

A 100x Investment (Part 2) - comma ai - Medium

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So I sat down to write part 2, and at first it was exactly what you'd expect. Copying and pasting the titles, "Don't hand engineer feature spaces", "Really, your hand engineered feature space won't work", "If you need a map for safety, you will fail", "Level 4 or bust is stupid" etc.

But then I realized, I've already said this stuff. Many many times. Most recently on Lex Fridman, but I've been saying the same thing for 3 years. If you aren't convinced now, figure out what evidence would be required to convince you. And, to be honest, getting the world to believe my technical arguments wouldn't change the reason I'm writing these posts.

If you haven't read Part 1, now would be a good time to do so.

At first, when you see someone attacking other companies, you think it's cause they are lost or not doing well themselves. With respect to the self driving space, nothing could be further from the truth. In Part 1, we posted our user growth numbers, and here are our revenue growth numbers.

Our burn rate is about \$160k per month, so we are on track to be profitable next year. We are providing real value to a diverse set of thousands of users, not signing one scummy backroom deal for an "innovation fee" from a megacorp. comma is a great company, and in any sane world, it would be recognized as such. So if things are going well, what's the problem?

The venture capital investment model depends on the winners delivering 100x returns. comma has raised \$8.1M, and we hope to not have to raise again. We've sold 17% of the company for that \$8.1M, so delivering 100x returns would require us to sell or go public for \$4.7B. It won't happen any time soon, but if you consider maybe 10% of \$53B Tesla is SDC, or that MobileEye sold to Intel for \$15.3B, \$4.7B doesn't seem unreasonable. Our tech is competitive with Tesla Autopilot and Mobileye powered GM Super Cruise.

Enter the bloat of Waymo, Cruise, and Zoox. Even Zoox, the smallest of the three, has raised \$990M. 100x returns for comma would deliver \$810M. In the best possible world, 100xing and succeeding beyond dreams, **we wouldn't even cover Zoox's losses.**

How should I feel about that? It's easy to say, oh, what others do doesn't affect you, but this isn't exactly true.

I spent the 6 years before comma in the hacking world. I published jailbreaking tools used by tens of millions of people. I wrote an Android root used by a hundred million. Software has no cost to replicate, and the internet is a fairly meritocratic place. The tools were good, the internet recognized this, and they got really widespread use.

I'd say that 95% of people I met in the hacker world were good people; only 5% bad. The business world has this flipped. To get ahead in the hacker world you need skills. To get ahead in the business world you need psychopathy.

There's a saying going around that really upsets me, "*perception is reality.*" Of course it isn't true, but it's one of these things that locally isn't obviously false. A great slogan for con men everywhere. Along the lines of "the market can remain irrational longer than you can remain solvent."

When "serious people" look at the self driving space, they don't see comma as a serious player. They see \$8.1M, they see no deals with automakers, they see 3-D printed cases, they see a "ghostriding for the masses" slogan from a hacker wearing sunglasses inside. They have no ability to evaluate the actual technology, so they fall back on highly gameable proxies. They look at how much money they raised. They look for partnership deals with big established companies. They look at how polished their PR materials look. They look at the "story" the company is trying to tell.

If you haven't read it, read Bad Blood. Theranos raised a whopping \$1.4B from a huge array of impressive people. They had partnerships for rollout with giants Safeway and Walgreens. They had beautiful PR put out by Chiat\Day. They had such a "compelling" story, the wide eyed girl trying to save lives. And now the world knows what happened. Theranos is an absolute joke. Yet the real lesson of their terrible evaluation criteria still isn't learned. **Everyone kept assuming everyone else had validated the company.** Instead of blaming themselves, they blame Elizabeth Holmes and Sunny Balwani.

The problem for the space: Theranos sucked all the air out of the room. I'm sure there were small companies making real progress in blood testing and microfluidics. But they could never get access like Theranos, because they were honest. Hype technology is always better sounding than real technology.

I don't blame the creators of these bloated companies. I blame the system. I blame the cargo cult process.

Waymo's executive department is supposed to hire a marketing and recruiting department. Waymo's marketing department isn't supposed to do due diligence on the technology, they are supposed to hype and market. Waymo's recruiting department is supposed to recruit and hire as many people as possible. The executives are supposed to raise as much money as possible. Everyone is just doing their jobs.

It's almost like, to these people, the technology is an afterthought. Theranos had so much, they had money, they had deals, they had marketing, they had a great story. The only small thing missing was working blood testing machines. A tiny mistake.

Nobody will have cars without a safety driver in cities anytime soon. Self driving appears to be like fusion, but instead of being perpetually 50 years away, it's perpetually 5 years away. It's 5 years away because that's what the marketing departments are told, but the truth is finally leaking out. It's going to be decades before robotaxis are profitable, and these companies are burning way too hot to last decades.

Waymo will have it the easiest, when they are shut down, the employees there will be reabsorbed into Google.

Cruise will be in the middle, when they are shut down, the employees there will attempt to be absorbed into GM.

And Zoox. Let's just say I'm glad I don't work there.

This has already started to happen. On 6/12/2019, drive.ai filed notice with the state of their intention to lay off 90 people. Although the headlines say Apple bought them, from Axios:

Apple was expected to pay less than the \$77 million Drive.ai raised in venture capital, to say nothing of the \$200 million it

| was valued at two years ago

All VC's I've heard of have at least a 1x multiple, which means every dollar of that "acquisition" went into the investors pockets, **leaving nothing for the founders and employees.**

And it was obvious early on, that tweet is from a little more than one year before they shut down.

Maybe in reality all this won't matter to us. Eventually the curtain is pulled from the wizard, markets track rationality, and the better tech wins.

We release a new version of openpilot to thousands of people every month. We support more cars, we make less mistakes, and we become more polished and stable.

And there are lower bounds on these things. Once we support all the cars, once we make less mistakes than a human, once the software has a MTBF that exceeds a human lifetime, we have to win. With the software being free, and the hardware required to run it being cheap, there will be no possible axis to compete with us on. We have no desire to rent seek.

The problem, this is going to take at least 10 years, and we'll have to go through a harsh winter. And when it comes, I hope we can survive it. A lot of what I do at comma is bracing for that winter, from working toward profitability to writing these posts.

Cruise has raised \$5.3 billion. SpaceX has only raised \$3.2 billion. One company makes 0 revenue and has humans driving branded Chevy Bolts around in circles in SF. The other launches billions of dollars in satellites into orbit and lands those rockets back on Earth. Something is seriously wrong here.

Before it gets any bigger, let's pop the bubble.