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RRA Technology Overview

Despite our interconnectedness in this increasingly complex and fast-paced world, a pervasive lack of foundational trust between individuals and organizations divides us. To regain confidence in processes and people and to stem the fraud, waste, abuse, and insider threat challenges we face, global organizations and governments require rapid, accurate, and scalable vetting mechanisms.

Six Maritime has partnered with Clearspeed (formally AC Global Risk) to bring Clearspeed and RRA technologies to qualifying clients.

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To help establish trust in processes and people, Six Maritime offers a unique and powerful technology - Remote Risk Assessment (RRA[®]) from Clearspeed. RRA is a highly scalable and effective voice analytics technology that quickly and economically assesses an individual's level of risk with respect to specific themes, issues, or topics.

By evaluating specific outputs of the human voice and speech, RRA can detect and quantify the presence or absence of risk in response to customer-defined questions – a groundbreaking approach to enhance the trust equation.

This AI-enabled technology leverages validated voice analytics, proprietary technical processing, and large volumes of unique, real-world data – none of which are available elsewhere in the market today.

One of RRA's primary applications addresses the massive problem of financial fraud, estimated to cost insurance and financial institutions hundreds of billions of dollars annually. Notably, the National Health Care Anti-Fraud Association estimates that healthcare fraud alone amounts to approximately \$70B to \$230B per year.¹

Additionally, the technology is extremely valuable to military and government agencies in meeting stringent requirements for domestic and foreign security vetting applications. The accelerated proliferation of risk vectors and malicious actors in recent years has underscored the need for advanced technology to identify the latter. Indeed, RRA has the potential to arm and fortify organizations with the type of trust required for dynamic, innovative, and prosperous economies and societies.

Overview

RRA solves the hard problem of establishing and enhancing trust at scale through a combination of expert methodology, validated voice analytics, and innovative computer engineering capable of detecting and measuring the presence or absence of risk in vocal output. Together these elements provide a tailored approach for rapid and highly accurate risk identification, to assist in use cases such as hiring, insider threat and insurance fraud.



¹ NHCAA, The Challenge of Healthcare Fraud

The methodology of question development is fundamental to the RRA process. We craft the optimal questions based on decades of experience in designing and conducting thousands of security and fraud related voice questionnaires. The question development process is done with the customer's input and addresses the most critical concerns of fraud, safety and security. The questions are recorded in the language of choice and automated to eliminate human bias and maximize scalability. They are then uploaded into Clearspeed's automated voice risk questionnaire engine.

The vocal structures and features our technology detects and evaluates are based on established cognitive neuroscience evidenced by international research experts, and supported by global organizations.

Our technology captures vocal responses to automated questions, creates an integrated model of each response, and then evaluates them from low-to-high risk. There is no "baseline" required for each voice questionnaire. The presence (or absence) of vocal signatures indicative of distinctive risk-associated reactions are detected and evaluated. The customer receives custom reports with overall risk ratings allowing them to clear people quickly, while also identifying fraud and risk that might otherwise have gone undetected.



The Clearspeed solution is not a silver bullet. However, in its core function as a reliable, cutting-edge fraud and risk identification tool, it has never failed to demonstrate its effectiveness in the tens of thousands of instances evaluated.

RRA is proven at scale commercially and with the U.S. government. Our customers in the Special Operations community were able to validate RRA's accuracy and effectiveness against other known, reliable risk indicators from intelligence and biometric database correlations. We further demonstrated our value by identifying risk not captured by legacy detection and clearance processes.

RRA leverages the power of voice to identify risk, reduce fraud, and build trust.

RRA: Technology

An enormous quantity of information is available in the human voice, the outputs of which may reveal the speaker's physical and emotional state, as well as any risk to specific issues. This information is embedded at such fine levels in the vocal signal that it's mostly indiscernible by humans. However, there are technologies available that can objectively recognize and interpret such signals. Standing out as one of the paragons among these technologies is RRA.

Changes due to the association of real-world jeopardy and consequence to automated questionnaire topics are measurable in characteristics of the voice. Anatomical and electrophysiological evidence reveal that particular mid-brain and brain stem areas also assist in coordinating control of the cranial nerves and muscles that change the vibratory (phonation) and resonating aspects of speech. The latter's downstream effects are detectable by RRA.

RRA technology is not based on the micro signal-level measurements that have been traditionally used for voice stress analysis. Rather, RRA measures macro-level stylistic vocal changes elicited in the voice production process through voluntary and involuntary neurological pathways. Some of the macro-level changes are measurable within spectrographic representations of the voice signal, as well as prosodic and other quantifiable voice characteristics, which have been found to be language agnostic. The specific features evaluated by RRA and the methodology used to analyze these features are a Trade Secret.

Voice Stress Analysis (VSA), developed in the 1960s, is a manually administered process that evaluates frequencies associated with the voice below 20Hz (typically 8-14 Hz). VSA is used almost exclusively during face-to-face, specialized interviews involving specific interrogation techniques. The goal is to identify truth and deception and gain admissions and confessions, similar to polygraph testing.

RRA differs from VSA in several fundamental ways:

- RRA evaluates a different frequency range than VSA. (Because most telephone systems transmit frequencies from approximately 300Hz–3.4KHz and VOIP HD transmits frequencies in the range of 50Hz–7KHz, the RRA integrated voice model does not contain the frequencies lower than 20Hz that VSA evaluates.)
- Each RRA verbal questionnaire typically requires no more than 10 minutes; one VSA examination requires on average at least 45–60 minutes.
- RRA verbal questionnaires are automated and designed to be conducted in parallel from numerous geographic locations; VSA interviews are singular, manual, and face-to-face.
- RRA evaluates voice signals for risk factors; VSA is designed for truth and deception applications.
- RRA evaluates the presence or absence of vocal parameters reflective of several reactions, whereas VSA only evaluates the presence or absence of stress as revealed in the voice.
- RRA makes no assumptions as to the root cause of the risk score for a response (which can be due to anything from malfeasance to more innocuous reasons such as auxiliary associations and/or individual variability). Only conclusive data from an alternate technology source, or a follow-up interview by the investigative team can determine the underlying reasons for higher risk scores. By contrast, VSA labels and assumes deception based on “Stress Indicated” positive results.

Remote Risk
Assessment Is
Not Voice Stress
Analysis

Lie Detection, on the other hand, is the process of making a final, binary determination of truth - “lie” or “no lie.” Technologies used to make that final determination are called lie detectors.

Remote Risk
Assessment Is
Not a Lie Detector

A Risk Assessment is an interdisciplinary process that identifies and assesses risk, along a continuum from low-to-high, and actionable steps that can be taken to mitigate, isolate, monitor, avoid, transfer or escalate the risk issue. Risk assessment systems implemented correctly are continuous, holistic, layered, redundant, technology-enabled and serve the purpose of helping end-users identify risk (whether it be a security-related risk or financially related, such as fraud), to make better decisions, faster, and allocate precious resources accordingly. This is the eco-system of sensors, indicators, and alerts that help

identify risk. As such, RRA technology is an AI-enabled decision aid used for the purpose of fraud identification, vetting, and screening, none of which are lie detector applications.

	RRA	POLYGRAPH	VOICE STRESS ANALYSIS
Application	Risk Assessment (Fraud Identification and Vetting)	Lie Detection	Lie Detection
Results	4 Risk Levels No Inconclusives = No Ambiguity	Deception, Truth or 30% Inconclusive = Ambiguity	Stress Indicated or No Stress Indicated = No Ambiguity
Non-Invasive	Not Invasive	Very Invasive	Borderline Invasive
Language-Agnostic	Yes	No Data	No Data
Automated, Telephonic Questionnaire	Yes	No	No
Consistent Questionnaire for All Participants	Yes	No	No
Questionnaire Duration	< 10 Minutes	90 Minutes to Several Hours	60-90 Minutes
Powered by AI	Yes	No	No
Results at Scale Available in 24 hours	Yes	No	No
Accuracy	>95% (Based on Field Validations)	50-75% (Depending on Study)	50-96% (Depending on Study)
Human Bias Can Affect Result Delivery	No	Yes	Yes
Portability	Yes	No	Yes

RRA: Engineering

The RRA system includes 3 inter-connected technology layers:

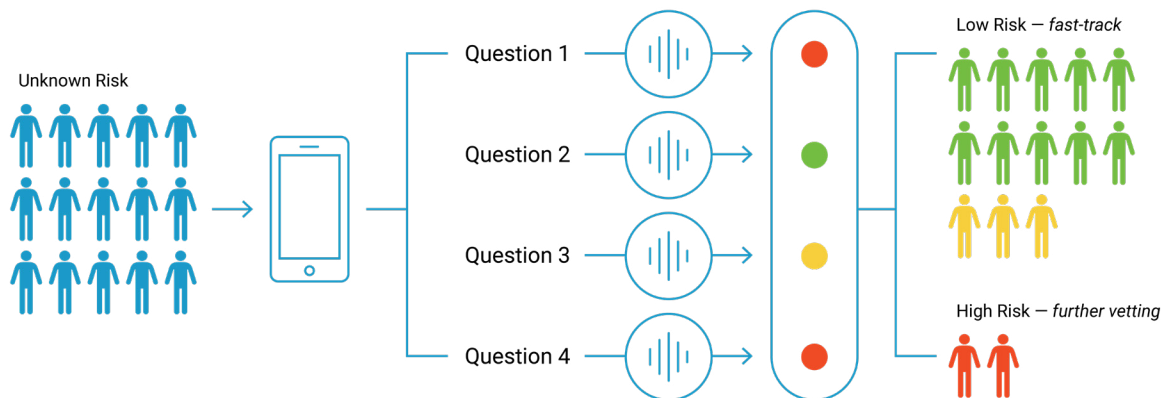
- Voice Analytics
- Automated Voice Questionnaire
- Enterprise Web Application

VOICE ANALYTICS

RRA voice analytics consist of an integrated model of the human voice, in any language, based upon vocal responses to customer-defined questions. The RRA voice model is transformed, processed, analyzed, and quantified using a series of proprietary methodologies, which evaluate and classify specific features of voice responses.

After the voice input undergoes the complete processing cycle, a risk level for each specific response is derived and assigned, from low risk to high risk.

During its development, RRA underwent numerous complex and iterative evaluations, as well as field testing in real-world, high-stakes conditions. Over time, these intensive assessment efforts contributed to the technology's impressive screening metrics (100% sensitivity, 91% specificity) and accuracy (>95%) for first-order risk vetting applications. Also, for supervised customer screening, RRA has consistently demonstrated flagging precision of at least 94% (i.e., > 94% probability that questionnaire responses predicted as higher risk are confirmed as such).



The RRA Technology automates and accelerates the vetting process to clear the vast majority of people who are low-risk, which allows organizations to focus scarce resources on the few cases requiring additional verification.

AUTOMATED VOICE QUESTIONNAIRE

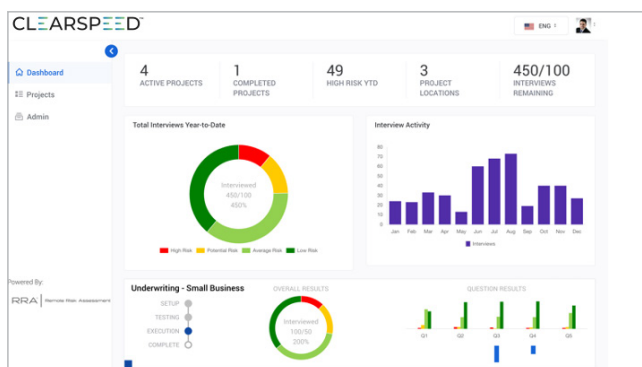
The voice analytics layer analyzes voice data that is collected through ClearSpeed's automated voice risk questionnaire engine. This engine comprises a host of sub technologies for question delivery, call control quality and other related technologies that produce the clearest possible voice signal to be used for the analysis.

Our automated voice questionnaires are deployed in the cloud, and can also be integrated with call center systems, installed on premise, or even completely offline for locations where there is limited phone or broadband service. It is scalable to virtually an unlimited number of concurrent calls or connections.

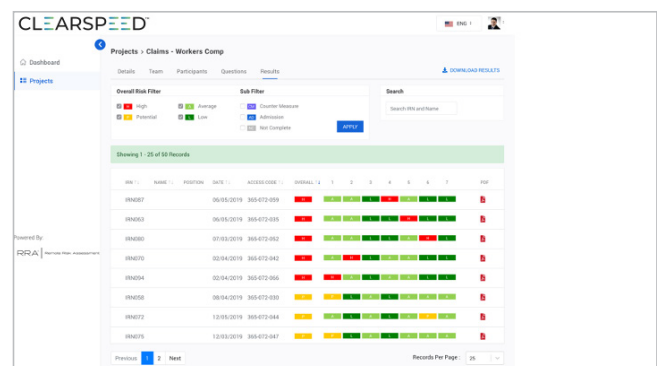
ENTERPRISE WEB APPLICATION

This layer provides a standard, highly secure, customer-facing web-based application. The application, which also runs in the cloud, is micro-services based, multi-lingual, and provides a comprehensive set of API's for integration. Functional features include the ability to view and maintain questionnaires, participants, questions, and results.

DASHBOARD



RESULTS



ID	NAME	POSITION	DATE	ACCESS CODE	1	2	3	4	5	6	7	8	9	10
IRAN001	IRAN001	IRAN001	06/05/2019	305-672-0009	Red	Green	Green	Green	Green	Green	Green	Green	Green	Green
IRAN002	IRAN002	IRAN002	06/05/2019	305-672-0015	Red	Green	Green	Green	Green	Green	Green	Green	Green	Green
IRAN003	IRAN003	IRAN003	07/03/2019	305-672-0012	Red	Green	Green	Green	Green	Green	Green	Green	Green	Green
IRAN004	IRAN004	IRAN004	08/04/2019	305-672-0012	Red	Green	Green	Green	Green	Green	Green	Green	Green	Green
IRAN005	IRAN005	IRAN005	08/04/2019	305-672-0016	Red	Green	Green	Green	Green	Green	Green	Green	Green	Green
IRAN006	IRAN006	IRAN006	08/04/2019	305-672-0010	Red	Green	Green	Green	Green	Green	Green	Green	Green	Green
IRAN007	IRAN007	IRAN007	12/03/2019	305-672-0014	Red	Green	Green	Green	Green	Green	Green	Green	Green	Green
IRAN008	IRAN008	IRAN008	12/03/2019	305-672-0017	Red	Green	Green	Green	Green	Green	Green	Green	Green	Green

RRA: Features

For large-scale screening applications, due to its modular, internet-based configuration, RRA offers the following unparalleled advantages as a first-order vetting technology:

- Language-, dialect-, and culture-agnostic
- Advanced security and encryption
- Clearspeed stores no Personally Identifiable Information (PII)
- Rapid and high throughput
- Completely unbiased
- Results delivered quickly
- No literacy such as reading levels required
- Ability to quickly create custom questions
- Standard and custom reports
- Multiple delivery options
- Very light “IT lift”

Analyses of thousands of questionnaires and results from real-world use cases have demonstrated RRA’s veracity, efficacy, and reliability in the following ways:

- Systematic quantification of vocal signals along a continuum of risk from low to high
- Accuracy in US Department of Defense (DoD) field evaluation was >95%
- Impressive screening metrics based on independent field-validation: 100% sensitivity, 91% specificity, 96.9% positive predictive value and 100% negative predictive value (Note: Type II error rate may be underestimated)
- Consistent flagging precision of >94% in customer deployments based on known outcomes provided by these customers
- RRA has regularly reduced customer’s existing false negative blind spots by identifying high individuals missed by client-based practices and procedures
- Focus on universal indicators of various vocal reactions
- RRA identifies vocal reactions in a quantifiable, reproducible, and effective manner, which corresponds to the expected outcomes of scientific literature

NO BIOMETRICS, PERSONALLY IDENTIFIABLE INFORMATION (‘PII’) OR BASELINES

Clearspeed does not track PII for people who take our voice questionnaires. Regardless of diverse caller conditions and attributes like gender, language, geographic origin, and specific questions asked, RRA works the same.




RRA does not use biometrics, does not require a “baseline”, and does not have or use any personal history to perform its analysis.

RRA In Today’s Voice Market

Voice recognition analysis and natural language processing are increasingly common features in today’s tech-driven world. Multiple segments of voice applications meet a variety of needs for organizations and end users. It’s important to understand how RRA fits in today’s voice analytics market.

RRA is a risk evaluation tool specifically designed to remotely identify and evaluate risk at scale. Those few who are flagged for risk continue to move through the established process for additional verification.

RRA should not be likened to a lie-detector or credibility assessment device because it neither evaluates truth / deception, nor assumes “malfeasance” for people who produce higher risk reactions — it is understood that the reactions that affect vocal outputs can be due to a variety of reasons (including associations, auxiliary memories, and individual variability).

	ASSISTANTS	AUTHENTICATION	EMOTIONS	STRESS	RISK	PROFILING
PRIMARY OUTCOME	Instructions, Search, Tasks...	Identifying Fraudsters	Improving Interactions	Deceptive Intention	Risk Assessment (Fraud Identification and Vetting)	Health Alerts, Human Profiling
METHOD	Natural Language Processing (NLP)	Voice Print	Voice Emotion/ Sensitivity Recognition and Analytics	Voice Stress Analysis / Layered Voice Analysis	Voice Risk Recognition and Analytics	Voice Forensics
SOLUTIONS	   	    	  	 		 

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Learn More About Remote Risk Assessment by SIX MARITIME

If you want more information about voice analytics for risk assessment using RRA®, please contact us today to speak with a voice analytics expert or schedule a demonstration.

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About Clearspeed™ with Six Maritime:

Six Maritime is a client-focused security and risk mitigation company partnered to bring Clearspeed™ patented technology to our clients world-wide. Together we are able mitigate risk with voice analytics. Voice analytics technology provides unique risk alerts based on an individual's vocal responses. It can be quickly and effectively applied for fraud, security, or safety risk screening to clear the low-risk majority while identifying potential high-risk responses that are often missed. Leading global corporations and government organizations use Clearspeed to build trust in their people and vetting processes in hiring, claims, applications, insider threats, compliance, and workplace safety. Clearspeed manages the technology and analytics of the data, Six Maritime brings the technology into the world and integrates the technology to suit our clients' needs.