AI BUSINESS

HOW THE BUSINESS OF AI IS DIFFERENT FROM TRADITIONAL SOFTWARE COMPANIES

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ACKNOWLEDGEMENT

- Based on the Andreessen Horowitz paper by Martin Casado and Matt Bornstein
  - https://a16z.com/2020/02/16/the-new-business-of-ai-and-how-its-different-from-traditional-software/

WHERE ARE WE NOW?

- We are *platform independent*.
- We are slaying *monoliths*.
- We are building *microservices*.
- We are tempted by *serverless* and *lambdas*.
- We are deploying in *Docker*.
- We are orchestrating with *Kubernetes*.
- We are in the cloud.
- We have virtual machines.
- We have access to limitless storage.
- We have access to limitless compute.

WHERE ARE WE GOING?

ECONOMIC CONSTRUCTION

- Andreessen Horowitz sees AI companies have an 'economic construction' more like traditional service companies, then like software companies (SaaS, etc.)
  - Lower gross margins due to heavy cloud infrastructure usage and ongoing human support;
  - Scaling challenges due to the thorny problem of edge cases;
  - Weaker defensive moats due to the commoditization of AI models and challenges with data network effects.

MARGINS

- AI company margins 50%-60%
- Typical SaaS company margin 60%-80%

- Note: Early-stage private capital can hide these inefficiencies. Early stage companies are typically geared to acquire market share. Since these companies don't have to report earnings, where a certain level of fiscal responsibility is expected- or can at least be observed by reading filings- AI companies may not be transparent in identifying expenses.

SOFTWARE + SERVICES = AI?

- AI companies may be an entirely new kind of beast.
- Let's compare the various business models...

SAAS

- Wwrite the software once and sell many times
- High gross margins 60%-80%
- Recurring revenue
- IP creates a moat around the business

SOFTWARE BUSINESS

- Write the software once and sell once
- Dedicated headcount
- Lower margins 30%-50%
- Challenge for recurring revenue, client relationship, consulting

AI BUSINESS

- Behaves as both a service and software business
- Setting up user accounts, integration with existing systems - SaaS-like
- Maintaining models - service-like

THE CATCH

- Setting up and maintaining models is surprisingly costly- this is not SaaS-like. It is believed that these costs may total 25% of revenue.
- Let's examine where time and money are spent running this business...

1. TRAINING IS DRAINING (WALLETS)

- Costs hundreds of thousands of dollars in compute
- Not a one-time expense (data drift)

2. INFERENCING

- While not as expensive to perform as training, typically more *compute intensive* than traditional software.

3. RICH MEDIA

- AI companies are more likely to be set up to provide services that involve *rich media.*
  - Images
  - Video
  - Audio
  - Large text corpus

4. CLOUD STORAGE AND EGRESS COSTS

- It can be safely assumed that AI business offerings will be cloud-based.
- All of this rich media has to be stored somewhere... and this has associated cost.
- While pushing data to the cloud is typically a free operation- pulling data from cloud services (known as egress) has a price attached.

HUMANS GET THE JOB

- In some cases, it has been found by some startups that *manual* data processing is more cost effective for some complexe tasks than designing, training and maintaining models.

HUMANS ARE INVOLVED (EVERYWHERE)

- Even under the best of conditions, there is overwhelming human involvement in the day-to-day operations at an AI business.
  - Data scrubbing, labeling. Is is believe that ongoing maintence of models to protect against *data drift* can consume 10-15% of revenue.
  - Humans are *partnered* with AI in social media monitoring, autonomous vehicle 'driving', medial diagnosing.
  - As we saw in a recent presentation on 'Machine Unlearning', humans must be in the loop to perform data removal operations.

EDGE CASES ARE THE NORM

- Andreessen Horowitz observes that as much as 40-50% of the areas for which AI is intended consists of a high percentage of irrelevant, incorrect, or otherwise unusable data.

DIFFERENTIATION IS KEY

- "Great software companies are built around strong defensive moats. Some of the best moats are strong forces like network effects, high switching costs, and economies of scale."
- It is possible for AI companies to exploit these capabilites as well, especially if they can be *first to market*.
- One major different with AI companies is that innovation and major advances in the field usually occur in the open. That is to say that many models and learning topologies are publically available.

STEPS TO A SUCCESSFUL AI COMPANY

- Andreesseen Horowitz believes the key to long-term success for AI companies is to own the challenges and combine the best of both services and software.
- The follow slides outline steps that are common to promising AI companies.

REDUCE COMPLEXITY

- Using a "single model" greatly reduces the amount of work to online new customers.
- A "single model" is simpler to update and maintain.
- You will have to "cast" your client data into a shape that is compatible with the common model.

CHOOSE WISELY

- Narrow the domain as much as possible. Serving a smaller audience with a *better* tool is more cost effective than chasing a larger audience and incurring all the costs associated with tuning what might end up being an incomplete solution.

PLAN FOR COSTS

- "Track down and measure real variable costs- don't let them hide in R&D"
- Provide conservative expense and revenue assessments.

SERVICE-CENTRIC

- A service oriented approach will give you more 'face-time' with clients.
- Exploiting this connection allows you to make continual adjustments to your business and its offerings.

EXPECT CHANGE

- It is expected that the rate of change in tooling, design and deployment surrounding ML model development will accelerate.
- Remaining flexible

DEFEND THE FORT

- "While it's not clear whether an AI model itself – or the underlying data – will provide a long-term moat, good products and proprietary data almost always builds good businesses."