# Key Frame Plan Expansion With Machine Learning

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From static pictures to smooth motion.

- **In a continuous environment, plans are inherently incomplete.**
- **A list of steps cannot fully describe continuous execution.**
- **What can we do to fill in the gaps?**
- **Living beings are pretty good at it…**
- **Therefore machine learning.**

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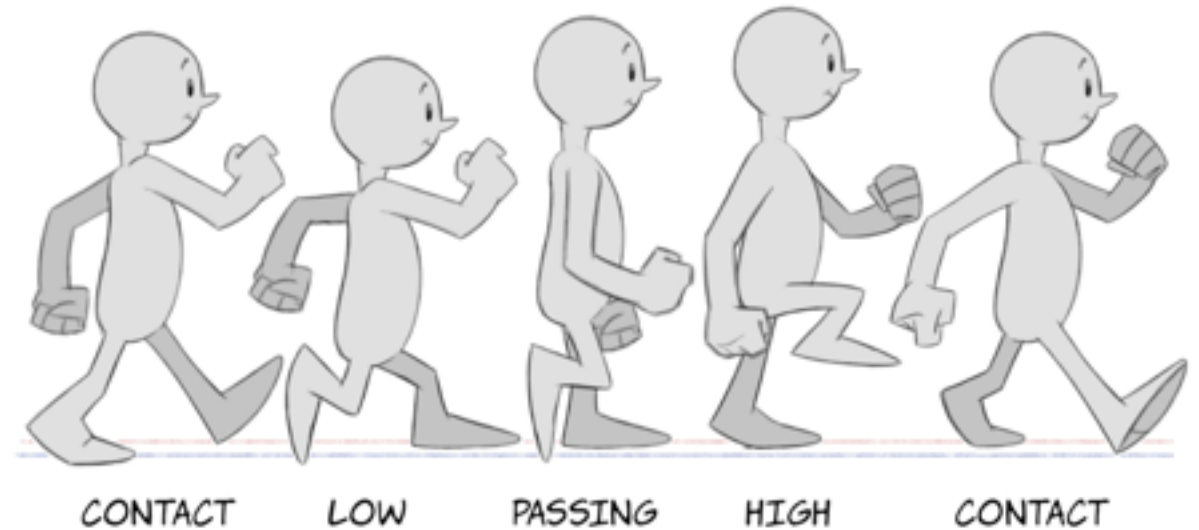
Key Frame Animation

- A key frame is a picture that marks a **significant** moment in time.
- In animation, that's the start, the apex, and the end of a smooth motion.
- Lead artists draw key frames, junior artists fill in the gaps by drawing in-between frames.
- If instead of pictures we use **state**, then the process of Key Frame Planning is to interpolate in-between state transitions in a plan described at a higher level of abstraction.

Proposing a neural agent model

- Cognition: Understanding of the environment. (Auto-encoder)

- Reflexes (subject to change): Understanding of one's abilities. (DNN)

- Intuition: To act without rational thought. (GAN)

Challenges

▶ While the cognition and reflexive components are proven concepts, intuition is not.

▶ Potential solution: Fixed Frame Count Intuition Network.

▶ Interlaced layering of Intuition and Reflex Networks. Only the final layer is tested against the generator.

▶ The frames should stretch to fit the given number of frames.

Project Plan

- Create test environment.

- Generate data sets and train cognition and reflex networks.

- Develop intuition network that can generate in-between state transitions.

- (Optional) Find a solution for variable number of frames.

- Write an article and cross fingers. Very carefully.

- ???

- Profit!