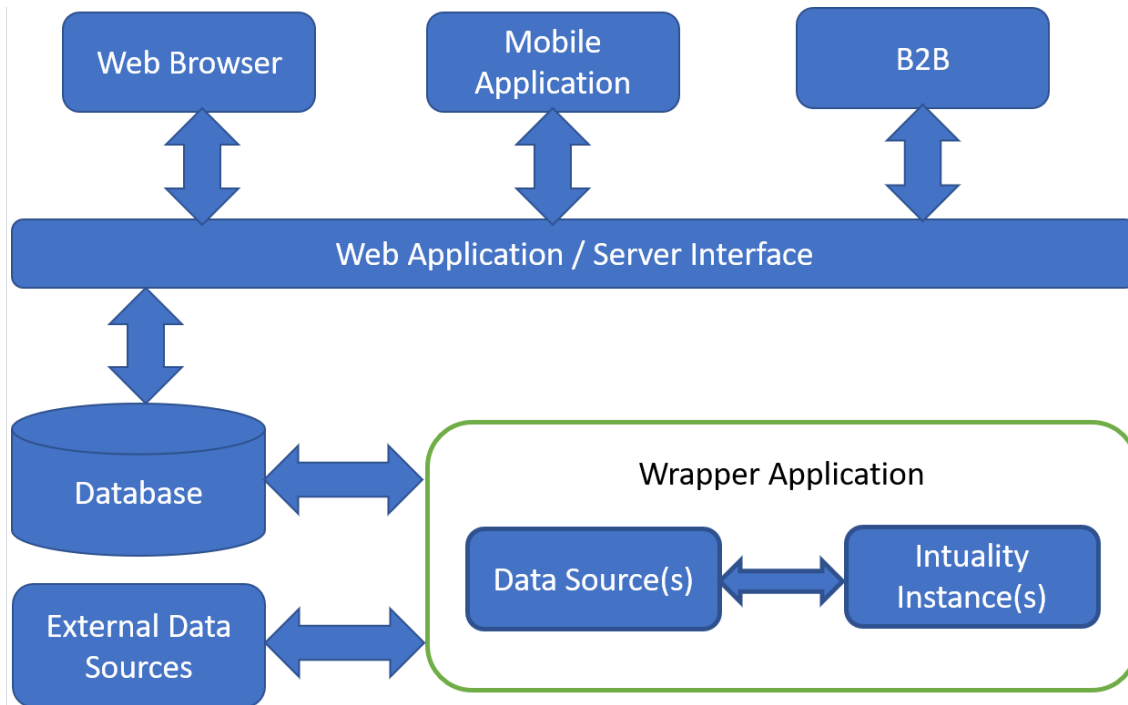
Notably, IntualityAI's lightweight footprint enables direct integration into mobile devices, such as IntualityAI-on-a-Chip explained below.

A key improvement to IntualityAI is the correlation algorithm, which allows many input signals in a single IntualityAI instance to include smaller application environments. For example, individual wearable health IntualityAI devices can interact with a larger, general health IntualityAI environment. These individual user environments would be bidirectional, with some signals designated as Objective and others as Influencers. Users receive alerts specific to the general environment they are in, such as all Type 1 diabetics.
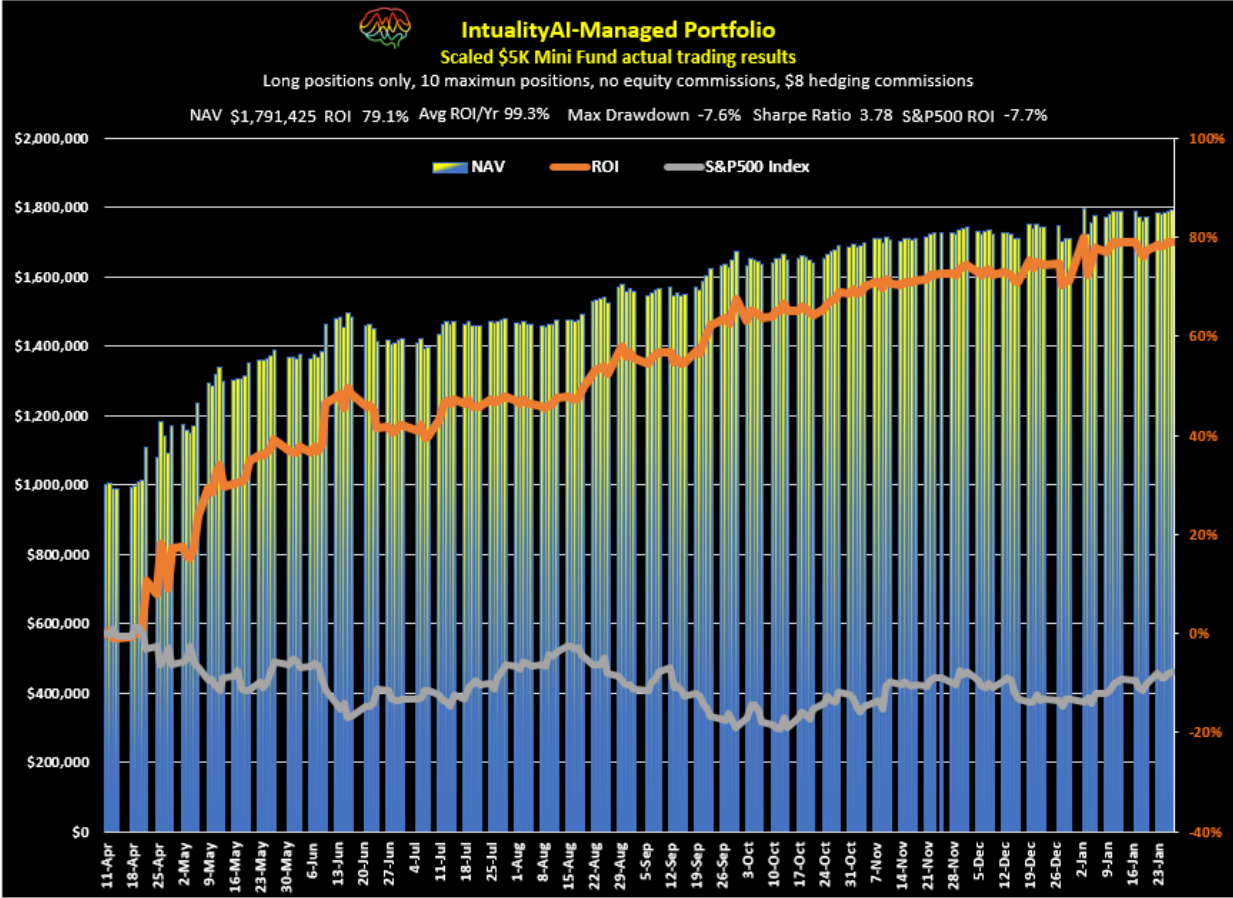
12. Learning Networks

As IntualityAI is lightweight and continuously re-trains itself, broader, society-scaled applications could combine instances in large learning networks. Prediction alerts are exchanged between instances, generating specific alerts out of the network. This approach allows for a more dynamic and responsive prediction system capable of adapting to changing environments and user needs.
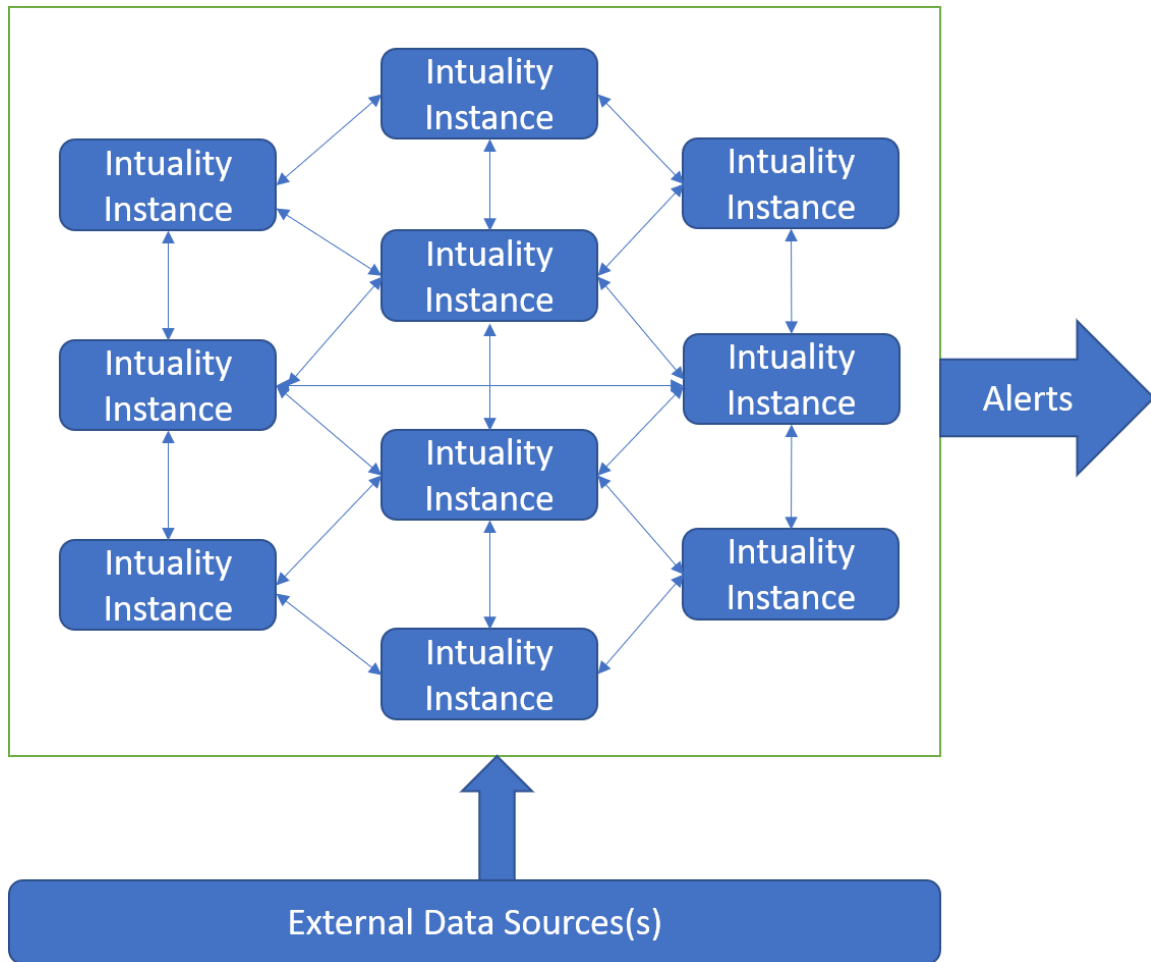


## 13. IntualityAI business applications

### 13.1. IntualityAIMarkets

These applications track the S&P500 stocks and use the E-Mini S&P futures contract or the SPY ETF to hedge portfolios. A track record account is shown below.

**IntuialityAI-Managed Portfolio**
**Scaled $5K Mini Fund actual trading results**
Long positions only, 10 maximun positions, no equity commissions, $8 hedging commissions

NAV $1,791,425  ROI 79.1%  Avg ROI/Yr 99.3%   Max Drawdown -7.6%  Sharpe Ratio 3.78  S&P500 ROI -7.7%

We have also integrated IntualityAI into the Bluewater Trader futures trading platform to allow users to define portfolios for automatic trading decisions.

## 13.2.        IntualityAIFootball

This application uses actual play-by-play data from prior games to simulate play-by-play games for every team competition during the upcoming week and predict the winners. Those predictions are then processed against the upcoming game Las Vegas spreads (Influencer data) to produce 'cover' and 'don't cover' predictions, including recommended wagering amounts by game, for a 10-year average record of 58% win rate and a 50% return on wagering.
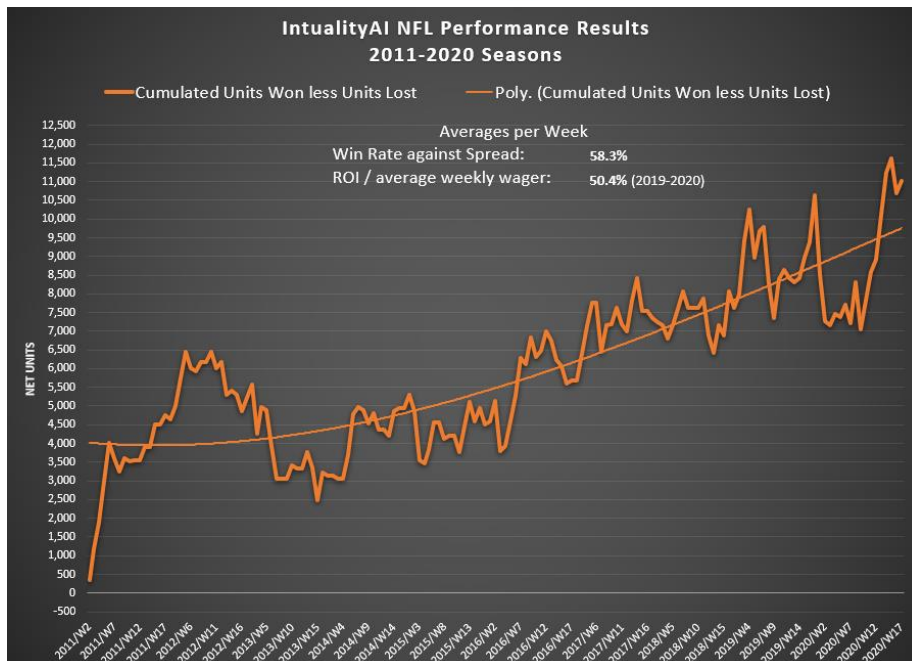
### IntualitySports
we show you the future

**NFL Game Picks Report**

#### Regular Season 2020 Week 16

| | Game | Favorite | Intuitor Picks | Spreads of Record | Wager |
|---|---|---|---|---|---|
| 1 | Arizona vs San Francisco at Arizona | Arizona | Cover | Arizona by 5 | Y 95(38) |
| 2 | Chicago vs Jacksonville at Jacksonville | Chicago | Cover | Chicago by 7.5 | Y 95(38) |
| 3 | Houston vs Cincinnati at Houston | Houston | Don't Cover | Houston by 8 | Y 95(38) |
| 4 | Washington vs Carolina at Washington | Washington | Cover | Washington by 2.5 | Y 95(38) |
| 5 | Philadelphia vs Dallas at Dallas | Philadelphia | Cover | Philadelphia by 2.5 | Y 95(38) |
| 6 | Baltimore vs NY Giants at Baltimore | Baltimore | Don't Cover | Baltimore by 11 | Y 100(40) |
| 7 | Tampa Bay vs Detroit at Detroit | Tampa Bay | Don't Cover | Tampa Bay by 9.5 | Leaning |
| 8 | Miami vs Las Vegas at Las Vegas | Miami | Cover | Miami by 3 | Leaning |
| 9 | Cleveland vs NY Jets at NY Jets | Cleveland | Don't Cover | Cleveland by 9.5 | Leaning |
| 10 | Kansas City vs Atlanta at Kansas City | Kansas City | Don't Cover | Kansas City by 10.5 | Leaning |
| 11 | Seattle vs LA Rams at Seattle | Seattle | Don't Cover | Seattle by 1.5 | Leaning |
| 12 | LA Chargers vs Denver at LA Chargers | LA Chargers | Cover | LA Chargers by 3 | Leaning |
| 13 | Green Bay vs Tennessee at Green Bay | Green Bay | Don't Cover | Green Bay by 3.5 | Leaning |
| 14 | Buffalo vs New England at New England | Buffalo | Cover | Buffalo by 7 | Leaning |
| 15 | | | | | |
| 16 | | | | | |

**IntualityAI Picks are in Yellow   Low Probability Picks are in Green**
**Wager column explanation:  Wager Y/N, Confidence (1-100), (Units (8-40))**
The Spreads of Record are as of this report's time-stamp in its title and before game time

**IntualityAI NFL Performance Results**
**2011-2020 Seasons**

Averages per Week
Win Rate against Spread:        58.3%
ROI / average weekly wager:     50.4% (2019-2020)
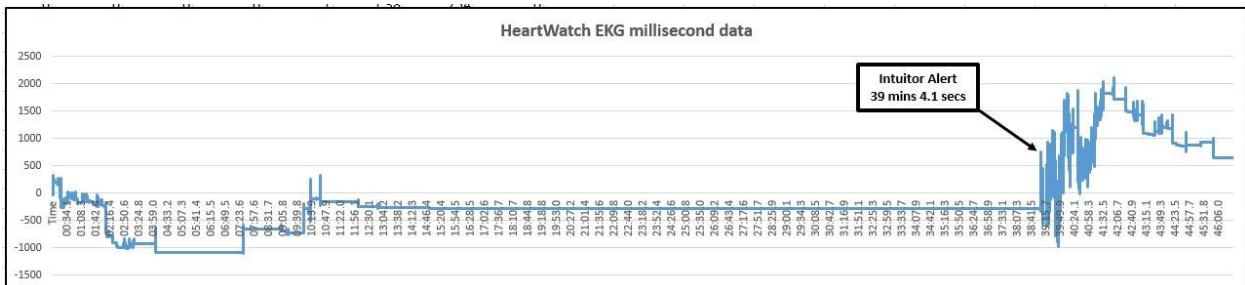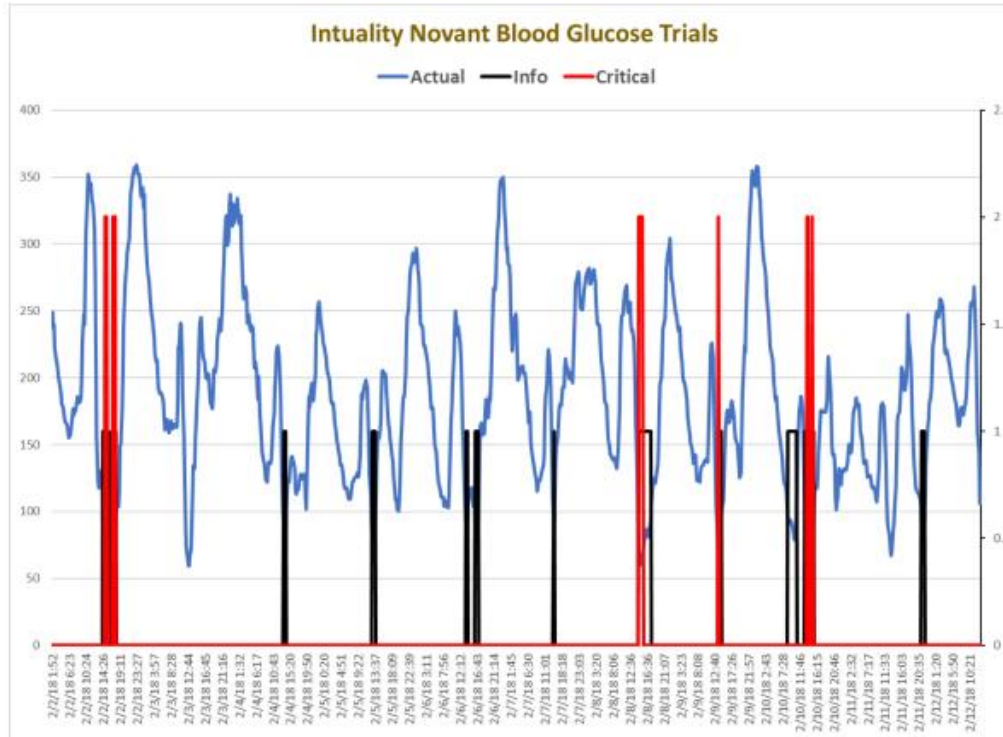
### 13.3. IntualityAIHealth

Controlled trials using IntualityAI to predict epileptic seizures produced alerts from 1.4 to 3.7 minutes prior to the events, in all three cases.



Neuroscience Research Institute of North Carolina
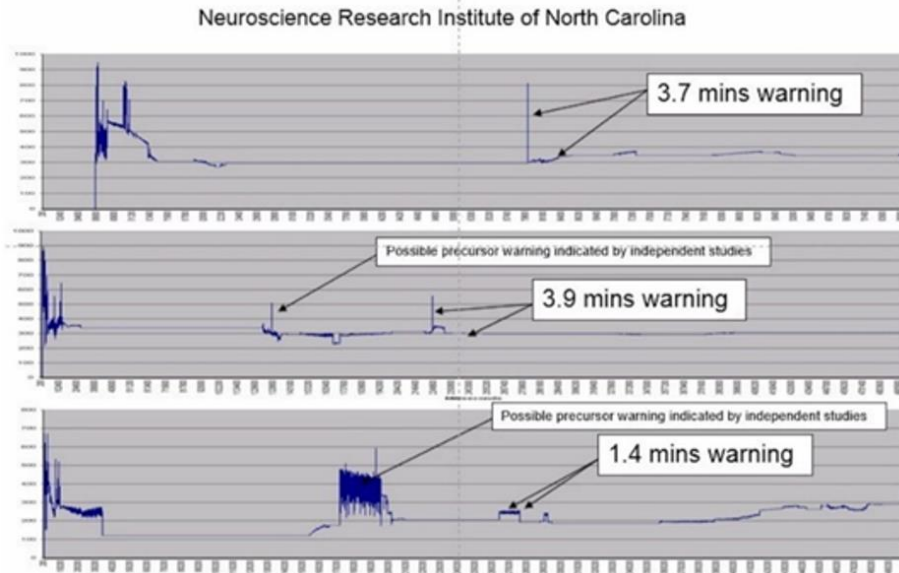
Controlled trials using IntualityAI to predict heart arrhythmias gave an alert 39 minutes prior to the event.



Controlled trials using IntualityAI to predict hypoglycemic events 15-30 minutes prior to the event with a 70% success rate.
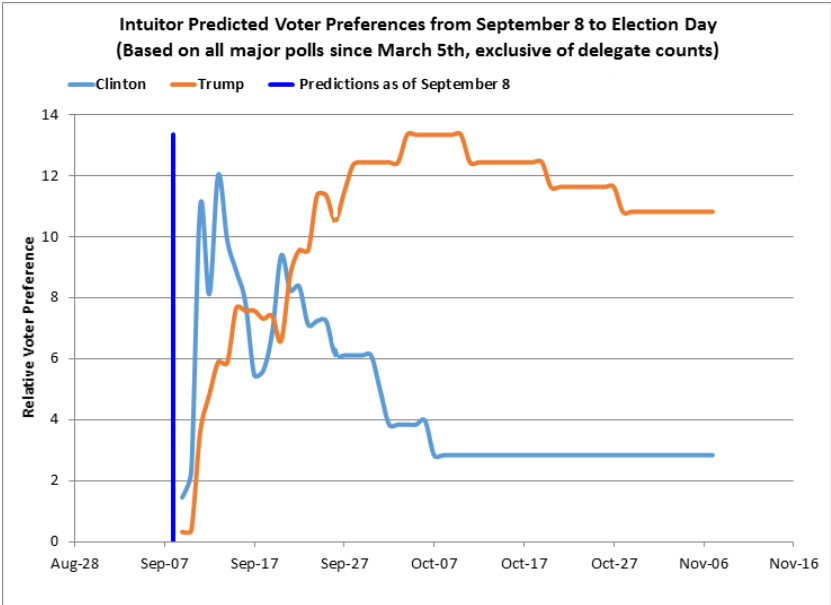
**Intuality Novant Blood Glucose Trials**

There is an immediate need for the direct integration of IntualityAI into a wearable health monitoring and prediction device. Data inputs will be from existing monitoring watches and related devices to predict and alert, not just report, mobility, blood pressure, heart rate, blood oxygen, respiratory rate, temperature, sleep quality and other environmental data. In addition, the system will predict and alert overall health conditions on a 24/7 basis. A follow-up
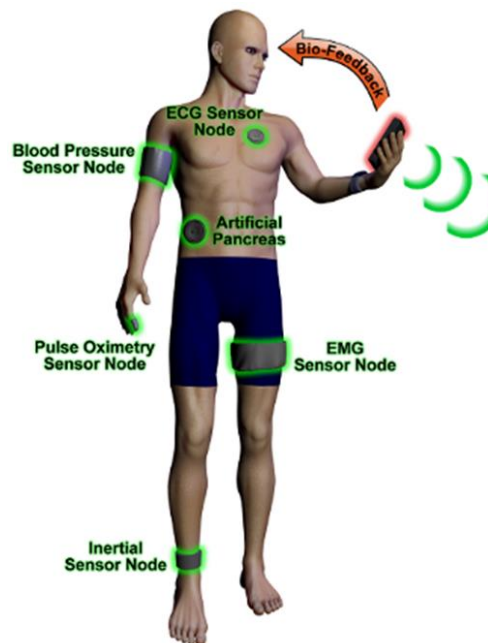
version, with appropriate FDA approvals, communicate health alerts to health providers.

## 13.4. IntualityAIElections

This application uses polling data from the major pollsters to predict probabilities for candidates to win their respective elections. IntualityAI continuously updates during election season to produce not just singular predictions but for every day out to election day. It has done this for every Presidential race since 2012 and congressional, gubernatorial and midterm elections for the same period with leading success. The 2018 midterm elections resulted in 87.5% correct predictions at the State and Congressional levels.

**Intuitor Predicted Voter Preferences from September 8 to Election Day**
**(Based on all major polls since March 5th, exclusive of delegate counts)**

— Clinton    — Trump    — Predictions as of September 8

This server-side implementation pulls in polling data and updates election probabilities according to user needs, particularly for campaign management, pollsters, and the news media.

### 13.5.　　Embedded Mobile Apps

Key considerations for embedded systems are small code footprints in harsh and mobile environments, including limited weight, size, and communication requirements. Many
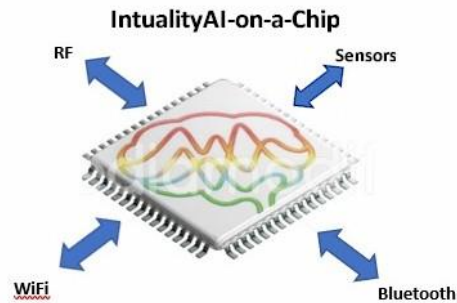


applications require on-chip solutions for which IntualityAI is well suited, as in monitoring vehicle components, like railcar wheels and bearings, heavy duty trucks, automobiles and planes.

## 14. Conclusion

IntualityAI represents a major advancement in AI prediction systems, by incorporating human behavior and decision-making into a compact, versatile, and general AI system. Its novel decision-making logic, Intuitive Rationality, and its diverse range of applications, demonstrates the potential of humanized AI in industry and human domains.