AI ECOSYSTEMS

Israel: (AI) Startup Nation?

Israeli Artificial Intelligence Startups and Their Ecosystem

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Artificial intelligence (AI) technologies enhance machines with the ability to “think”, to improve operational efficiency, to streamline processes, and to solve complex problems. Nowadays, AI captures the imagination and interest of entrepreneurs, investors, businesses, and consumers alike. However, the term AI is not new. In fact, it was coined by John McCarthy in 1956, at a conference at Dartmouth College, NH, USA. For decades AI was merely an academic discipline, and research was performed in labs by a modest community of devoted scientists. However, in the last decade, AI has arisen as a leading transformational technology and a prominent factor in the fourth industrial revolution.

Indeed, AI has become an inseparable part of modern life, affecting areas such as transportation, healthcare, banking, shopping, and security, to name a few. AI already automates work tasks that were previously performed by employees at the workplace; AI software and hardware increase vehicle’s safety; algorithms guide the marketing of products and services; AI is ubiquitous – chances are that it already has a major impact on your daily life. In proceeding years and decades, AI technologies will likely transform our future. Evidently, the AI market is booming! It is predicted that in 5 years, by 2025, the cumulative worth of the global AI market will exceed $30 billion.

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In this rapidly growing industry, where does Israel stand? Referred to as the “startup nation”, it should not surprise that AI, and AI startups, are flourishing in Israel. According to a *Business Facilities* report from July 2019, Israel is a leading player in Artificial Intelligence, and Tel Aviv is an Emerging AI Hub. Specifically, the report ranked Israel sixth for AI (US, China and UK were at the top ranks). In the emerging AI hubs, Tel Aviv ranked seventh, where the six top hubs were Beijing, San Francisco, London, Shanghai, New York and Toronto. Given its modest size, Israel’s AI rank is impressive. Indeed, on a per capita basis, it is significantly above everyone else.

We would like to get a better understanding of these numbers, and of the Israeli AI ecosystem at large. A leading data source on this ecosystem is StartupHub.ai. According to StartupHub.ai, Israeli startups raised this year around $7 billion, and the pace of funding is accelerating. Estimates are that more than 800 Israeli startups use AI technology as a core part of their offering—about five times the number since 2014. AI startups in Israel span almost all AI technologies and application domains. Prominent AI technologies in this ecosystem are machine learning, natural language processing and computer vision. Significant application domains include healthcare, fintech, automotive, agritech, enterprise, marketing, retail, and core AI technologies. In the Israeli AI ecosystem, each such application domain includes dozens, if not hundreds, of companies.

It is important to note that the proliferation of AI technologies spans beyond startups. Several international corporations (e.g., Intel, Nvidia, Microsoft, Google, General Motors, Siemens, IBM, Citi) are operating research labs in Israel, with much focus on AI. Venture capitalists are flocking to Israel, bringing big capital with them. This further accelerate the growth of the Israeli AI ecosystem.

There are additional contributors to the Israeli AI ecosystem. For it to flourish, highly skilled AI personnel are required. Apparently, Israeli universities are an excellent source of such skilled people. Computer science and engineering departments are ranked very high internationally, and many of their academic staff members are prominent AI researchers. As a result, the level and quality of AI skill among university graduates is very high. Additionally, the Israeli society is very well connected. As a result, close connections between university professors and the industry are ubiquitous. As a result, one may find multiple joint ventures, be it in the form of a research project, or a development of a new technology. You would additionally observe bi-directional migration of experts from universities to the industry and vise versa. This, of course, bring state of the art AI technologies from academia to industry, and exposes the academia to challenging problems tackled by the industry.

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In addition to the close relationships among different players in the ecosystem, some university professors become entrepreneurs themselves. A most prominent example is Prof. Amnon Shashua, one of the founders of Mobileye. Founded in 1999, Mobileye has become a global leader in the development of vision technologies for driver assistance and autonomic vehicles. The company was bought by Intel corporation in 2017 for $15.3 Billion, an unprecedented sum for an AI startup. Interestingly, the founders, Prof. Shashua and Mr. Aviram, have started up in 2010 another artificial vision venture, OrCam, whose market valuation is already at $1 Billion. Jerusalem based OrCam uses artificial vision to enable visually impaired and blind people to read text, recognize faces and identify products. This example is not anecdotal: many AI professors are involved in AI startups, thus providing the local AI industry with high quality, up to date, AI knowledge and skills.

AI week

To exemplify the diversity of the Israeli AI startup ecosystem, I'd describe a few. However, for such a report to be up to date, one needs to get to the field and explore. Fortunately, at the time of writing this article, the Israeli AI week event took place at Tel Aviv University. By attending this event, I was able to meet industrialists, academia people, venture capitalists and government agents, all taking part in AI research and practice.

Firstly, I attended the SparkBeyond booth. There, not too surprisingly, I met an old-days colleague of mine (such encounters are very frequent in this ecosystem). In the past we had some joint AI research initiatives, and now he is a technology leader at SparkBeyond. Founded in 2013, SparkBeyond develops and offers a state-of-the-art AI problem solver. Their technology is already in use by many fortune-500 companies across industries such as finance, pharmaceuticals, retail and many others. It is used for risk analysis, fraud analysis, cross-sell and up-sell, demand forecasting, and many other problems. It interfaces with a very wide range of data types, and copes well with big data too. This is a success example of a core AI technology startup.

Another company I visited was Binah.ai. That company is developing an application – a smartphone application. Initially it sounds like an old school company. Who develops apps nowadays? But then, after a short demonstration, you will most likely change your mind. The Vital Signs Monitoring app takes a 20 seconds facial shot of a person, and within seconds provides an array of medical-grade measures of vital physiological parameters of that person, including, for example, mental stress, blood pressure, heart rate, respiration and oxygen saturation. This real-time AI capability that can work with any connected camera provides an unmatched capability for remote healthcare. The application was tested clinically, and an FDA approval is expected soon.

Yet another company is Cognata, whose main business is autonomous driving simulation. Established in 2016, this startup has already raised about $24 Million, and has established strategic cooperation with leading companies in the autonomous vehicles industry. Cognata is located in Rehovot, just next to Weizmann Institute, which is a prominent international research institute. Inevitably, such collocation facilitates knowledge and skill sharing. Cognata is an example of leadership in automotive AI technologies, and of the advantages of proximity to knowledge hubs.

Having met companies that focus on artificial vision and others that focus on healthcare, Magentiq Eye was an appealing combination thereof. Established in 2014, the company has developed a diagnostic technology based on computer vision and deep machine learning, that can identify polyps and cancer during a colonoscopy procedure. The technology is now in field trials. Once widely used, it could likely help doctors diagnose early on, treat cure millions of people worldwide. The CEO of Magentiq Eye, Dror Zur, holds a doctorate in computer vision from the Weizmann Institute, and MSc and BSc from the Technion. The company works in close collaboration with a major hospital and a medicine faculty. In this case we can observe the flow of skill from top research institutes to the AI industry, and the ongoing collaboration between AI startups and academia.

What about AI for retail? Shoodoo Analytics provides answers. The company was established in 2015 and raised $1.55 Million seed money in two rounds. It offers cloud-based “analytics-as-a-service”. That is, via its service, its customers – companies of any size, can perform a wide range of analytics in support of their business process. At this stage, it appears that their main cliental is from the retail industry. According to Deloitte Israel, Shoodoo’s predictive analytics is “changing the retail tech landscape”.

In the transportation industry we also find Optibus. Using AI technologies, this Tel Aviv-based startup (est. 2011) provides online transportation scheduling and optimization. The system streamlines large-scale transportation systems, including multi-route, multi-driver optimized scheduling. The demonstration is impressive: even for large and complex systems, a schedule is computed in a matter of seconds. The Optibus solution is already deployed in at dozens of sites across the globe. It has received several prizes, including the European Commission’s Seal of Excellence and the 2016 Red Herring Top 100 global prize.

As we exemplify, there are multiple AI-centered startup companies in Israel, spanning across AI technologies and application domains. However, there are some other enterprises that do not appear as AI companies but are essential for the ecosystem. For example, Intel and Nvidia, both leaders in the processor industry, are very active in the Israeli AI ecosystem. They do not only provide the processors on which AI software will execute. They also have AI research groups that relentlessly work to make their technology AI ready.

Both companies, and other AI infrastructure providers too, interact closely with the local AI community to identify its needs early on, and to expose the AI community to their state-of-the-art AI offerings. For example, Intel is supporting AI educational activities in Israeli universities. Nvidia develops open source AI software and shares it with the community. As in startups, there is an ongoing flow of skill and knowledge from academia to industry and

vise versa. For example, at the Israeli AI week, I met a professor from my university who is now on temporary leave, whose role now is the lead of the AI research group at Nvidia.

Some informal inputs

Having surveyed multiple players in the AI ecosystem, I must add some informal inputs gathered while mingling over coffee at the Israeli AI week. Many attribute some of the technological success of the ecosystem to high-quality technology units that operate in the Israel military. Indeed, some very successful startups, with focus on AI and other technologies, were founded and led by veterans of such technology units. However, there is no “control experiment” here to verify this claim. Is it those special people that make up those units, or do the units generate such special people?

Others suggest that there is something in the local culture that make a difference. Children are considered very important in Israeli society. Hence, parent make their utmost to invest in their education. Additionally, intellectual achievements were always highly considered, and post-graduate studies are very common. Not only that, thinking “out of the box” is also perceived as common cultural pattern. This promotes innovation. The cultural willingness to take risk and to accept failure (and that to retry), leads to entrepreneurship. Combined, you get a startup nation, and a booming AI industry.

In summary, the Israeli AI ecosystem has facilitated the growth of the largest number of AI startups per capita. The ecosystem includes more than 800 startups; it includes dozens of AI research centers of leading international corporations; billions of dollars are raised yearly, and venture capitalist are flocking to Israel; highly skilled personal from academia and from military units are available; the government provides support via research funds, incubation, acceleration and tax breaks; the cultural promotes innovation and entrepreneurship, as well is cooperation and information flow. This array of properties not only explains the leadership we observe now, it also affords potential for further growth. Forecast are always not much more than educated guesses. Nevertheless, the forecast for the number of AI startups, and the funds raised, is for 15-20% growth per annum for the coming 5 years.

Yet, there are two major prohibitors in the way to such growth. Both surround manpower. Firstly, the cost of highly skilled employees in the AI industry has soared. As a result, some ventures are to expensive to execute in Israel. Secondly, there is manpower shortage. Government officials understand that for the high-tech and the AI sectors to grow, the market must be opened to foreign talent. While, for many years, the market was close to foreign talent, nowadays things are starting to change.

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Onn Shehory currently works as an associate professor of information systems at the Graduate School of Business Administration from the Bar Ilan University, Israel. Prior to taking up this position, he was a researcher at IBM Research. He holds a MSc Degree in Physics and the PhD Degree in computer science. His research interests include intelligent information systems, autonomous systems, data analytics, social networks analysis, software engineering and algorithmic game theory.