Pascal Weinberger: So with Bardeen, what we can do is we are on your LinkedIn profile and we can understand the context of the profile and then build an automation, kind of like an Excel macro type automation that you click a button and the magic happens in the background for what you're doing. And that was always kind of like a big goal for us. People communicate a lot through emotions, or modulated through emotions, and making sure that computers or the systems we interact with can at least to some extent understand and or mimic that, I think will provide for a much better and more embedded user experience. As with every startup, there's always kind of an incumbent sitting in the market share. You know, like when Uber came along, people were like why would I use Uber versus Taxis? and then Airbnb came in. People were like I'm just going to book my hotel, why would I use Airbnb? I think at that point the question really is about like a company really solving for the end user's needs. Solving is like focusing as much as you can to really nail the problem for the end user.

Pascal Weinberger: So my name is Pascal. I'm a co-founder and CEO of Bardeen AI. Prior to Bardeen, I was working, among other things, with computer vision and other machine learning applications at my own startup companies, but also Telefonica's moonshot lab called Alpha where we were looking at different kinds of data applications for machine learning and AI. They were not the core of Telefonica's business, so kind of like adjacent things, and I've always been fascinated by practical, practical applications of technology. And the space of workflow automation has always been appealing to us because you know myself, as I'm sure many other people out there I find myself a lot kind of doing very mundane, boring copy-pasting tasks And every time I do that I ask myself should I actually be doing this manually or can I automate it? So that was kind of the inspiration for it, but you're happy to take it whichever direction you want to.

Craig Smith: Yeah, i want to hear about Telefonica And, as I was saying earlier, we're now facing since you know. You know, generative AI has been developing since 2017, but since the release of ChatGPT and then GPT4 and the APIs and the plugins, everyone is busy reconfiguring or building new applications with Generative AI at the core, while people with existing applications are grafting a conversational element onto it, using large language models with, i would imagine, the eye to rebuilding those products. So tell me what you were doing at the skunkworks, as they say, at Telefonica, and when did you see Generative AI coming, and how has it affected Bardeen? And then we'll get into what Bardeen does. Sure, yeah.

Pascal Weinberger: So I think I'll start with, like the Generative AI question. So one of the very first touch points for me for machine learning was reading about Ray Kurzweil. For some time was Chief Scientist at Google. Ray Kurzweil's work of generating MIDI files, like piano music files back in the 80s was very kind of preliminary technology, nowhere close to what we see today with Generative AI, but at that time it was very fascinating technology where you could sort of like train a machine learning algorithm much smaller networks at that time, very different approach but you could train them on like some artists or some combinations of different artists' music and it would generate new songs piano songs at that time. So I thought that for me was like actually one of my earliest touch points with machine learning and I thought it was fascinating at that time. And I think from the beginning it was very clear not only for me but for, i think, everyone in the field, which is why we're seeing this explosion of new applications today that with this machine learning AI technology you can not only like recognize patterns, which you do in computer vision, many other classification tasks, but you can also generate content or generate images, texts, midi files back then and so on. So I think that has always been a big theme in the industry due to the transformers and other like big advancements that we've had in the last I think transformers was like when 2017, so last six, seven years there's been a huge amount of progress in the field And that means that now we can represent, like, bigger data sets, we can represent bigger context, so more complicated patterns, and therefore it becomes just way more useful generated some cute MIDI songs, as cool and fun for an application case, but you can't do anything practical as we can do today with GPT, GPT-4 and other applications. So I think that's always been kind of a guiding theme in the industry and it's always been something that personally to me, has been fascinating and kind of got me hooked in the AI field in the first place. About what we were doing with Telefonica.

Pascal Weinberger: So Telefonica is one of the largest telcos in the world many different subsidiaries all over the world, hundreds of millions of customers and so on And the telcos space is a very interesting business because essentially they're an infrastructure company but they control and own a lot of the critical infrastructure for the internet. So with that you have a lot of data and a lot of very interesting data sets that you can do things with that are outside of your typical telco business as you and I interact with every day around, like our subscription plan, mobile phone subscription and so on. So there's many different teams in these telcos that focus on turn prediction, upselling, like all the standards, I would say, business data science use cases. And then the CEO of Telefonica at that time he had seen, i think, inspired by the Google X Moonshot Lab from Google and a bunch of other labs like that, he had thought that, like, with the infrastructure, reach and technology that Telefonica has, they can do more interesting things that are not directly adjacent to their business.

Pascal Weinberger: So we were looking at many different applications in the healthcare space, like mostly mental health. We're looking at energy, energy distribution, city planning, lots of other kinds of different interesting application cases And the work that was super interesting because essentially it was like I mean almost like a little startup incubator, slash y-combinator, and there we had a team that was focused on exploring different things. They came up with like 10, 20 different ideas every month and their primary job was to kill those ideas like prove that they're not useful And then the ideas that actually seem to be interesting and useful. They kind of graduated and got like a small team and resources around it And then a few of them got to bigger stages with even hundreds of people working on it And there were some successful projects coming out of this, including one mental health company that has since spun out and raised a lot of venture capital, hundreds of employees, very successful business at this point that is focusing on understanding and predicting and managing the onset of mental health crises, both at the workspace but also for individuals.

Pascal Weinberger: And I think there's a lot of interesting things you can do as Telefonica, but as any big, large infrastructure company, that are not directly impacting your core business, but they're sort of leveraging this like massively powerful new technologies around AI, machine learning, data science and so on And some of the data that you have from your infrastructure business. So I think that's a really, really interesting model, like moonshot labs, moonshot factories that Telefonica was, I think, the first one in Europe that did it. I think at this point you see a few of those models emerging, but I strongly believe that there will be a big way for large companies, large corporations, to survive and to kind of disrupt themselves and build new businesses on top of their existing old businesses. That may or may not be future proof sometimes. So I think that's really interesting work. For me it was really interesting to go through this journey and a great learning opportunity.

Craig Smith: Yeah, and that was primarily looking at applications for supervised learning. Is that right?

Pascal Weinberger: There were many different things we were looking at. I think we, with the machine learning and AI team that I was specifically working with, were very focused on cutting edge applications at that time. So back in 2017 2018, as you pointed out, generative AI was not as strong. I think, generally, the AI field wasn't as strong. So the core problem we were looking at was understanding machine learning algorithms. So, especially in mental health and so on, if you make classifications, you want to be able to quote on, debug them, unquote like no if something's going wrong, and understand what's happening. So that was a big field that we were looking at. So, understandability of models.

Pascal Weinberger: The second big thing is working with customer data. It became very critical that we could train those models without necessarily having to move data around. Today it's a well researched field, known as federated learning or privacy preserving machine learning. Back then it was still a very nascent field and there weren't as many people working on it, so that was a big focus point.

Pascal Weinberger: And then the third one was around emotional AI, which really isn't like related to generating emotions or making machine sentient, but much more about like understanding emotions from people, which I think is something that now, especially with generative AI and kind of these chatbot type interfaces being more and more embedded in our lives, will become again much more powerful. because, just, i think one thing we oftentimes don't realise in technology is people communicate a lot through emotions or modulated through emotions, and making sure that computers or the systems we interact with can at least to some extent understand and or mimic that, i think, will provide for much better and more embedded like user experience. So those are kind of like the three core focus points for us in the lab.

Craig Smith: The, then the founding of Bardeen AI and that's a nod to John Bardeen, the Nobel Prize winner the tell me, tell me how you, what led you to that, and was it conceived as a generative AI tool, or did you sort of segue into generative AI once chat GBT had taken hold?

Pascal Weinberger: Yes, great question. So I think the inspiration for Bardeen really came from both my co-founder, atom, and myself. We kind of individually arrived at the same conclusion. He led a team at Mesosphere or D2IQ, now a large engineering organisation and we were both doing very interesting work. Like, from the face of it, you're super excited about the content, super excited about the projects and so on.

Pascal Weinberger: Yet if you look at your day to day and you look at your like cannot calendar, like you do the calendar audit, you find yourself doing a lot of stuff that doesn't seem that exciting. For example, I had to do a lot of partnership management, recruiting, and outreach from people's LinkedIn profiles and GitHub profiles to make and join a team. A lot of just sort of like user support and understanding with the beta and early customers that we're working with And, if I did, a bug report added to our Jiva ticket management system. All this type of stuff that doesn't seem that exciting. So the idea there was can we use technology to automate a lot of these boring but very important processes to just make our own lives more useful and more impactful? And then quickly you look at technologies like RPA or the like other automation tools like Zapp here, if this and that and so on, and we were like power users of all those different tools, tried all different combinations of them and so on, but they didn't quite cut it for a lot of the applications that we wanted to do that were contextual. So, basically, I'm great. Example is like I'm recruiting for a bad Dean and I'm on someone's LinkedIn or GitHub profile and I see that, like crack seems like a cool guy I want to hire. Now I want to understand what your profile is. I want to write a customised outreach email and I want to find the email address on the profile that sent you the email on LinkedIn, on Gmail, for example, from LinkedIn. So there's a lot of copy pasting between different tools that will take me like five to ten minutes every time I do it And that's just wasted time. So with by Dean, what we can do is we are on your LinkedIn profile and we can understand the context of the profile and then build an automation, kind of like an Excel macro type automation that you click a button in the magic happens in the background for what you're doing, and that was always kind of like a big goal for us.

Pascal Weinberger: Now I want a generative question that actually the very first prototype by Dean that we built three years ago was very similar to a command line interface. So for the engineers out there, if you, if you, if you like interact with every kind of like, like technology tool, like a like AWS console or something like that, then they some sometimes they don't have a new eye, sometimes you just like do commands and it's much easier because you create shortcuts for them and like you only have to type it once and it's much faster to interact with. So it was kind of like our nerd inspiration for it. So we wanted to create a command line interface for those web tools that we wanted to interact with and that was language based. At that time we trained very much like we fine tuned a very small bird model. That was the large language model at that time And I just didn't quite cut it for the use cases because the models weren't quite there, we didn't have enough training data and so on. So that was the very first prototype of buddy that was meant to be what we now have built on top of the GPT models.

Pascal Weinberger: But yeah, so we basically had to build this pivot then because we realised that the technology wasn't quite there. So we built all this infrastructure to make it easy to build it in a visual builder. And then now we're going back full circle so you can actually just describe the automation the way you want it to run. And now, thanks to the large language models that are built by great companies like OpenAI and others, we have the context and understanding in these language models that they can actually handle the ambiguity of the descriptions that people give us and we can then compile that down to that work for executable and actually run it based on. So that's kind of been going full circle. But yeah, from the beginning we were thinking about this as a generative AI approach. That's why we invested over the last three years. We invested a lot of time into building the right infrastructure, the right abstraction level, the right programming language, if you will, to enable the applications that we've built today.

Craig Smith: And you're using GPT for, or what model are you tapping for for the generation?

Pascal Weinberger: Yes. So there's many different layers in which we use large language models in the application . The first layer is just kind of like a building block for your automation. So in the example I just gave, you aren't writing an outreach email based on a LinkedIn profile. There you can kind of feed the context of the LinkedIn profile and then ask OpenAI or any other model for that matter to generate a customised email for that person And there the user can choose. So, like you know, sometimes people prefer to use a faster but not as powerful model like GPT 3.5. Sometimes people prefer the GPT 4 model, or we're also integrating with other models like Anthropic and so on. So that's something where we leave the choice to the user.

Pascal Weinberger: On the second level, down where you describe the automation, and then we build kind of the automation for you as a user, they were using, as of today, gpt 4, but again we kind of built this as an abstraction level that you know, in the beginning we had bird running there. Today GPT 4, tomorrow might be GPT 5 for some other companies model if they catch up with OpenAI's progress, or it could be our own custom built model for our specific use case. So that's really something that we see as a. You know, I think, like this technology will commoditize the same way that computer vision models commoditized five, six years ago. So we try to keep it as independent from the specific models as possible and we built all of the abstraction they are tooling and training tools and fine tuning tools and so on around it So that you know, if tomorrow the next model comes out and proves to be better than GPT 4 today, then we can just drop and replace them.

Craig Smith: Yeah, one of the things I'm curious about. So you guys were early in building around generative AI. A lot of companies now are adding generative AI to existing applications, and then there are a lot. As I said, there will be in 18 months. I think we're going to be overwhelmed with new applications that have been built around generative AI. A lot of those and, as you say, the large language models are becoming commoditized. I had Aiden Gomez on the podcast recently and he was on the team that built the transformer algorithm And now has a company, co chair, that basically rents large language models or or helps you build custom large language models, as is.

Craig Smith: At the same time, you've got open AI releasing Plugins with different existing companies, and it looks to me that open AI is playing both sides. So they're providing the infrastructure, but they're also developing their own Applications, or at least plugins with specific partners. So you know you can use open AI, but you're also competing with open AI, and how? I mean, for example, with Bardeen. You have a Zapier integration, right, but open AI has a Zapier integration. And how do you compete with them? Because a lot of people will just use open AI's plugin And so, and I would expect that those plugins and different sub-models are going to continue to proliferate from them. So how do you compete with them?

Pascal Weinberger: Yeah, it's a great question. I don't think we compete with open AI in any way, shape or form. Just to kind of clarify one thing there. So like we don't have a Zapier integration, I think like you.

Pascal Weinberger: Oh I thought you did. I'm sorry. Yeah, what you're referring to is that, like open AI has a Zapier plugin, we actually also have a plugin with open AI's JetGPT at this point. So, if you're using JetGPT as a plus user, they recently opened it up that every plus user can, or paid subscription user for JetGPT can, use their plugin infrastructure. They can, at this point, choose from, I think, 160, 170 plugins that have been developed And you can use, you know, jetgpt's plugin for Zapier. You can use Badine's JetGPT plugin, hundreds of others of them.

Pascal Weinberger: So I think, like we're also an early mover in this space and we believe that JetGPT could become like a big platform.

Pascal Weinberger: You know, the same way that you want to be on the App Store and on the Android Store and on the Google Chrome extension store and then the Safari extension store and so on, like JetGPT, i think, will become a new interface that people interact with And, at this point, like hundreds of millions of people are using it every day. So you also want to be on the JetGPT plugin store for people to interact with it. The actual application logic, however, is something that JetGPT doesn't try, at least for now. I mean at this space that, like, at the pace that OpenAI is moving at, you know everything's possible, but at least for now, from what I know, they're trying to solve the actual intelligence problem of trying to build better and more intelligent learning algorithms. They're not actually trying to, at least from what I know. They're not trying to build a consumer facing platform that solves automation or something like that. They leave to the Zappiers and us and then, like they, become an interaction layer for that Yeah, and I shouldn't have said OpenAI, it's really Microsoft.

Craig Smith: You know they're integrating this into. You know their various power platforms. I can't remember the names of all their products, but yeah, so scratch, openai substitute Microsoft. How, I mean? Certainly the global market is huge, but it seems like these players like Microsoft or Google are. They're tough to compete with.

Pascal Weinberger: Yeah, of course, I think, as with every startup, there's always kind of an incumbent sitting in the market share. You know, like when Uber came along, people were like why would I use Uber versus taxis? And then Airbnb came in. People were like, I'm just going to book my hotel, why would I use Airbnb? I think at that point the question really is about, like as a company, really solving for the end user's needs, solving as like focusing as much as you can to really nail the problem for the end user.

Pascal Weinberger: And then the incumbents, like Microsoft in this case, they usually like to optimise for something very different. So Microsoft, like most of their business and their optimization basically becomes serving enterprise, customer rights, like they make most of the money with enterprise and so on, and that's a very different problem to optimise for than what we're doing where we're trying to bring automation to the end user. So that means making it as simple as possible to interact with, integrating with all the different tools that people actually interact with every day, bringing it into the browser, et cetera, et cetera. Microsoft certainly is a scary competitor, and so is Google, but, as of today, what they focus on with generative AI is much more on an individual document level versus workflow level. So, the same way as notion AI or Coder AI or any of these other document AI tools, they focus with at least the things that they've released so far on helping you generate that PowerPoint or the helping you generate the text in your Word document or helping you pre-write or fix the email that you just wrote, so kind of on a document level, using generative AI to assist your workflow and be using what they call copilot to make it easier for you to generate content, which is super useful, like.

Pascal Weinberger: I'm a big power user of notion AI and other tools myself and we use it across the company and we have users of co-pilot for engineering and so on. So I think that's a super, super useful application for generative AI that creates a lot of value for everyone. But they're not as focused on this workflow level, where it's much more about how do I get my data from tool A to tool B and transform it in a certain way and kind of like replacing this copy-pasting type workflows. There were much more competing with the Zapiers and UI paths of this world that are much more focused on this area And they're kind of like, again, incumbent technology They've built for a different stack. They've optimised for a different world.

Pascal Weinberger: 10 years ago And, as we talked about before, when we started, we started this with AI and generative AI as its core. So our entire architecture and our whole decision-making as a company is optimised to make this as easy as possible for the end user. Knowing and very much planning with the scale of generative AI tools. So I think that's kind of the advantage that I think we have, for any other new player in this market has, and that's also what we're trying to capitalise on.

Craig Smith: Yeah, so the behemoths Amazon, google, microsoft will be doing you think I'm just thinking how the market is going to shake out, so you think there's a space for startups to build applications that are more narrowly focused. Is that it, or that our workflow focused as opposed to in the case of Microsoft? What you're saying as opposed to sort of individual document or document processing is can you see the market separating and where the opportunities are?

Pascal Weinberger: Yeah, I think there's always space for startups to improve. I think like if you look at the history of the last 30, 40 years in technology, there's always been these tectonic plate shifts in technology, you know, when the internet came, when computer vision came, when now generative AI comes and so on, and that almost always has brought with it a shift of major players where some of the older players weren't fast enough to adapt to technology and new players came in and designed around that paradigm shift. So I think there's always space in many different aspects for new companies to come in and shake the industry, specifically around generative AI. I think there's a few different layers here. One is the infrastructure layer. You mentioned Amazon and Microsoft and so on. They're all playing on the hardware infrastructure layer. So you know NVIDIA, microsoft, amazon they either provide the hardware or the cloud infrastructure to train these models. And these models are very, very, very expensive and resource-efficient, resource costly to both train but also use. So that's a huge opportunity and there's a lot of incumbents. They are, like you know, nvidia recently hitting the trillion-dollar market cap Club. I think it is a great example of that. But there'll also be startups coming in that build better hardware, better inference-optimised hardware and so on. There's a lot of companies now tackling that space.

Pascal Weinberger: Then you have the model layer, which is, you know, openai being the famous one, but a lot of other companies that people use every day, like NotionAI, for example, doesn't actually use OpenAI in the background. They use others, like Anthrofic, and you mentioned Coher. Before There's, I'll have Alpha, there's like, at this point, 20 plus maybe 50 companies that are focusing on building either general or application-specific language models, and I think there'll be tens more. This will be a market where, similar to cloud computing, where it's not going to be OpenAI wins and takes it all, but there'll be, you know, a handful you know not hundreds, but a handful of players that are going to be significant there. And then after that, you have the application-specific layer right, which is going to be, you know, the jazz buzz of this world that focuses on writing. You have the NotionAI's of this world that focus on their specific platform, generative AI technology, i think.

Pascal Weinberger: I think that's also where you will see the Microsoft co-pilot or the GitHub co-pilot and other technologies like that play a role. It's very application-specific, and then what we try to focus on is kind of the cross-platform layer. So now, between your GitHub and between your Microsoft and between your Coder and between your Airtable and whatever tools you're using, you still end up having 50 tabs open and you copy-paste data around and move it around. And that's this specific layer that we are trying to focus on and solve for, as is SAP, pm2 path and other players, but that's kind of the way I think about the generative AI opportunities. There's many different layers. In each of these layers, you see both incumbents grabbing massive market share and opportunity there, but also there's a lot of space for startups just doing it better and faster and bringing new ideas and technologies into the mix. And that's, I think, as an industry, that's how we're going to move. And that's how we've moved so quickly from 2017, where transformers were a cool technology idea but not engineered, to the scale that we are today.

Pascal Weinberger: And I think, like Sam and a few others from OpenAI Greg and so on famously said this a few times is that at this point, openai is much more of an engineering company than a research company, where essentially, they and others are taking existing models and they figure out how to scale them, and it's super important. But at the same time, we need new ideas. Maybe transformers aren't what is going to get us to general intelligence. I personally don't think it's going to be like the final AI algorithm and that's it, and we only scale it and we're done. I think there's a handful of very interesting approaches around symbolic AI, like capsule networks. That Jeffrey Hinton presented a couple of years ago I think is a very interesting approach. There's a handful of cool ideas that are out there that haven't been scaled yet. That could be very promising, but no one really knows. But I think that's really important to have a handful of approaches in the game at any given point in time.

Craig Smith: Yeah, well, that's interesting too about the transformers, not the master algorithm, no one really knows.

Pascal Weinberger: Honestly, if you had asked me five years ago I would have not thought that would get as far as we go today. And a lot of people are with it. I had a lot of conversations with Gary, Marcus and Sam and Greg and a few other people in the space at the time. I don't think anyone thought that we would get this far with just a quote and you know there's a lot of improvements that were made on the original Transformers idea and so on, but with this basic idea But yeah, let's see I mean, no one can really predict the future.

Craig Smith: Yeah, i mean it's intriguing because it's it's it's been so impactful and Aiden Gomez was saying That it could have been a different algorithm that one of the reasons it's been so impactful is that the community picked it up and and developed it and built infrastructure around it, and now there's you know there's a critical mass there that's propelling it for, but they're, and it's a fascinating thought that there could be dozens of equally powerful algorithms yet to be discovered.

Pascal Weinberger: So I think one thing that's really important, also that the transformer has gone for itself, is that it's uniquely fit for the current infrastructure. We have, you know, massively parallelized GPU training and influence. There's a lot of other algorithms that theoretically are very promising, but they just don't scale as well on the current infrastructure. So I think there's a bunch of realities that kind of came together: the hardware infrastructure, the cloud computing reality, the hyperscalers algorithm side and so on that brought together this unique moment and opportunity and time that made this possible. But yeah, they could. you know now like there's a lot of research and engineering going into quantum computing Same thing with optical computing, ships that use photons for infants and stuff, electrons that allow for very different parallelization profiles And I think, as you see that developing, i think that opens up a lot new, different opportunities for other technology stacks.

Craig Smith: Yeah, yeah, if it works quantum I'm a quantum sceptic personally, but the timeline is something we could argue about, yeah.

Craig Smith: Yeah, so. So with Bardeen is it continuing to develop, and maybe just you already did. But give kind of a succinct introduction into what Bardeen does. It operates as a browser extension. I use it and I like it, so that you don't leave your browser right And and then it it has a lot of pre built what you guys call auto books, i think, and then you can create your own, either with this drag and drop interface or through conversational AI though, which you guys call the magic box, where you just type in what you want it to do and it doesn't.

Craig Smith: Where do you go from here? Personally, I think there's a lot of development yet to be done on the UI, but where? Where does it go? where do you see this going? because, and and again, the other thing that that Bardeen does you references that it looks at what's in your browser, so it creates things that are contextual, as you say, that are drawing information from whatever is open on your browser, whether that's an email or a website or something like that. I can see this idea of you know, there are all these different applications that currently don't talk to one another and generate AI, whether it's Bardeen or Microsoft or open AI itself has the potential to, without asking a user to code or or even drag and drop. It has the potential to be kind of an orchestration layer that you interact with through natural language that can then marshal all of these different applications in a way that they work together. Is it? Am I describing Bardeen accurately and maybe talk about how you see that orchestration layer, or whatever you want to call it, developing?

Pascal Weinberger: Yeah, and then, Greg, I think you did a great job pitching us. Thank you for that, I think you know. Just take a step back like quickly, buddy, where we are today is a browser extension. The idea is that we bring automation to the users and we make it as easy and accessible to use for as many people as possible. So historically, automation was something that was either reserved for fortune 500 companies with the UI paths and RPA tools of this world that come with consultants and large implementation projects and they're very, very powerful but also very complicated to use. Well, for the nerds, so to speak. So people who can use more complicated automation tools or, frankly, can code, then you can automate things. But there's this huge, massive market in the middle of people who are neither of those two and they still have a lot of things that they should be automating. And I found myself and my co-founder found ourselves in that market where, yeah, we could probably have coded unique solutions to each of those problems, but then the time, investment and the inertia and energy involved and that's just not worth it a lot of times. So that's kind of what we're trying to solve for, i think, the unique kind of the big movement here is that, like, things are moving in the browser, like all the new applications, all the billion dollar companies that we're talking about these days, they're all web apps, or at least like web native apps, that come with their APIs and they sit in the browser. So I think the browser for at least most knowledge workers excluding some very specialised tools like the code editors or FIGMAS and so on of this world even FIGMAS actually a lot of the like uniquely specialised tools still are outside of it. But most of this like common admin, wide caller, like busy work today already happens in the browser. So that's why we said, like okay, we start in the browser, we build a browser extension, bring it to the, where the users make it uniquely accessible and easy to use, and that's kind of where we are today. We integrate with roughly 70 of the most commonly used workflow tools, from air table notion, google calendar, slack you name it and then we can, as you mentioned, also read and write data to the current website or other tabs that are open in your browser, so that it's again contextual and understands what you're at. We ship the product with hundreds of at the same point, i think 703, build automations that are all the common workflows that either we ourselves or user community of over 150,000 users has asked us to build or build in the community, and then users can then easy to use visual drag and drop, build out of language, build their own automation. So that's kind of by Dean as it is today.

Pascal Weinberger: I love the word that you used as an orchestrator. That was actually in the first pitch deck for the seed one that we wrote was basically, if you think about it, I think the high level analogy here is like the web before search engines. You had to know the URL of the website that you wanted to go to, or even the IP address, sometimes for DNS, and you had to like, go to like yellow pages and then look for the certain thing on the yellow pages and you were kind of orchestrating the web. And then search engines came along And now all you do is you go to the search engine and then the search engine looks in this vast universe of applications and does the orchestration work for your search query. And I think now for this, like the idea of the action rapper, whatever you want to call it, with all your web apps like slacks and javas and so on. Like you, we're still in this pre search engine age where I have to go to java and I have to create a ticket in java and then I have to go to slag dot com. I have to copy paste the link from java to send it to the engineering channel and slag, where I'm basically orchestrating the workflow. What you know we just talked about in the search engine. So I think what, what we're working on, or the long term idea here, is to become this quote on search engine against bad analogy for the orchestration layer for this like new action web of, like the services that we use in our everyday life, and we do that today already, in the sense that you know you're on that LinkedIn profile page, you want to write an outreach email to someone with by Dean today, if you have a pre built automation for that, or you can build a pre built automation simply by typing what you want to do on the LinkedIn page in the magic box And then we will do the copy pasting and, you know, send the email for you in the background, without you having to switch tabs or lose context and therefore lose flow, which a lot of people you know. It's a lot of distraction and people get distracted, workflow productivity goes down, and so on. It's a huge loss to the economy and to companies globally if people are content constantly switching tabs and context. Therefore, and that's kind of like what we're going for Long term, the idea is to make it simpler.

Pascal Weinberger: So you mentioned that there's a lot of improvement to do in the UI and the UX. I totally agree with that. You know, we're a small company, less than 30 people. Today we're just getting started with this. The product is out there. Since we're here today we're creating quickly based on user fit pick. But there's a lot of work to do And I think the direction in which we want to take it is to make it more and more accessible to people.

Pascal Weinberger: So today is already easier by just typing, like what you want to do.

Pascal Weinberger: So next step maybe you don't even have to type.

Pascal Weinberger: Maybe we can intelligently suggest to you and we already have this in preview with some users where we can suggest to you what we think the right automation is for what you're doing. So if we see you copy pasting data from LinkedIn to Google Sheets so building your recruiting pipeline on Google Sheets, or something like that Then we could pop up and say, like hey crack, like I see a copy pasting data from LinkedIn to Google Sheets let me take care of that for you and it suggests the right automation in the context, or even learns it, based on like unique behaviour that you have. So I think like the long term vision here is really just to make it easier for everyone to automate their workflows And with that, our goal really is to like make like life and work easier and save time for millions and millions of people, which ultimately saves, you know, money and productivity for the companies and so on. It's a huge value proposition for them, but it also is just annoying for people like you and me to do those things.

Craig Smith: Yeah, on the, and I've only used it for very simple automations, but Is it possible today? And first of all, have you played with auto GPT or baby Yeah or any of those? Yeah, they're, they're fascinating. I mean the. my experience is very imperfect, i think largely because GPT for is still you know, hallucinates quite a bit.

Craig Smith: So Auto GPT picks that up and then it's got to work it out and you end up in these loops. And is it So? is it possible with Bardeen, to, for example, extract data from a LinkedIn page, compose an eba email using open AI and then send the email Through Gmail or whatever your email client is? Is it possible to set it up so it does that automatically on a recurring basis? Maybe every reason I ask personally. I have a Newsletter, not a very sophisticated newsletter, it's AI generated has been for years using a System called primer dot AI, which was an early Early, i'm not sure which way you categorise. It wasn't generative, but it's sort of text mining AI.

Craig Smith: And You know I've been playing with auto GPT to get it to scan Archive papers. Go to semantic scholar, you know, get the rank of the papers by, say, citation. Go to Twitter or Primarily Twitter and get a sentiment analysis for any mentions of the paper, rank the papers according to those two metrics and then output it in a newsletter format with a Link to the paper, a summary of the paper, the rank and that sort of thing. I Haven't gotten out of GPT. Yeah, to do that Is that something I mean. Can you set up those kinds of complex workflows and Put it on a schedule, like it does every Monday?

Pascal Weinberger: Yep Yeah so that's actually like we Differentiate between two core types of automations. One is the contextually triggered automations. That's the I'm on your LinkedIn profile and I think you're a cool candidate and I want to reach out to you, so I just click the button when I'm on your profile and trigger it that way, and then you have to schedule to our triggered ones, which is that every time I get a new email that contains the word bug, i want to get the email, create a jewer ticket, send it to my slack engineering channel and reply to the person that sent me the bug report and Think them for reporting the bug and tell them that we're working on it. Those types of automations are kind of like triggered automations. They can also be time triggers where, as you say, it's like every morning, 8 am In the morning, I can run an automation that does something. So that's certainly like something that's possible within.

Pascal Weinberger: Bardeen Does a quick comment on the kind of agent based automation models like baby GPT, auto GPT and the hundreds of other models that are out there. I think, as you pointed out, the challenge with that is that these models hallucinate And I think they will be hallucinating for a long period of time. You know, fundamentally one transformer models do is they, you know, kind of like predict the next token, essentially, and then in sequence of text, and then they do something with that. And that fundamentally, is kind of like chaos theory, governed regime, right, like where you have a small perturbation and your input, or the small perturbation and the latent space of the model, and That creates like a huge like divergence and output, and that's something that I think the models will have to tackle with for a long time. So what you don't want to do is you don't want to rely on those models at one time, meaning that when you actually execute the automation, you want it to be deterministic, you want it to work the exact same way every time. I want to be able to debug it when it sends it to the wrong email address. I want to know where and how and why that's happening and want to be able to edit it in a way that it never does that again. And that's something that fundamentally, you just cannot do with language models today.

Pascal Weinberger: So what we differentiate is we say we use the models for build time, which is getting you from your intent, either in language or an action or an, you know expressed in the builder or something like that. I get you from your intent to the actual automation script and then, once I have the automation script, it's a bit of a subnormal program. You can think about it like a you know program on your computer That it will always do the exact same thing every single time. There's zero ambiguity there. There may be some AI modules in there where it calls out to an open AI API to generate the email and so on, but the sequence in which it does it in the way it does it is deterministic. It doesn't change and therefore it's much more reliable, it's debuggable and it's also frankly, like cheaper and better in one time where you don't have to rely on the cloud models to do it For you. So that's kind of the way we built these automations and I think these baby AGI and agent based learning tools are really cool. It's a cool direction of research, like we play around with it in the team a lot.

Pascal Weinberger: I personally I'm a big fan of these models. We talked to a lot of those founders and so on. I don't think they're fit for purpose yet for Automation and even if they are and there's a bunch of companies that are trying this like adept on AI and others that are trying to do The end-to-end automation Flow. I think of that. That will be much more like a documentation on steroids case. But I don't know how to do something on Photoshop, like I don't really use Photoshop, but the other day I wanted to edit a photo on Photoshop. They have 50 different sub menus, which are really complicated to understand.

Pascal Weinberger: I do Google and watch a YouTube video to figure out how to do it, but like that's where I would want a box that I can say, like I want to remove the background and we like make the transparency to zero And then the model does it for me and I just watched the model do it the first time, so next time I can do it manually.

Pascal Weinberger: It's actually faster for me to do it manually once I know how to do it, but I just need to figure out how to do it. That's kind of, i think, where these like enter and agent based models can play a huge role, to kind of Like be documentation on steroids. But if it's something that's repeating and it's a high accuracy process that I don't want to mess up, then I think the approach where you have deterministic execution is much more favourable And that's kind of like what we are working towards. And then, yeah, you can trigger them manually or you can have them scheduled. I can actually, if we wanted. Like, if you want to follow up on that offline, I'm happy to try to build that.

Craig Smith: Yeah, maybe, i maybe.

Pascal Weinberger: I'm on the complicated side, but I think it should be possible.

Craig Smith: Yeah, I would. I would love it if and I've seen some other people there's a Couple of new newsletters that have popped up, that That are have figured it out and are scraping archives and yeah.

Pascal Weinberger: I have something for myself that actually looks at Semantic scholar papers in this AI category and, like every morning I get a slack message with the top three papers and the summary of the paper. We don't actually generate the summary, like Semantic scholar does a great job at just exactly the architect of the paper And then I just get them a slack message and it's kind of like more morning briefing and every time I see something interesting I can click into it but how?

Craig Smith: oh? so it's using the semantic scholar ranking.

Pascal Weinberger: Yeah, it's just they do, I think, a great job at ranking.

Craig Smith: Yeah, okay, well, let's leave that here. I have to ask the big question that's looming over all of this. Yeah, in my opinion, this risk debate has gotten out of hand. I got a call yesterday from a friend who doesn't even have an iPhone. I mean, he is not involved in tech at all. You know, he, he man, he owns and manages real estate. I pick up the phone and he says ‘extinction event?’ You know, and it's, it's like everywhere. I just think this debate is not helpful, or at least having an in such a public way. But what you're describing is setting up automations that can send emails, post to Twitter, do things like that? Are you concerned about the message at all, about misuses of those applications?

Pascal Weinberger: Yeah. So I think, like two comments to that point right. One is, in our specific case, everything Bardeen does or ever will do is explicitly on users Commands. You know, either they tell us in the magic box and then, even with the language driven automation command, we still, like, we have this verification step, if you will, where we show what we think the user wants to do and we ask them, like Is this exactly what you want to do? thumbs up, thumbs down? if thumbs down, please edit it, make it what you want, and then we'll run it for you. So I think, like we. Because I understand and we as a team, like we understand that the technology is, it's very powerful, super amazing, very exciting, but it's not fully matured yet.

Pascal Weinberger: So there's still some risks about hallucination, models, making stuff up, etc. That's like you want to have a certain human in the loop control layer And like we have that built into the product, so, Bardeen will never do anything that you don't tell us to do. So from that perspective, like, of course it can be misused, the same way that you can misuse slack or email to spam people or anything else. I think any technology that's powerful can be misused in some ways. We try to make it very hard to do that, like we have certain mechanisms in place that just make it very hard to misuse it. I think the tool, from an AI perspective, will never kind of go wake and do things that you don't want it to do, so I think, from that perspective, it is safe. However, i think it is very healthy to have a debate in the public about, like, the risks of this technology, the same way that we should have debates about the risk of any technology You know, like, frankly, internet computer vision I remember six, seven years ago there was not as loud because I think this language just gets to people a lot more where it's more accessible In the sense, like through chat, gpt and so on. Like you know, my mom and bus driver sees it and some people who are typically not Early adopters of technology that hasn't fully matured yet, they now are using this technology. So they see, like not fully mature technology and that starts to spark a very different angle of debate. But I think it's very healthy to talk about it as a society.

Pascal Weinberger: I personally think it's a very powerful tool and I mean, can it be misused, probably the same way that other tools can be misused. Can you know if the internet, famously, or email can famously be misused to hack people's identities and steal people's credit card information and everything You know? I think that's just kind of a risk and I'm happy that we have a public debate about this and that the leaders in this technology both you know, with Sam Altman and the company around OpenAI and Google and Microsoft and all those big players that are implementing measures to make it hard to misuse this technology. So I'm very happy about that. Should we be regulating in the sense that We stop technology advances? There was a debate a couple weeks ago, if you remember, about stopping the training of language models. I think that stuff is not necessarily useful because someone's going to do it anyway, you know, maybe outside of the US and other countries like China, Russia, you name it. At that point you just handicap yourself. So I think that's not super useful, but having a debate about it is certainly important.

Pascal Weinberger: I think AI and generative AI in general, like the mass progress we've seen in the last couple of years, hopefully will continue and that's already something that has made not only cool kind of productivity applications or cool toy applications Chat to Peter but also in the medical Space, on the, you know, like For people like elderly care, to handle loneliness of people, like to handle education, like there's so many very, very impactful applications that are now kind of leapfrogging because of the new technology that that I'm personally super excited about.

Pascal Weinberger: Like, if you like, one very close friend of mine is working on something that uses language technology to understand research papers for the human proteomics, so like how your proteins interact with each other, which is a cause for a lot of diseases and Issues that people have in health care. And there's like so many papers published every day around this. Like It's impossible for any given human to stay up to date on the research. But like, with these language technology tools, you can actually extract a lot of interesting Knowledge data from those papers that are being published and then aggregate them in the model that you can query against for Testing, drugs testing, clinical trials and so on. So I think those types of things are extremely powerful and they're going to have a huge impact. That's what I'm excited about, obviously also in the productivity space and just making our lives easier and more accessible. But, yes, it's very good to have a debate about it. I think yeah.

Craig Smith: Okay, well, let's leave it there, okay.

Pascal Weinberger: That's great thanks, yeah, good talk to you. Cheers, cheers.