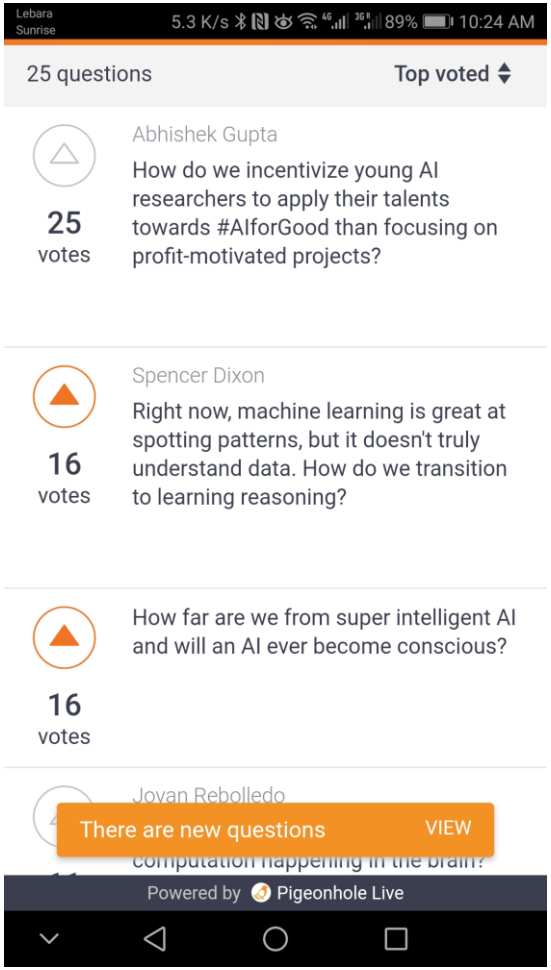
THIRD WAVE OF AI IN HEALTHCARE

PROBLEMS IN HEALTHCARE

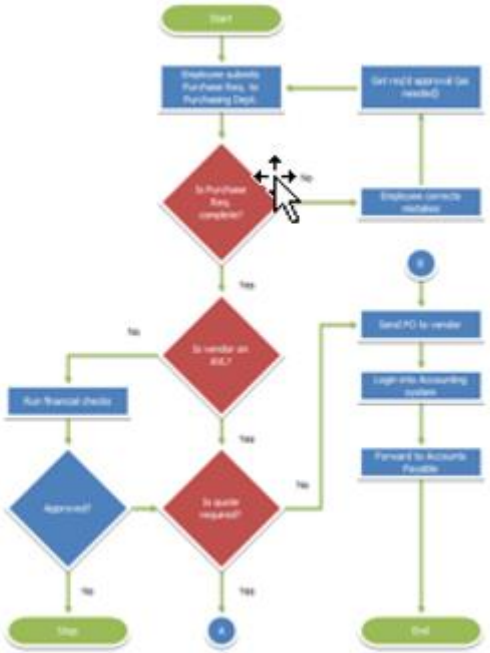
TOO MANY

FOOD FOR THOUGHT



THE FIRST WAVE OF AI

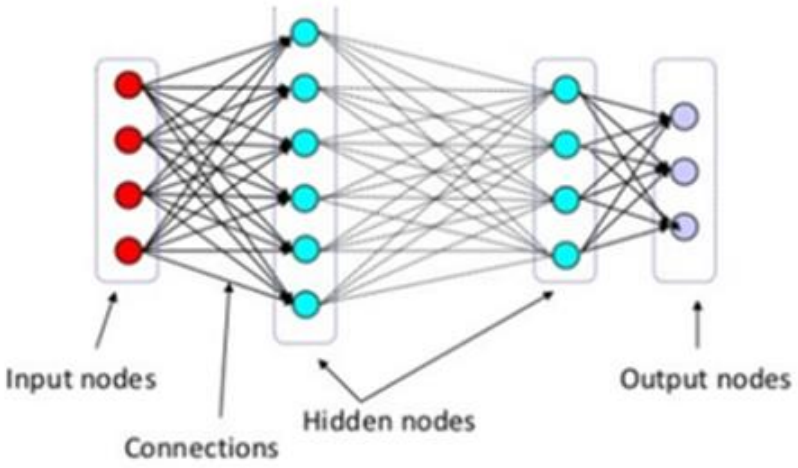
Traditional Programming



- **Handcrafted Knowledge**
- Engineers create sets of rules to represent knowledge in well-defined domains.
- The structure of the knowledge is defined by humans and the specifics are explored by the machine.
- No learning capability and poor handling of Uncertainty.
- Windows operating system, our smartphone apps, and even the traffic lights.

THE SECOND WAVE OF AI

Neural Nets – Deep Learning



- **Statistical Learning**
- Engineers create statistical models for specific problem domains and train them on big data.
- Nuanced classification and prediction capabilities.
- No contextual capability and minimal reasoning ability.
- Statistically impressive, but individually unreliable.
- Skewed training data creates maladaptation. eg. Tay

THE THIRD WAVE OF AI

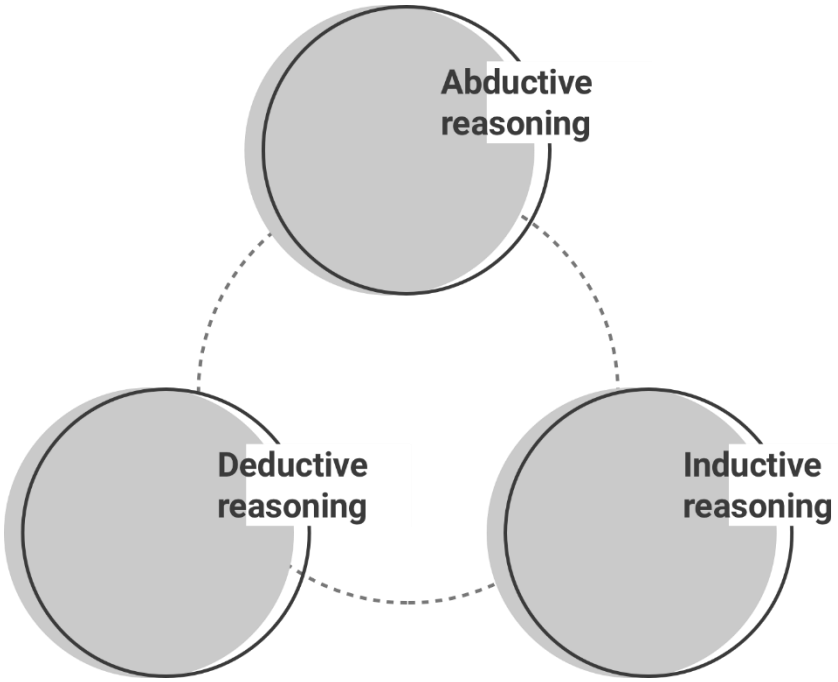
- **Contextual Adaptation**
- Systems construct contextual explanatory models for classes of real world phenomena.
- Transparency. Models to explain decisions and output.
- Contextual capability and reasoning ability.
- Real time, interactive learning.
- Self-directed learning.

SECOND WAVE vs THIRD WAVE

WHAT IS REASONING?

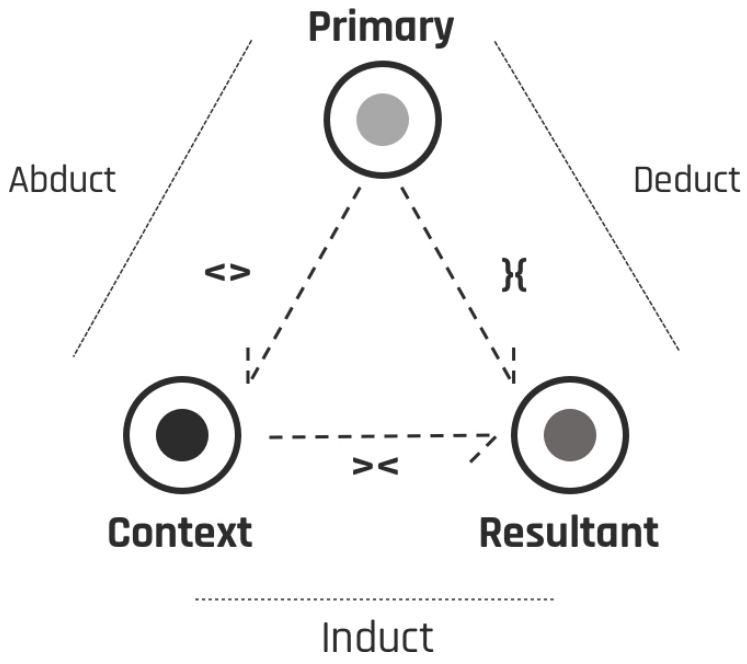
Reason is the capacity for consciously making sense of things, applying logic, establishing and verifying facts, and changing or justifying practices, institutions, and beliefs based on new or existing information.

Reasoning is associated with **thinking, cognition, and intellect**.



“UNIT” OF REASONING

Our natural language reasoning AI engine is formed through **Canonicals**. This closure is the core algorithm that allows unstructured data such as natural language to be logically understood and processed to provide reasoning to a given problem.



DIFFERENTIATION

- **New Symbolic Paradigm**
- **Natural Language Reasoning**
- **Augmented Topological Network**
- **Linear, qualitative** reasoning process
- **Human understandable** logic
- **Don’t** need tons of data and can run on a regular laptop
- **Transparency** of operation
- **Any language**
- **Universal**

THIRD WAVE OF AI IN HEALTHCARE

1. AI enabled decision support systems role in self-assessment and professional settings

2. Interpretation of laboratory results or imaging data (CT, MRI, X-ray, microscope images, photos, videos etc.)

3. Virtual Nursing assistants

4. Augmented diagnosis capabilities

5. Interconnected systems so that learning in one domain could possibly be applied to other domains. That problem is largely unsolved by straight neural network systems

6. Explainability of AI – Transparency