IARPA REASON
Proposers Day Lightning Talk

January 2023

Regina Joseph

PYTHO: WHO WE ARE

Regina Joseph

- System design & R&D
- Security & Defense Analyst (Senior Research Fellow, Clingendael Institute NL, Sibylink EU)
- Technologist: developed 1st digital media publication and digital ad formats in 1994 (Blender); led first international livestream transmission over IP in 2000 (Super Bowl XXIV; Liberty Global); developed earliest streaming technical standards (Sony)
- Researcher & Consultant: Clients include USMC; INTERPOL; NCSC-NL; NATO; UN ICC; ERSTE Bank; European Fund for the Balkans
- Superforecaster since ACE Y2; Member of winning ACE Y3 Super team; 1st & 3rd place Superforecaster in FOCUS Phase 1 cycles

Pavel Atanasov

- Cognitive Psychologist
- Aggregation Strategy (ACE, HFC)
- Associate Professor, IESI (EU)
- Frequently published in peer-reviewed journals on judgment & decision-making

- **Winning team members in IARPA ACE, HFC & FOCUS programs.**
- **Stood up our own teams for IARPA CREATE & FOCUS as co-PIs**
- **As co-PIs, winners of 2 National Science Foundation grants to investigate human versus machine forecasting of clinical trial transition success**
- **Established standards in hybrid human-machine interaction, training protocols, superforecaster identification, statistical aggregation, UI/UX strategies and crowdsourcing platform development for superior accuracy.**
- **Granted patent on NEUER bias-sensitive structured analytic system; Human Forest granted US patent; EU patent pending**
- **Developed Cognitive Training System for INFER forecasting system run by Applied Research Laboratory for Intelligence & Security (ARLIS)**

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PYTHO: STATE-OF-THE-ART PREDICTIVE ANALYTICS PORTFOLIO

The mission of Pytho's creation was to build a constellation of the most advanced and accurate predictive analytic systems and tools by harnessing our decades of experience at the forefront of decision science research:

Human Forest (USPTO Patent 11,550,830; EU Pat. Pending):

- **The world's first information scaffold for data sources**
- **The first platform to enable crowdsourced reference class forecasting**
- **The HF system generates custom base rates**
- **Allows crowds to provide base rate-informed forecasts**
- **Scores and ranks forecasts for accuracy**

Human Forest is just one part of Pytho's IP Portfolio:

- **NEUER (Patent 10593220): Systems And Methods For Bias-Sensitive Crowdsourced Analytics (a noise-reducing structured analytic technique)**
- **ADYTUM: Forecasting Elicitation Platform**

WE SPECIALIZE IN BOOSTING THE HUMAN SIGNAL IN HUMAN-COMPUTER INTERACTION

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SUMMARY: About Pytho

Our Methods Outperform AI / ML in Forecasting Geopolitical & Commercial Outcomes

- Our crowdsourced human methods show surprising accuracy
- Winners on 3 IARPA programs. Consistent outperformance of human vs. machine intelligence
- Testing complete in 2 current NSF programs. Effect replicated & reproduced

Won 2 NSF Grants ($680k+) to Apply Our Winning Method to Clinical Trial Outcomes

- Our patented Human Forest method and system has been tested against industry gold standard Random Forest model developed by Johns Hopkins/American University
- Results: Human Forest beat the model by up to 50% in predictive accuracy

Our Wide-Ranging Multidisciplinary Experience Yields Results Across Domains

- Familiarity with ergonomic system design that appeals to commercial as well as government users
- Deep exoerience in information curation, design & analysis
- Applied anticipatory systems for technically complex domains
- Experience for building ontologies across wide range of categories

WE OFFER REASON TEAMS EXPERIENCE ACROSS:

Human-Computer Interaction (HCI)

Cognitive Psychology, Judgment & Decision-Making

Structured Analytic Technique Design

Intelligence Analysis

Information Design & Sourcing

User-facing System Design & Ontologies

UI/UX Strategies

Language & Cultural Ranges In Analysis & Training

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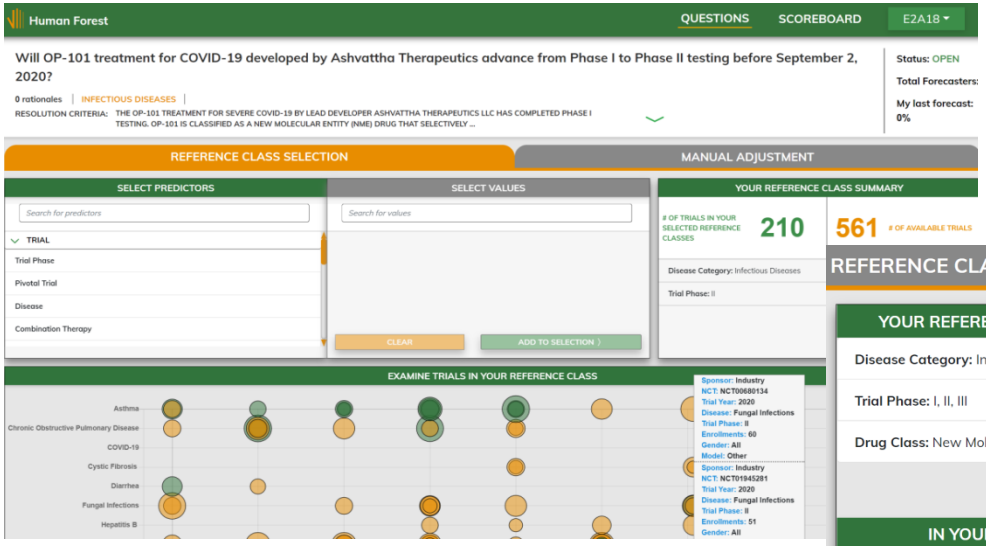
INTRODUCING HUMAN FOREST

Human Forest Process

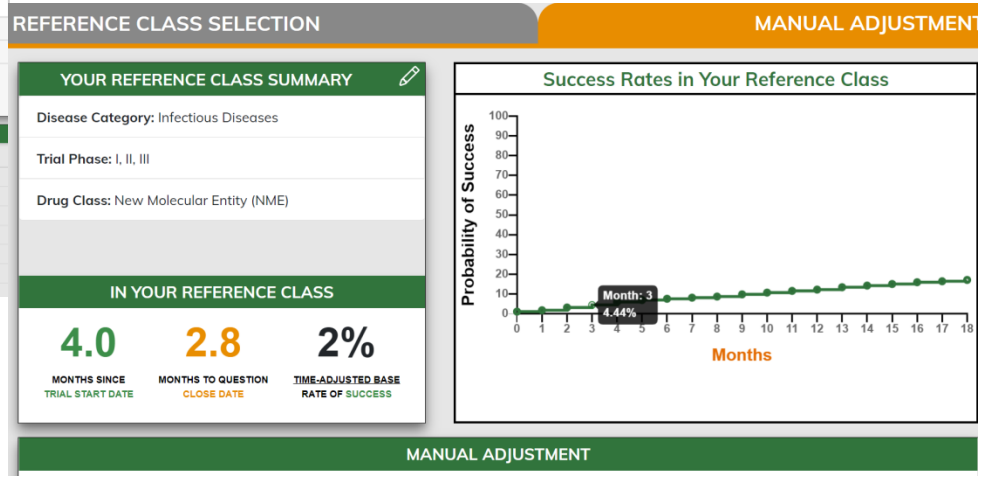
Patented human-computer interaction method encompassing any leveraging of existing datasets in service of prediction

Human Forest Platform Product

Forecasting platform's UI/UX extracts predictive value from pre-existing datasets to boost forecasting accuracy of human decision-makers by generating base rate and tracking data



Human Forest allows groups of people to form the "nodes" of a human algorithmic system shown to consistently outperform machine learning algorithms in prediction



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INTRODUCING NEUER

NEUER Process

Patented process for reducing noise in crowdsourced structured analysis

NEUER is a method and process embodied in a structured analytic technique. The SAT is built to assist analysts, especially when working in groups, to assess the quality of their information, the cognitive disposition of the analyst(s), and to assign probabilistic values to outputs rendered by the analyst(s)

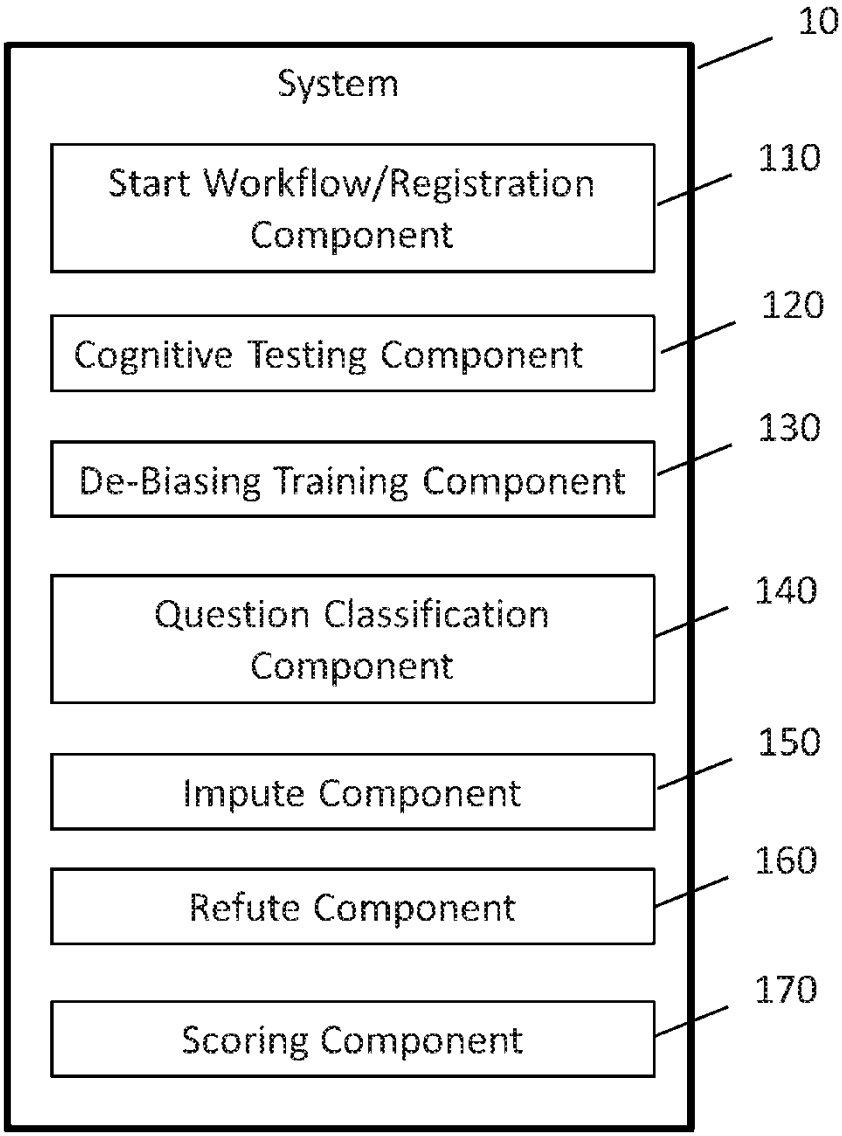

FIG. 1

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INTERESTED IN TEAMING?

Get in touch!

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THANK YOU!

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