Mixed Self Optimizing Neural Operational system (MONOS)

Work in progress

Developed in YE35 and released in YE37, MONOS or Mixed Self Optimizing Neural Operational system is a brain-computer control software technology, used to drive equipment such as vehicles, weapons or anything with a computer. Importantly, MONOS is software and serves to augment an existing brain-computer interface system for a more 'gestalt' style of control.

A neural interfaces suite, developed by the Lazarus Consortium in YE 37 for general consumer use and sold internationally for military and non-military purposes - allowing nations and companies to forgo developing their own neural systems - saving money and allowing them to focus on the platform and armaments themselves.

About

MONOS differs from existing neural control systems in that rather than have the pilot take on the workload of what could be considered the machines cerebrum and cerebellum (areas of the brain used in decision making and action coordination), the pilot instead becomes the cerebrum and is freed up to make greater decisions as MONOS steps in as the cerebellum. This results in machine-level precision but human-level decision making.

MONOS learns action via intention recognition - that it identifies not how something is to be achieved but the desired outcome instead. MONOS then automatically computes the optimal way to achieve the outcome and performs it accordingly, allowing for user suggestion in method to be abstracted or specified accordingly. Some of this method suggestion comes in the form of constraint-recognition - that the system can identify outcomes the user does not want and plan accordingly to minimize their statistical likelihood. Taking this a step further, users can also anticipate special cases in advance which the system will pre-simulate, drastically reducing its own reaction times.

This level of separation allows fly-by-wire like performance - hundreds of thousands of simulated physically accurate corrections a second. When moving at speeds measured in mach or fractions of the speed of light, the need for super-human-level performance diminishes and instead experience, foresight, planning and determination become the key factors of piloting.

MONOS requires no surgery or implants, making it ideal for use in civilian markets and its applications are broad enough to be used for most computer systems, including both civilian and military grade systems. It is particularly ideal in commanding not only single units but clusters of smaller units, because of its abstraction system which greatly eases the bar of entry into high speed micromanagement of assets.

Case Study

Challenge 1: The egg conundrum

The most commonly cited example used when comparing neural systems is the egg challenge: that is, picking up and moving with an egg.

In the case of a classic 1:1 system - achieved either neurally or by nerve tracing - the user's body is a different shape and is balanced differently from that of the machine, which already introduces problems - things which require extensive training to negotiate. In addition, they have to pay close attention - since the strength of the machine doesn't match that of the user either. In addition, when moving, autonomous responses in the user's own musculature may prompt them to tighten their hands when they begin moving - or relax them when running - introducing further work the user has to do to not crush the egg.

Next, is the **common current-generation control system**, mentioned earlier. Here, the user is fighting thresholds for things like multipliers - which enhance the user's strength in special situations. Here, the user has to very finely balance the thresholds of the multipliers to ensure the egg is not crushed but that they can still move the heavy armour itself - sacrificing dexterity for precision.

In both cases, an egg and spoon race would be close to impossible to all but the most trained pilots.

MONOS, on the other hand, takes a different approach entirely: It instead focuses not on trying to move individual limbs but steps back, posessing a more objective understanding of what the user is both trying to achieve and also trying to prevent.

In this case, a user is trying to pick up the egg, without dropping or squashing it. The computer processes this automatically and without any further information needed from the user, performs the task automatically - elevating a tremendous amount of pilot tedium.

Indeed, for MONOS, this task is effortless. In testing, armour fitted with the system can run with eggs, fly and even punch with the egg inside a fist - and even throw and catch the egg against the hard palm of the armour without cracking it.

Conclusion

While in this simple situation the potential doesn't seem remarkable, it means a user only needs to focus on the strategic nature of a situation, rather than the physical nature of the situation - freeing up the users attention to focus on incoming information to make smarter decisions.

In situations which do require a higher nuance of control, the solver will accept partial override, allowing the user to move closer to a 1:1 control system when intentionally unfiltered responses are required.

Challenge 2: The gun and fire-control

As mentioned with other systems, they still have to work manually to achieve the outcome of a fire solution on a target. MONOS does not.

With complex sensors and an advanced ballistic targetting solution, MONOS can automatically compute solutions and automatically guide a user's aim (taking into account how the shift in weight will affect their balance, too).

While this might seem overbearing in most situations, this allows a shooter who is changing velocity too quickly to keep up with manually to strike an opponent who is moving similarly - in situations where the velocities involved are simply unrelatable.

This is ideal in high speed combat, long-range combat and near-superluminal combat - in situations in which the user would normally be called upon to use hit-scan lightspeed weapons or guided weapons which can be financially, energetically and observably problematic to the user, putting them at risk.

In theory, such a mechanism would allow a MONOS user to keep up with an advanced AI system operating on a similar level.

OOC Notes

In the simplest terms, MONOS does the same job as the part of the brain that turns the desire to walk into walking instead of commanding every individual movement of every muscle to balance and position the feet. Just like the brain, MONOS does the same kind of forward thinking simulation used to jump over and side-step objects automatically just like we do, though its simulations are physically accurate and affect everything it does. The result is a system that can think about the action its needed to do, plan it out and then actually do it. Using MONOS, a big machine like a frame is capable of really delicate motions like throwing a basket-ball through a hoop without bursting the ball or smashing the hoop – or picking up a person without harming them or shooting a target with physically accurate ballistics computation.

It means less thinking about what's happening and more just actually doing it. Try to think of it as the way you tell a horse where to go and not how to walk. Paired with MICAS, a user can either ask really specific motions and gestures of their frame or just tell it to perform an action - a bit like a unit in a real-time-strategy game. There's a trade-off between effort invested vs fidelity an precision though.

— *osakanone 2016/04/03 18:15*