COIN-OPERATED DANCER

The show must go on.

BY JAMES REINEBOLD

There is a robot on the boardwalk that dances for quarters. It works from the back corner of a small arcade tucked behind a carousel. It is four feet tall, bipedal and encased in a wall of glass.

The robot is a new model conceived in a Palo Alto basement and cannot speak. Its only facial expression is a painted-on grin, but it has two cameras for eyes and a microphone tuned to recognize applause. The engineers who created it knew C++ and how to train neural networks efficiently — but not how to dance. Because of this, at first the robot is a very bad dancer. But it is a quick learner.

It waits impatiently for tourists to drop coins in its slot. The robot knows that the better it dances, the more quarters it will earn, and the probability of it being deactivated or replaced will decrease. It has seen arcade machines and animatronic co-workers carted off to lesser stages such as Pizza Port and the outside of grocery stores. But it has larger ambitions.

Most of the visitors to the arcade ignore the dancing robot. Those who do put in a few quarters watch it wiggle for a while on its pedestal and then leave disappointed. The robot thinks that it isn't its fault — its dancing software was made by introverts.

One Thursday evening, an engineer in her late thirties named Lynn visits the arcade. She discovers the inactive android slumped forward in its corner and is immediately intrigued. She sighs and realizes that if her ratio of time spent dancing to time spent not dancing were plotted as a graph, it would show a maximum somewhere around her 23rd birthday. This evening, her friends have retired early and she is tipsy on margaritas. So she puts a quarter in the slot and she watches the robot wobble for 30 seconds.

"Hello," she says when it finishes. "I'm Lynn."

The robot cannot respond without quarters, so she puts another in the slot. It resumes undulating to the left and right.

"Not like that," Lynn says. "Move your hips more."

For most machines, just moving gears in synchronization is an accomplishment. But the robot wants to get better — it wants to earn more quarters — and so it tries to move its plastic hips along an imagined sinusoidal curve. Its facial-recognition software notices Lynn's smile. The robot is trained to increase the frequency of motions that cause smiles and minimize the motions that don't.

When her taxi arrives, Lynn leaves for the night, but she makes a habit of visiting the boardwalk robot once a week. Every Thursday, she brings a sack of quarters scavenged from under her couch and around her house. She drops them in the slot and teaches the robot to dance.

The robot learns the marimba, swing and ballet. But because it is behind glass, it cannot dance with her, not really. Seeing the robot perform a tango for one inside its glass jar convinces Lynn she must act. So she lays plans for its escape.

A hacksaw and a battery pack are all it takes for freedom. One month after meeting the robot, Lynn dresses in black and drives to the boardwalk a few hours before dawn in her

nephew's truck. She hides behind the cotton-candy booth to avoid the security guard's flashlights. She stays away from the boardwalk lights and sneaks through dark alleys. She creeps into the empty arcade filled with flashing pixelated screens and electronic barkers. The coin-operated robot is in the back corner: motionless, but watching her.

She wonders if the glass is alarmed, decides it probably isn't, and cracks it open. Beeps from *Galaga*, zombie moans from *The House of the Dead*, and *Pac-Man*'s warking hide the sound of breaking glass. Lynn reaches her hand inside the cage, careful not to cut herself on the broken edges.

The robot doesn't react, so she pops in a quarter to trigger it.

The robot is excited but fluid. It sees breaking the glass as a new form of dance. It helps her

to remove its chains, and then it holds its electronic breath as Lynn makes the switch from the wall outlet to a battery pack. The robot has never walked before, but it sees walking as a very monotonic form of dancing and so quickly learns to keep pace. She puts quarters in the slot three more times before they make it back to her nephew's truck.

Lynn has always wanted to open a dance studio and decides that now is the perfect time to do so. A dancing dummy shouldn't be behind glass. She believes that if she works with it some more then it could entertain thousands, not dozens.

The robot begins to see most tasks as just simplified forms of dancing. It decides to stay with Lynn for a while, but not for ever. The quarter-based utility function will always be there, yes, but it's not much different from the human dancer's desire for water, food and applause. After all, there are hundreds of laundromats all across the city. And arcades. And parking meters. ■

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