

The Beat-Finding Shoe

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Once upon a time, in a village in the countryside of England, lived an old cobbler and his son. They had a small workshop with an outdoor sign reading 'Our shoes beat all' and a large window overlooking the grassy village square. The father loved both his work and his son and he hoped that one day he could trust

all the shoes of his clientele to the hands of the young boy. But though the quality of his work was fine, the father feared that the heart of his rascal did not really beat for boots, re-soling, and high heels. Especially when the marching band was exercising, outside, on the green square, his son's eyes became shiny, his face turned red, and his hammer was slamming down on the poor shoes while he tried to play along with the band. This boy lived for music. He dreamed to be accepted into the band one day and to change his small last for a large drum. And, as we all know, dreams can hurt.

Every year an audition was held in that small village, to approve new members of the band. And twice already the cobbler's son had failed. Being given the big drum and asked to play in time with the band, he confused the musicians by hitting the instrument at unexpected times, and not hitting it when he should have. It could not be his unfamiliarity with the piece, as he had heard it so often in front of his window. It could not be his movements, as being a cobbler made him proud to swing his hammer in elegant gestures down to the shoe. He had practiced and mastered that part so well that the young girls from the village liked to watch him in secret with their eyes just above the windowsill. And it could not be his enthusiasm, as he longed with whole his heart to be able to join in with the troupe and make music. And no matter how often the conductor told him to simply stay with the beat, he could not find it, nor could anyone explain to him what this mysterious notion of 'the beat' meant. "You just have to feel it", his friends explained, but he felt nothing except the tears welling up in his eyes when his drumbeats seem to upset everyone.

Another year went by. That evening the band was again practicing and the father noticed that his son was working without any concentration. Glue dripped to the floor, two shoes of the same pair were polished in different colors, one black and one brown, and leather was wasted in wrong cuts. "Why don't you stop working for today son, and do some practice on your last while you try to play along with the band? In the mean time I'll cook us a meal so you can do the audition on a filled stomach".

Although symbolic rule-based models are not much en vogue anymore, these kinds of models pioneered the field of computational modeling of rhythm perception and still perform amazingly well. Longuet-Higgins & Lee (1982) propose a rule-based model of beat induction that was unique at the time, because of its incremental nature and its focus on the initial stages of beat induction. This tale is based on this theory and written in honor of Christopher Longuet-Higgins' groundbreaking contributions to AI.



And while the old cobbler disappeared in the kitchen his despairing son put his head on the workbench and started to sob. How would he ever be able to play in the band?

He did not remember for how long he sat there, but suddenly he heard a voice clear as silver call out to him "please stop crying". First he thought it was of one of the village girls behind the windowsill, as he secretly knew they were often there. But as he looked around he saw a tiny fairy, hovering in front of the tool rack. Her shiny golden wings reflected the light of the evening sun. "Don't be frightened, I'm the shoe fairy". "Because your father so lovingly cares for all the shoes in the village I think we can do his son a favor. Furthermore, if you would be able to join the band you would not spoil your fathers work anymore, would you?" she said while playfully pointing at the bi-colored pair. The boy blushed and, stumbling over his own words, asked if he could make a wish and if the fair lady could grant him a bit of rhythm feeling. "O, no boy" the fairy said laughingly, as she sat herself down on a reel of thread." I'm afraid your unmusicality is incurable". But when she saw the boy's face cloud over she added quickly: "However, I can put a bit of beat perception in your shoe. Hurry, there is work to be done, see the band is about to start again the rehearsal of the song. Let's instruct a shoe. Take the black shoe and your hammer and on the conductors sign, when everyone plays the first note you hit the shoe, and you do so again at the onset of the second note. After that you stop. Do you think you can do that?" O yes, he thought he could do that, two taps, hammering out the beginning of the first and the second note of the song he had heard so often. With his tongue between his teeth, in utmost concentration, he awaited the conductors sign. And when the music set in he did his job perfectly, administering two loving taps to the shoe with his hammer. Turning towards the fairy he was going to ask what was next when, lo and behold, he saw that the shoe was still moving on the anvil. It continued tapping in the set pace, repeating the first note over and over again, and what was even more surprising, it was tapping the correct beat to the music that drifted into the room through the open ceiling skylight.

The fairy was laughing at his surprise and explained that tonight he should wear the shoes during the audition and ini-

tialize it by carefully tapping the first note with his right foot. After that the shoe would continue tapping and guide his way through the whole piece, he only had to drum along. At that very moment, while he was still full of questions, his father appeared carrying a tray with soup and bread, and quick as a fire dragon the fairy disappeared through the window. Dumbfounded, the boy ate his soup, not really daring to hope that the audition would go well this time. And while putting on his shoes, one black and one brown, he promised himself never to be so absentminded anymore.

Though this was just an audition, the friends and family of the

GREAT BRITAIN
God save the Queen



The first piece at the audition and how the shoe played the beat.

KENYA
Land of the Lion



The first piece at the audition and how the shoe played the beat

musicians gathered in the hall were already standing because the piece to be played was the national anthem: “God save the queen”. Trying to hide behind his big drum the cobbler’s son prayed that God would save him instead and allow the magic shoe to work. The conductor gave him a nod and carefully the young boy tapped with his black shoe the beginning of the first note, a quarter note and the beginning of the next note, while the choir sang the words ‘God’ and ‘save’. And miraculously it worked, it went brilliantly, his shoe kept tapping the beat out of itself and he only had to follow it with majestic hits on the drum. Though everyone thought that he might be overdoing it a little by not playing at the bar level, but faster, hitting the drum three times per measure, he was applauded with his success. In fact it went so well that the musicians could not stop playing song after song. While they practiced “The land of the lion”, the national anthem of Kenya, the young drummer slowly appeared from behind his drum, beaming, as finally his heart could follow the music. And not only would his heart follow the music to adventure and sun. As from tomorrow the whole band would go on tour and visit countries far away, and the cobbler’s son was asked to join them. That night he could not sleep and neither could his father.

Having arrived in Kenya, the band was invited to a big party. The young boy had never been out of his own village. He was completely dazzled by the bright colorful clothes, the sounds of drums, and the many sweet smells of the country. As they

played the “Land of the lion” he noticed a girl standing near a tree, carrying a water jug on her head. She was moving her hips to the beat, his beat. And guided along by his shoe, he played his drum for her. This is the life he thought. Traveling through the world, playing music, and making people feel good. He had finally found his destiny. But destiny, as you may be aware, can once in a while play a nasty trick on a young boy.

As numerous guests had been invited from the many countries of this huge continent the band was asked to perform “Nkosi Sikeleli Africa”, a song originating with the Bantu people but now song throughout Africa. “No problem” the boy, who had never heard this anthem before, kept telling to himself, “I trust my shoe”. But after the music had set in with a very short first note (*Nko*), his shoe started repeating that note. The boy tried to keep up with his shoe, drumming like mad. The sound of his instrument became a fast roll that drowned the other instruments. And while the girl near the tree proudly stretched her neck and walked away, the boy felt the eyes of the other guest staring at him in accusation.

AFRICA

Nkosi Sikeleli Africa



The piece that made the shoe go much too fast

That night he lay restless in bed full of shame and anger, his magic shoe tossed aside in a corner of the room, when suddenly the shoe fairy appeared. The boy started to accuse her of wrongful magic and undelivered promises, but she sat herself down on his shoulder, and as you already know, it is very hard to stay angry at a lovely fairy that sits on your shoulder and whispers in your ear. Soon he felt himself listening to stories about different kinds of music, and how music always seems to escape simple rules. Then she got more to the point as she explained how doubling a beat, conflating it to twice its duration, may move you one step up in the meter, the hierarchy of time intervals. And on she went, about beats and bars and how they relate as metric subdivisions of time. And just when he was about to dose off, the fairy pulled his ear and shouted: ‘work to be done, the shoe needs to be taught a new rule’. As you may know a fairy shouting sounds like a soft tinkling necklace, but the cobbler’s son awoke anyhow..

To be continued on <http://www.nici.ru.nl/mmm> under fun, and on <http://www.connectie.org>

References:

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