Computer science and technology : historiography VII (6 - 3)

Camille Akmut

November 4, 2022

— McCartney, Scott. 1999. *ENIAC : The Triumphs and Tragedies of the World's First Computer.* Walker

McCartney does not seem particularly set against Atanasoff; this is the first impression but changes considerably at the latest by chapter 8 with discussion of the Honeywell v. Sperry case (at a theoretical level this chapter is misguided, and contains falsehoods whose instances are described).

McCartney does interesting things that we have not seen in other authors.

1) Place the visit by Mauchly to Atanasoff inside its context : a series of visits he did during the critical years 1939-41[1], a variety of conferences, meetings, expositions were attended (NY World Fair 1939, AMS in 1940 are mentioned);

Although his interest for the most part appears to have been in electrical calculating machines (as indicated among others by a Sep. 1939 letter).

The most interesting of these is one where he was supposed to have met Wiener and both agreed about electronic computers' future. Meanwhile the most interesting of the classes was a Summer 1941 course by the US army intended to give people like Mauchly with mathematical-physics background a crash introduction to electronics (of relevance due to war effort).[2]

> "*Soaking up all he could from his contemporaries, Mauchly drove to Dartmouth College in New Hampshire in 1940 to a meeting of the American Mathematical Society, where Stibitz demonstrated his electromechanical calculator, the Complex Number Computer. Stibitz explained how relays used in telephone circuits were better than gears and wheels in calculating machines; Mauchly already knew vacuum tubes were better than relays because he had seen tubes working in physics experiments at Swarthmore. After the demonstration Mauchly chatted with Norbert Weiner, a prominent MIT mathematician, and the two agreed that electronic computers were "the way to go." After that, Mauchly stepped up his experimenting with vacuum-tube circuits patterned after Stibitz's flip-flop.*" pp. 36-37

2) A further, interesting, contextualization effort : Digital machines and experiments with them being, per his description, an outsider domain of science at the time :

> "*[Atanasoff's] prototype was digital, not analog, and thus was out of the mainstream of university research. Most of the major universities were enmeshed in major experiments on next-generation analog machines. They had grown up on Bush's Differential Analyzer, and*

[1] (because preceding ENIAC, and thus important for evaluating the machine's genesis)

[2] We could not find Wiener in the Burks book, index or else.

their research was devoted to perfecting that technology. Digital was something new and different and not yet accepted." p. 37

3) He also gives a lot of background information for Honeywell v Sperry case :

"*By the end of the 1960s, the computer industry was known as "IBM and the seven dwarfs." In 1965, IBM had 65 percent of the computer market. The seven dwarfs had 34 percent. Of the seven, Sperry Rand was the largest at 12 percent, followed by Control Data at 5 percent, Honeywell and Burroughs at 4 percent each, then General Electric, RCA, and NCR, all at about 3 percent.*

(...)

[ENIAC] patent in hand, Sperry turned its guns on the other six dwarfs. In 1967, negotiations for royalties from Honeywell Corporation reached an impasse ..." pp. 173-74; 78

and cross-licensing deal between Sperry and IBM (a monopoly-like situation according to Honeywell) :

"*Remington Rand wanted complete access to IBM patents. IBM figured that in return, from Remington, it should get access to ENIAC and UNIVAC computer patents (...) In 1956, one year after Sperry bought Remington Rand, Sperry and IBM settled their patent swap. They managed to keep the complete terms of their deal secret, for fear it would provoke more antitrust problems. What it amounted to was a cross-licensing deal under which IBM agreed to pay $10 million (...) for computer royalties*" p. 177

Honeywell - R. K. Richards (the engineer, computer historian) link :

"*Honeywell's lawyers got lucky. Henry L. Hanson, general counsel for Honeywell's patent division, happened to be a classmate of an Iowa State electrical engineering graduate named R. K. Richards, who had written an obscure book about computer development in which he mentioned the work of John Atanasoff (...) Hanson mentioned the book to the Washington attorneys Honeywell had hired for the case. With the help of Iowa State, they tracked down Atanasoff, who happened to be in suburban Washington, just minutes from the lawyers' office.*" pp. 179-80

Atanasoff's circumstances post-Iowa :

he "*moved to Washington and went to work in the Naval Ordnance Laboratory. After the war, he stayed on with the research lab working on various defense projects, then went out on his own and formed his own consulting company. He ultimately sold the company to Aerojet General and was a retired millionaire when lawyers came calling in 1967.*" (p. 181)

It should be noted Mauchly in 1944 joined the Lab ran by Atanasoff (p. 86).

The author's argumentation starts to harshen considerably in chapter 8 and must be rejected :

The ABC and ENIAC were not "like bicycle and automobile" (p. 182) : the argument made by the author that their design was different does not sustain it. One was serial, the other was parallel, he argues but that is not the point! The patent was about the first electronic computer, not that there was considerable difference in design between an electronic computer started by Atanasoff and Berry in the 1930s, and one begun in a different decade with entirely different funding.

Hence the difference is between a serial electronic computer and a parallel electronic computer (but that is still not the point of the lawsuit which sought to examine the patent claim of an electronic computer).

Following arguments follow the same pattern : the ENIAC had a clock, the ABC didn't (p. 183) etc. and can be rejected on the same principle. Stubborn the author goes on about speeds being "worlds apart" (p. 184); that is still not the issue (even if it were true).

The author's repeated reference to Atanasoff as a "gadget maker", and his invention "a gadget" at that point start to make sense.

The author continues down the same rabbit hole of defending the ENIAC was not "a copy" (p. 186). The notion of derivation was the one the judge retained, not copy. The first electronic computer is debated, not differences between two electronic computers...

Ch. 8, 'Whose idea was it anyway?, is remarkable because the author defends Mauchly's viewpoint, contrary to previous literature (using the misguided approach of focusing on features rather than clarifying fundamental differences in the nature of the machines).

Besides basic logical flaws, exactitude the more the author goes on is a concern :

"*Once the judge made his decision, Atanasoff became an instant celebrity. (...) Now a quirky retired physicist was declared the in-*

ventor three decades after the fact by a federal judge. Incredible!" p. 202

Atanasoff did not become an "instant celebrity". He remains an obscure computer scientist, whose role and legacy is still in the process of being worked.

He almost certainly had not become a celebrity at the time, because this all happened during a period when computers were still far from the mainstream, multiple years away from even the 1977 personal computers boom. Watergate revelations were in the middle of being produced. A President resigning in scandal, a bomb shell like this one, was something people could understand. Unless they belonged to the elite of computer users, let alone scientists, how could a revision of the electronic computer inventor thirty years down the line mean anything to them?

By then the author is so far lost that he starts presenting, easily discarded, falsehoods :

"*Herman Goldstine (...) wrote a well-regarded book detailing the historical development of the computer. (...) Goldstine said that Atanasoff never amounted to much, that his chief contribution "was to influence the thinking of another physicist...*" p. 203

Goldstine calls the Atanasoff Berry computer, in the previous sentence, "a great pioneering effort". And, in the next page : "The discussion greatly influenced Mauchly and through him the entire history of electronic computers."

TV — *Ghost in the Shell Arise* [1: Ghost Pain]

Il. ltr : i. Borma, ii. Saito, iii. Batou, iv. Kusanagi, v. Aramaki, vi. Togusa, vii. Ishikawa, viii. Paz

Il. airport security (of the future) : 'heavily cyborg'

The film opens with a classic, Gibson airport scene (e.g. Johnny Mnemonic); an easy, effective stylistic device helping set the narrative firmly in the future. Scanning machines control for cyborg bodies, and panels give indications as to the degree of modification, transformation; "heavily cyborg" a scan of Kusanagi reveals.

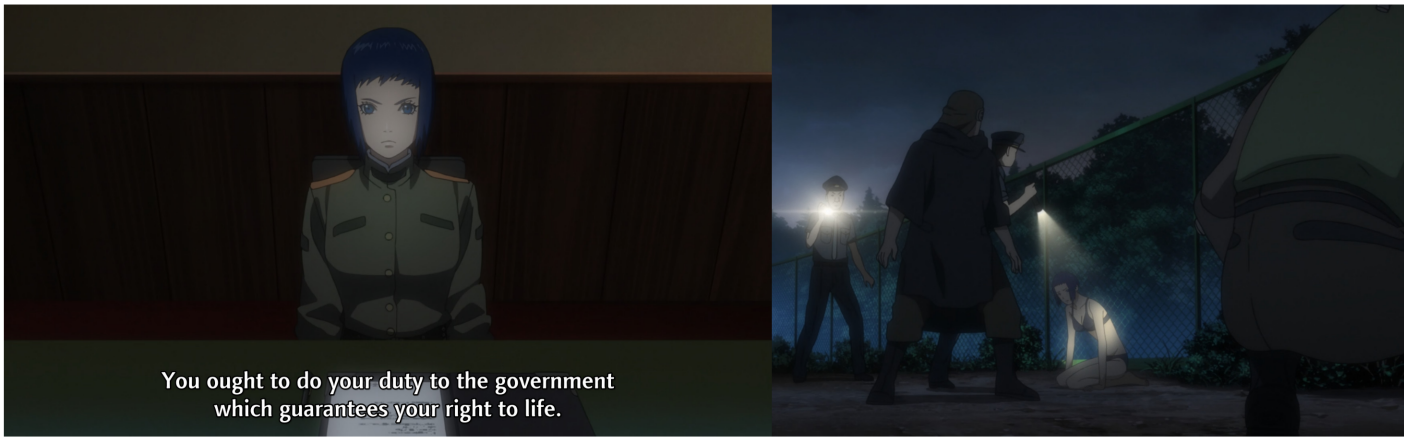
The main attraction of this series is to, as a prequel to the main story, give a view of the relationships between Major Motoko Kusanagi and her future colleagues prior to them becoming collaborators; at a time when they were still split across various forces and sectors, before joining Public Security Section 9, (the team they are commonly associated with later in time), here in the process of being formed. - and an explanation for the title.

- Kusanagi is with Unit 501, under (late) Lt. Colonel Mamuro [5]; "a special unit of the GSDA" [10] i.e. Army
- Togusa is a "special investigator with the Niihama police" [26]
- Paz is working undercover (as part of a project for the Army) [22]
- Aramaki is a chief of Public Security Section 9 [4]
- Batou : whom Motoko, as if surprised to see him, identifies as "Batou the Ranger" [26]
- Tachikoma, called here "Logicoma" (perhaps because a predecessor) [10]
- Saito is depicted with a heavy sniper rifle [2]
- Ishikawa in the original film was associated with computers and Intelligence

The relationships between them are so different (compared with subsequent collaboration and even friendship) that in fact in the first scene, a younger barely recognizable Motoko is pointing a gun at Aramaki and company in a military cemetery.

Explaining their animosity is the exhumation of Mamuro's body; before his death, he was accused of corruption which contradicts Aramaki's experience, who knew him in the Army ('he was squeaky clean').

Kusanagi has a special interest in the matter, beyond any emotional involvement that may be attributed to them, because Mamuro - as their supervisor - had written a letter for them which appears to free them, partly or fully, of their burden as a (special) type of property of the government.



Il. *GITS Arise*, r. mighty guards

A main theme of *Ghost in the shell* remains its always disturbing and moving depiction of a future where cyborgs exist - part human and machine - giving way to new property relationships; meaning also new forms of exploitation, and ownership dispute.

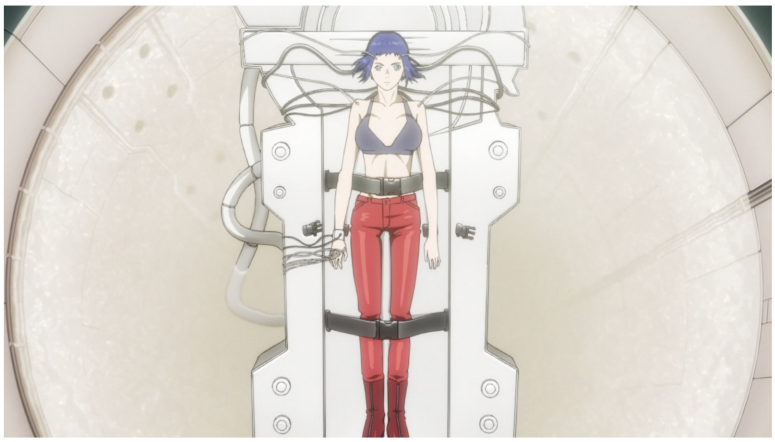
```
Army official - As both a Special Cyborg and a recognized wizard-class programmer,
                new regulations apply to you under the revised Weapons Act. (...)

Motoko - ln Lt. Col. Mamuro's letter on my reclassification, he guaranteed my financial autonomy. (...)

Army official - You ought to do your duty to the government which guarantees your right to life.
```

Out of this conversation, around 13m, emerges that the government has an, objective, interest in showing that Mamuro was corrupt so as to void the (liberation) letter to Motoko. A most valuable possession would be lost, similar to historical forms of dispossession e.g. nationalization of critical resources, but in the future imagined in S.F. : these are cyborg beings of economic, military, national interest. - and worse, creating a precedent for others like Kusanagi.

Aramaki after this encounter comments , providing the context for it : "*During the war, Japan allocated a sky-high budget to promote cyborg development. Did they tell you to become Army property to foot the bill?*"

(Motoko was made to sign a form agreeing to their own surveillance in the previous scene ...)
Around the perimeter of Kusanagi's housing there are many security measures in place - to protect property of the kind represented by Motoko [walking property]; when property laws exist, so do a police : powerful guards, in addition to regular police stop Kusanagi from leaving unauthorized.

Another consequence of the emergence of cyborgs, (a theme of high philosophical potence), is also the emergence of a connected, new medicine - since these beings give rise to new issues in this domain also.



Il. *GITS Arise* : neo medicine of the cyborg body

One particular class of problems that strike is the established notion of "phantom pain" in cyborg, and connected "ghost pain" concept proposed and later formulated in the matter of Kusanagi - a special case (cf. 12 and 33m). A diagnostic discussion between a neo physician and their patient, goes :

```
Neo Physician - Any pain?

Motoko - Not right now, no.

Neo Physician - It could be similar to the phantom pain that cyborgs experience, but that should not apply to you.
              - Could be a bad contact in your nervous components.
              - Any other abnormalities?
```

The, not so surprising fact after consideration, is that the physician is themselves not human.

```
- You're saying you were made a full cyborg at birth?!
- I lack any memory of a body.
- So perhaps you could call this "ghost pain", created by false memories.
```

One of the advantages of the cyborg body are its enhancements (increased strength, extended senses : vision, cognitive capacities etc.);

Among others, Motoko can continue exploring the net/networks while doing other activities which can range from showering to, more critical and intensive ones like riding a motorcycle;

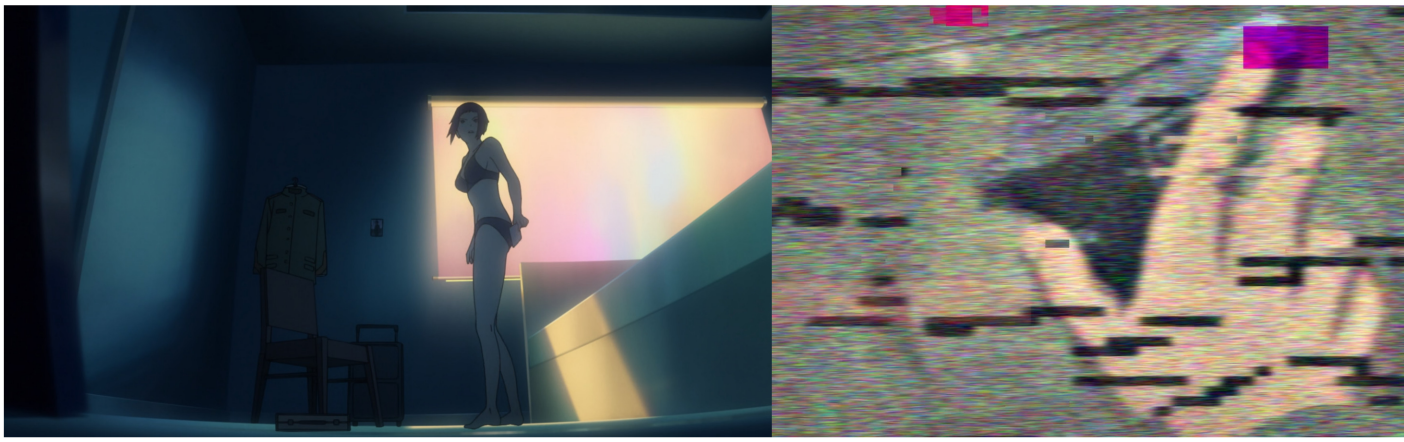
Enhancements are also one of its weaknesses, because now various parts of the previously human body are subject to hacking.

This is illustrated in the fight between Batou and Kusanagi (who are normally good friends), [27], when Motoko for a brief moments is able to blur Batou's vision, enough to create a strategic advantage.

Motoko uses such hacks, because for one they can as a "wizard" programmer, and it's a clever way to fight, but in this encounter especially is reliant on them because Batou has considerable physical strength - applicable if he knows where to direct it, otherwise rendered useless by hacking induced hallucinations.

```
"I've told you your sleepless eye's weakness is how easy it is to infiltrate."
```

Kusanagi themselves experience visual hallucinations throughout, visions of the girl-landmine from the beginning; that are the necessary consequence of the body as a sort of programmable interface in the future.

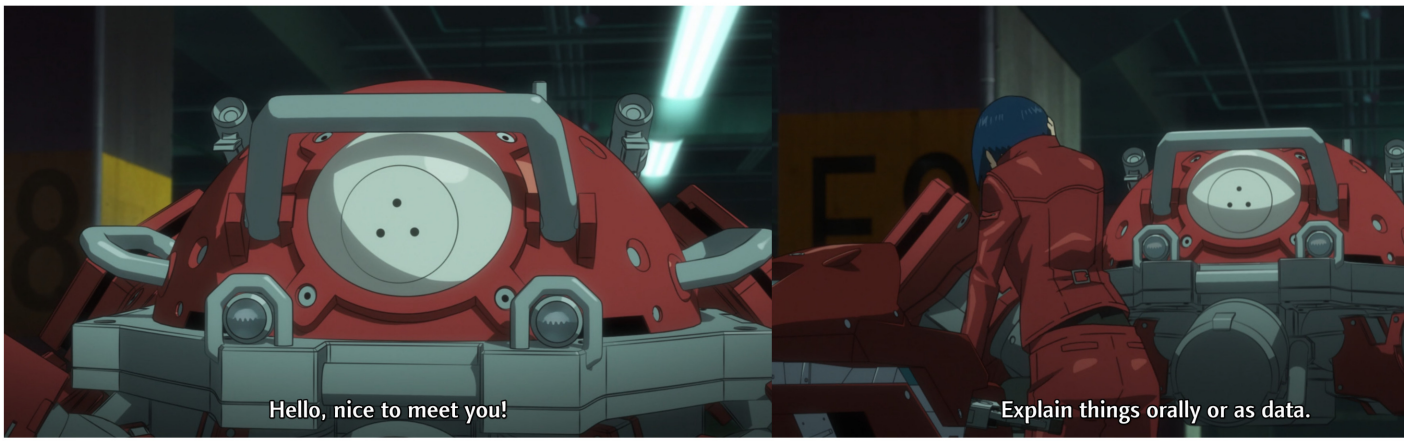


Il. Kusanagi and Baitou instances of visual anomalies, disturbances

A new weapon called a "mobile landmine", which has the outward appearance of a girl or young woman, is another interesting addition of *Arise* to that future imagined...

Tachikoma are here in an early form called "logicoma" (but still characterized by a child-like playfulness and eagerness to learn, and serve). This comes as surprise because they are the "bodyguard liaison" announced by Aramaki in an earlier scene. [20]

```
- Chief Aramaki calls me a "Logicoma"!
  You'll be receiving information through me, Major Kusanagi.
```



Syncing - while very convenient - is not the preferred form of communication for Kusanagi, because it represents a heightened security risk : this is how one gets hacked, viruses are transmitted etc. A typical pattern of cyberpunk works goes like this : connecting to a device, followed by infection.

"Jacking in" is to cyberpunk what "Let's split up" is to horror genre...

Memories, already in the early 21st century imagined here, can not be trusted anymore :

A classic representation of the Major at the heart of *Ghost in the Shell* consists in the mirror or reflected shot, in which they are so often shown. This serves at least two functions : in general, it is suggestive of the uneasy cyborg condition, split between Man and Machine, and a dual nature. Kusanagi is a special case because modifications done to them are exceptional, extensive. (In the original film the diving scene also confers some of those ideas.) Secondly it may be used to convey the possibility of two, or more souls within the same shell; often in connection with hacking (where the initial or main inhabitant of the shell is not aware of the modification, while experiencing various ills) although parties can come to an agreement – most obvious when mirrors or reflective surfaces don't show Kusanagi's reflection only .

Il. *GITS Arise* [1] classic mirrored representation of Kusanagi

(By repeated childhood revelations,). This film breaks with or at least complicates a major hypothesis, or perhaps rumor that Kusanagi had been a man once now occupying a female artificial body as a result of an accident; and by the time of the events of the original Ghost in the shell movie and manga they did not care anymore or had adapted (while retaining their previous preference for women, among other characteristics in addition to general masculine behavior, presentation).

Although, in the end, this could all be rejected as false memories - the main topic of the film, only operating at a deeper, more succesful level.