

# Cengine

Cengine blends human and artificial intelligence together to create Cens™ - (Intelligent Avatars) and uses real time communication to make the worlds first AI marketplace.

# Founding Team



James Tagg

**James Tagg** is a serial entrepreneur specializing in man/machine interfaces and communications. He was instrumental in developing the first touchscreens and built the first mobile VoIP and Messaging products for smartphones. James Tagg made the first ever IP mobile phone call on an iPhone at Demo in 2008. He holds over 200 patents and has written extensively about the relation between human intelligence and computer intelligence.



Erik Viirre M.D. Ph.D.

**Erik Viirre M.D. Ph.D.** is a Professor at the University of California, San Diego (UCSD) in the Departments of Neurosciences, Surgery and Cognitive Science. His scientific interests include vision, hearing and the vestibular system and higher cognitive function. He has published a broad range of research and is currently researching AI medical diagnosis. Dr Viirre led the medical team that enabled Stephen Hawking to experience weightlessness.

# Problem

- Artificial Intelligence (AI) often struggles with problems that Human Intelligence (HI) finds relatively easy.
- AI fails catastrophically when it exceeds one of its limit, yet it is often not aware it is struggling!
- AI failure can be frustrating - customer support systems, or dangerous – medical diagnosis.

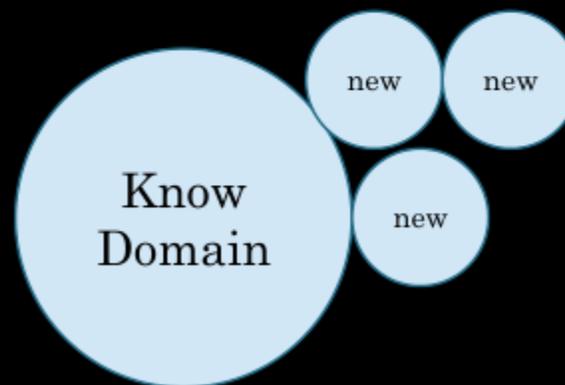


What is Love

A Noun

# Solution

- When an AI nears its cognitive limit – the boundary of its known domain – we need a way to tell if it is about to fail and allow humans to seamlessly intervene.
- Our technique detects when we need to move from an application of AI to the use of HI in real time and preemptively.

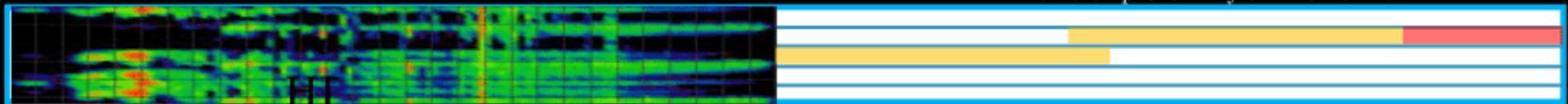
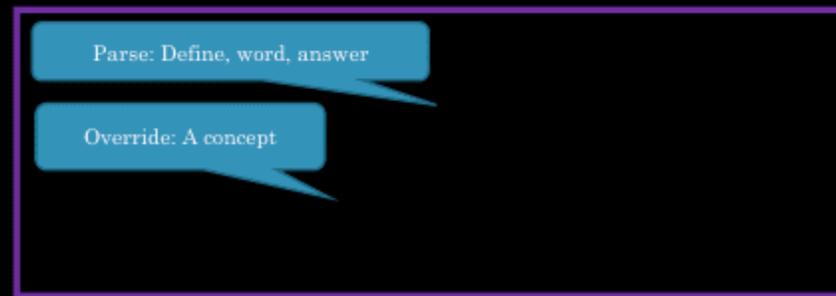
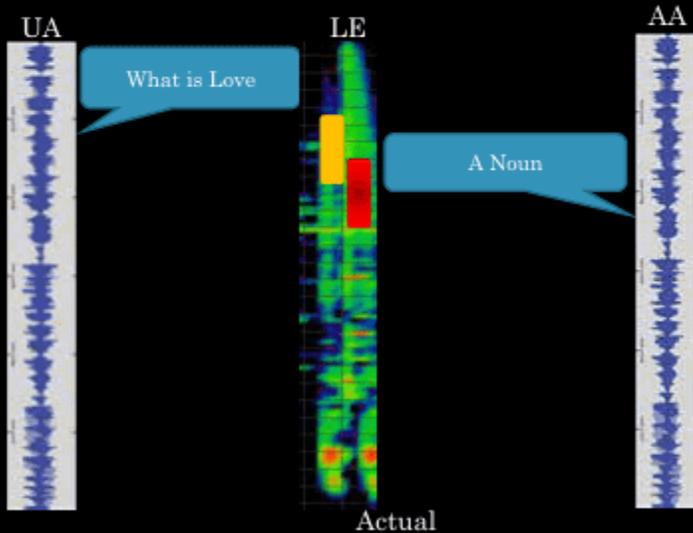
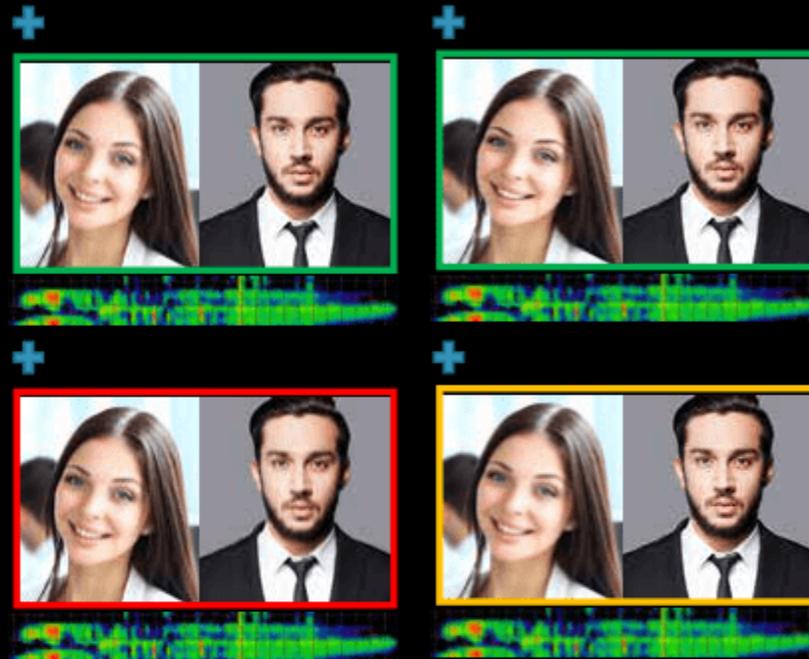


# Technology

- We are developing a mathematical tool to detect when an AI is about to fail, but training such a system is difficult.
- We have realized a practical shortcut exists using communication tools to bring humans into the mix based on the measure of empathy and engagement.
- Using multi-mode interaction we can train AI systems using humans, gradually reducing the need for human participation.
- For systems that will always need a human for safety and ethical concerns, this builds a Human Artificial Intelligence hybrid, a Cen™.

# Interface

Moderating Human

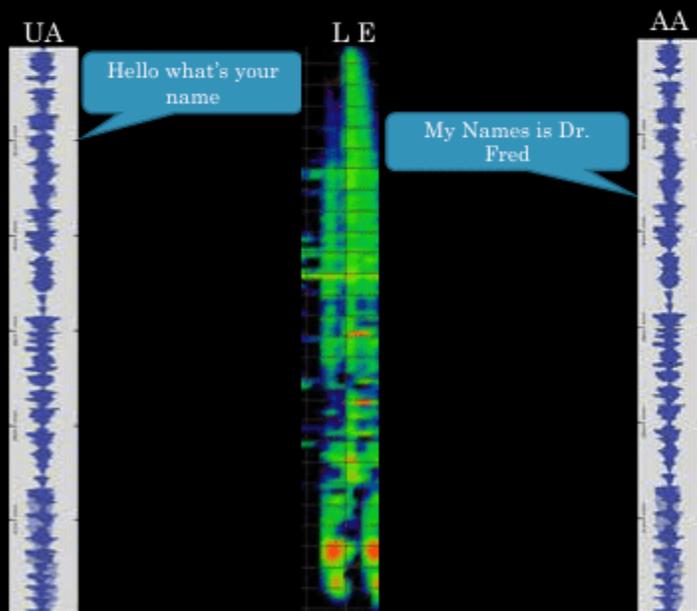




# Interface Activity

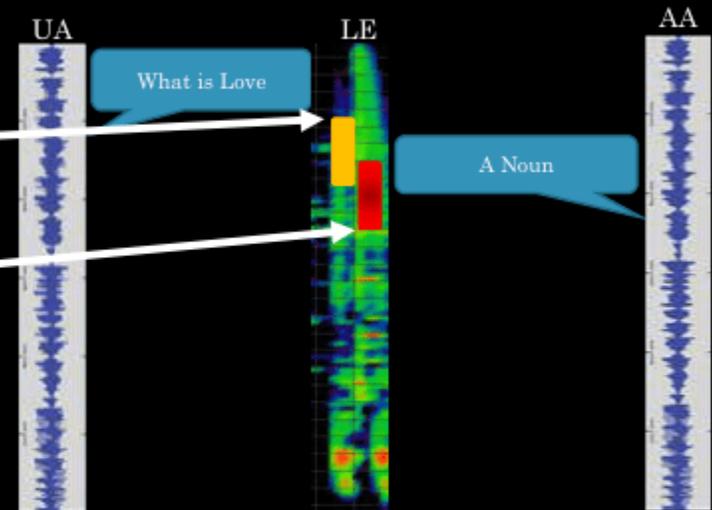


- A human monitors the interaction between a human user and an avatar. They can see video, hear audio and see the natural language parser text generated by the AI in original language or translation.
- The moderating human has information on the logical complexity of the transaction and the emotional empathy in the transaction. The emotional empathy includes tone of voice as well as face and body language cues.
- A single human can monitor many transactions. When a transaction looks like it is failing they can step in.
- This creates a training set.



# Human Intervention Types

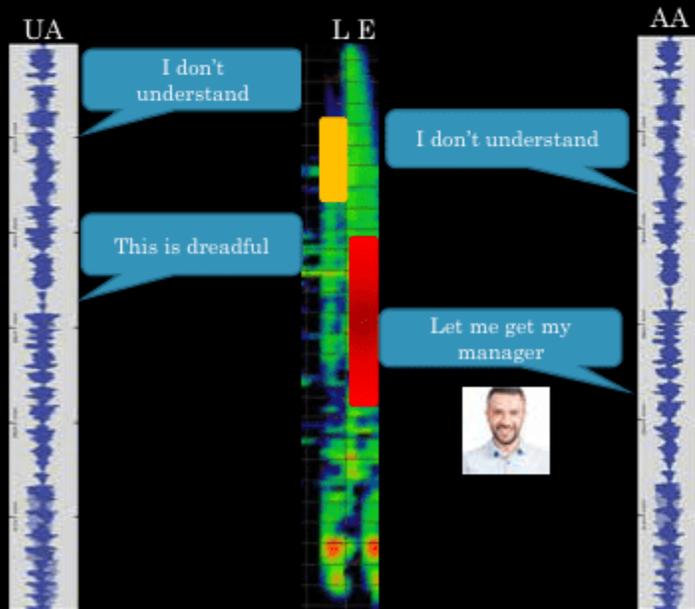
- Humans can override at a number of points
  - Before the response, using the mathematical predictor
  - After the response, using the emotional response of the user (not so good)
- Human can override
  - In Background
    - Answer as the avatar
    - Improve the model or data
  - Step into the foreground
    - Answer as Manager 'Let me get my manager'
    - Consultant (in medical context)



# Example: Let me get my Manager



- If the task gets too complex and the rapport has broken down between Avatar and Human, the AI can bring their 'manager' in.
- One of the moderating humans that has been monitoring a set of conversations comes into the chat and replaces the AI for a while.
- The User interface keeps track and redistributes the work amongst other human assistants.



# Human Skill Marketplace

- Moderators join the human skills unit to form a community of suppliers rather like Airbnb, although the skills are far more specific.
- These moderators train the AI and catch errors.
- The more they train, the more 'blocks' they earn, giving them a share in future revenue generated by the AI version of themselves.
- They are also paid for error correction work and providing oversight.
- For many tasks human input is always needed for reasons of ethics, safety, oversight and the assumption that AIs will always struggle with new scenarios.
- HI is different to AI and our aim is to make them work well together.

# Applications

## First Products

- Personal Friend (Chat bot)
  - Very first product is just a friend (character to help lonely people. In app purchases may provide some monetization.)
- Medical counselling chat bot is the first paid product.
  - Performs the job of a clinician force multiplier, allowing one doctor to see multiple patients at the same time.

## Further Applications

- The technology can be applied to low risk applications first
  - Personal helper
  - Customer service
  - Low intensity medical diagnosis
- The training should generalize to higher risk applications
  - Driverless cars
  - Higher intensity medical diagnosis

# Differentiation & Value creation

- We are building an AI / HI hybrid able to interact with problems in real time.
- We will build a large data set of situations where an HI / AI decision needs to be made, as well as the algorithms to select appropriate reactions.
- Participation in this HI / AI hybrid is on an open basis rather like Airbnb. Moderators log in to add their HI to an AI task. We build community and user / supplier base.
- We are also targeting more specialized problems such as medical diagnosis and counselling which involve high \$ per hour values (\$1000-\$1500). Rather than more general problems.

# Finances

- We are seeking an initial investment of £5m c. \$6.25m.
- The funds will be used to build and launch the communications AI HI market place, and ready the product for trials in medical counselling / diagnosis assistance and training.
- One trained doctor could simultaneously handle up to 4 patients using our system. Given costs run between \$1000 and \$1500 per hour for this sort of professional there is a large opportunity. There is also huge shortages of skills in these areas and growing demand.

# Contact

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CEO