

**GrowSmart**

Stress free digital well-being for kids

# Project Report

*for*

Engineering Leadership Professional Program  
University of California at Berkeley  
Spring 2021

*by*

Matvey Farber (Applied Materials),  
Trupti Dave (California State University),  
Rajan Verma (Ericsson),  
Rain Lei (Applied Materials),  
and  
Sudarshan Lamkhede (Netflix)<sup>1</sup>

---

<sup>1</sup> Corresponding author

# Abstract

---

In today's world kids want access to the online world for socializing, learning, communications and entertainment. Parents want a peace of mind that their children are using technology in a safe and age appropriate way. Growsmart provides seamless and transparent access for children while enabling parental control via a set of applications for standard android devices. Additionally Growsmart provides a community network of parents, experts and AI enabling collaboration and sharing of device policies for healthy usage for any family. The community suggestions help parents adjust policies as the kids grow. Growsmart is a holistic solution for parental control of mobile devices, low-touch kids accessibility to online content, and community/expert advice on device usage and policies.

## The Need

---

Many parents ask themselves: how can I help my child use technology in the most healthy way? How do I avoid on-the-fly decisions about what is allowed or blocked on my child's device? Parents often seek information from peers or other expert sources. However, it's difficult to integrate the complexity of the existing information in a holistic way that reflects a given family's needs, preferences and values.

Parental concerns change as the kids grow. Younger kids may develop unhealthy habits, or become inadvertently exposed to age-inappropriate content. Teens may choose to bypass digital barricades as a rebellion tactic. There is also risk of children spending money on apps and games without parental approval. These types of concerns are just examples. Untethered usage and access to the digital world can lead to other adverse social and development effects. Parents want and need advice on how best to guide and support their children's technology usage. We came up with a solution - GrowSmart!

## Solution Overview

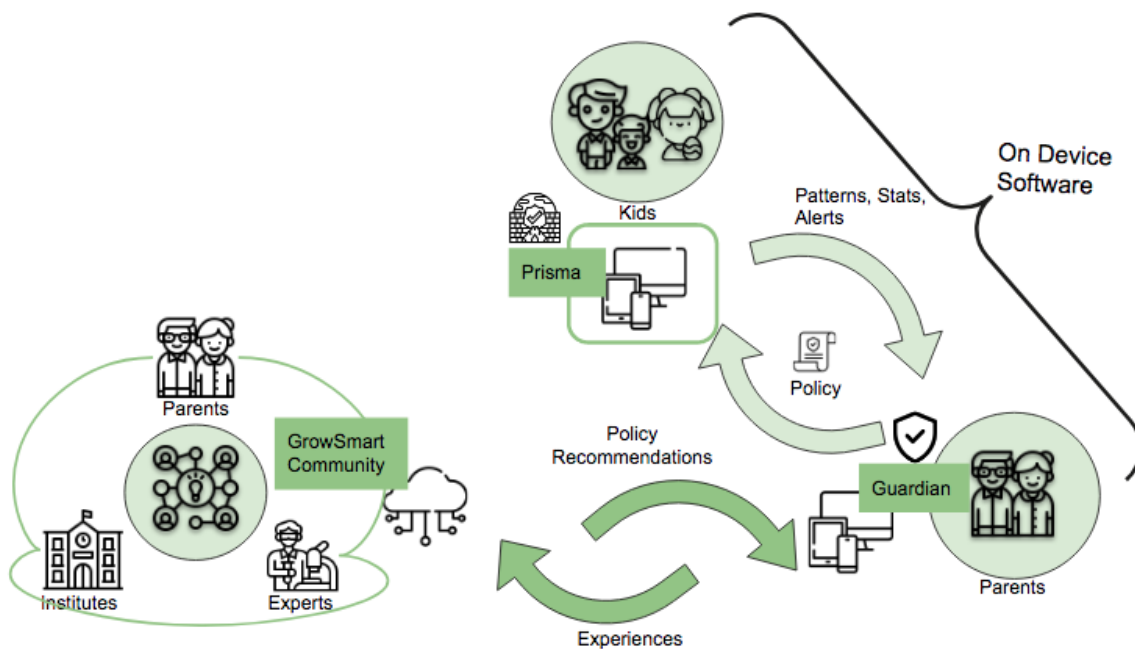
---

GrowSmart is an ecosystem which takes a holistic approach by integrating three key components which allow parents and kids to get the most out of their family digital experience. A robust parental oversight app with state of the art privacy protections

would be installed on a parental device. A kids device software that respects their privacy in an age-appropriate way will be seamlessly integrated on childrens' devices. Lastly, and most importantly, the parental device will have a portal to a community of parents, experts and AI generated policies to help parents navigate settings that work for their families.

GrowSmart ecosystem consists of 3 main components:

- Prisma
- Guardian
- GrowSmart Community

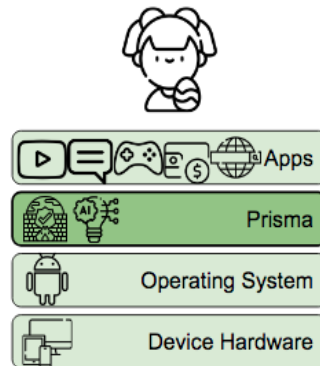


The on-device portion of our ecosystem consists of Prisma & Guardian. Both Prisma and Guardian work hand-in-hand to monitor and control kids' devices. The GrowSmart Community provides an intuitive social platform for parents to learn what has worked or not worked for other parents, seek expert guidance and collaborate to create digital usage policies for their families.

## Prisma

Prisma is an OS extension on kids devices which brings in a seamless experience for the

kids. With full transparency, there are no identifiers for the kids to recognize that Prisma is installed on their device.



Prisma follows the 'Adapt as needed' philosophy: the simplest and most common whitelisted device features are available immediately after installation. Some features can be made available with supervision or authorization from parents via the Guardian application. Prisma provides a full spectrum of possibilities from tightly controlled to fully open with infinite configurability.

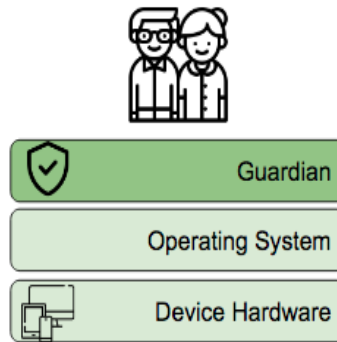
## Features

Several features which are instrumental in making the parental experience more stress-free and aware are made available on Prisma implicitly including but not limited to:

- On-device real-time content monitoring for age-inappropriate content consumption
- Sending monitoring data to parents devices / pre-authorized services in privacy-preserving ways
- Location Tracking
- Screen time limit and on-screen timers
- Family Scheduler and Calendar
- Trusted contacts and 1-touch Emergency button
- Digital wallet
- Near field communication
- Two Factor Authentication for the parent side
- Voice assisted search tools

## Guardian

Guardian is an application on a parent's device which enables monitoring and managing the kids' devices. This centralized parental app allows for customized usage profiles to be created per kid and per device.



It provides additional tools for the visual representation of on-device kids activities by identifying and monitoring “ongoing kids’ interests” while maintaining a level of privacy for the child. Guardian projects keyword cloud/trends mined from typed or spoken text (multimodal) on the kids device. Communication between Prisma and Guardian is done over an encrypted channel. The information metrics are exchanged without transferring any image, video, audio outside of the device.

Guardian, being a central Manager, comes with several capabilities including, but not limited to:

- Granting permission levels for supervising the activities like authorization of application installation
- Blocking/unblocking specific features on the device
- Adding authorized caretakers to the account,
- Policy configuration and adaptation (from policy artifacts)
- Managing the policies per device and per kid
- Access to GrowSmart community
- Individual channels to reach out for expert advice
- Multiple Guardians can manage a single Prisma and vice versa.

## GrowSmart Community

GrowSmart Community brings in the social parenting aspect to the GrowSmart ecosystem. The community includes all the parents who are GrowSmart users (by default) and external parents who are not GrowSmart users. Child behavior experts and institutions will act as a support mechanism for parents to help them collectively understand best practices for shaping their kids’ digital lives.

When you subscribe to the Guardian application (user) or to the GrowSmart application (non-user), you gain access to the community. You can learn from others, share your experiences, publish your policies, and access expert-curated policies. Based on the rich, but anonymized interactions and policy data, our AI algorithms digest user content and increasingly serve better recommendations and insights to all community users. The GrowSmart community uses data science techniques and machine learning algorithms to mine policies from the community based on the criteria set by parents' comfort level.

## Device Onboarding

Device Onboarding (i.e. installation) of Prisma on device and integration of the device with Guardian is initiated via pre-packaged 1-click software installation which can be downloaded on any Android device.

A user signs up for our ecosystem via the Guardian app and then he/she can add their kids' profiles and devices (with Prisma) to manage them centrally. Once the link between your Guardian account and Prisma is authenticated, parents can push parental control policies to Prisma and start receiving alerts and statistics.

### **Policies**

The policies are a set of fine-grained rules and access permissions that control device usage. They can be as simple as screen time limits or as complicated as definitions of age-appropriate content. To get started Guardian suggests you default policies based on the information populated by parents during the signup wizard and gets you started with the most suitable policies for your needs. Customization is allowed at any time.

As a subscriber to the GrowSmart community, all parents get access to central policy artifacts and users can pick the policy that makes sense for their kids. Policies are sorted and differentiated by various parameters such as Age Group or geographical location.

## Technology

Guardian and Prisma apps are based on the Mobile Device Management System, which is an industry standard used by enterprises for controlling corporate issued devices.

Privacy and security aspects are implicit to all components of the GrowSmart ecosystem. The communication between Guardian and Prisma is fully encrypted and totally private. The seamless channel between Guardian and Prisma ensures that policy enforcement is transparent to kids and the on-device intelligence from Prisma helps to monitor age-inappropriate content and threats in real-time to be shared back to the Guardian Application.

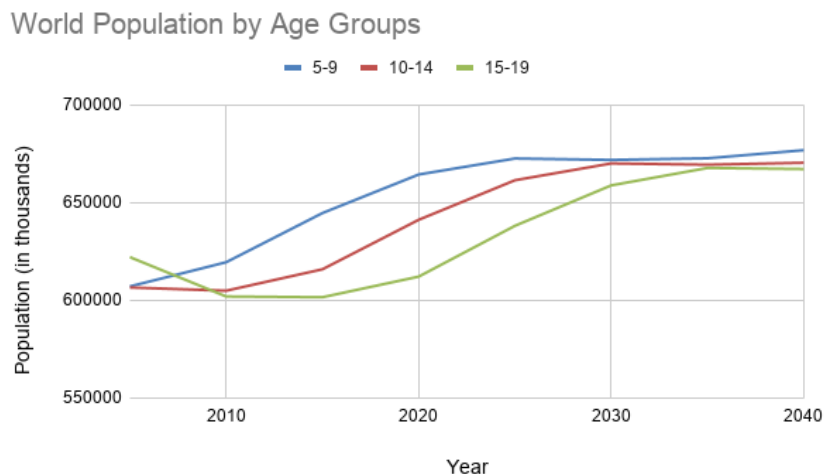
During the early phases of GrowSmart, Prisma software is focusing on Android devices

only. The GrowSmart community is virtually maintained along with our compute infrastructure on a cloud.

## Opportunity and Market Validation

---

Per 2020 census, in the United States alone there are about 54 million kids of age between 5 to 16. Smart devices usage by children increased by almost 14% on average across age groups 8 to 16, between 2015 and 2019 according to the [Common Sense Media Survey](#) about media usage in tweens and teens in 2019. With a subscription of \$2 per kid per device per month, the total available market for GrowSmart is estimated at \$1.3B in the US with the rest of the world market to be 30 times that of the US.



A question arises, parents would want to have the GrowSmart app but what about kids? There should be an open and honest parents-kids trust relationship. Kids should be well informed, should participate willingly while installing parental control apps on their devices.

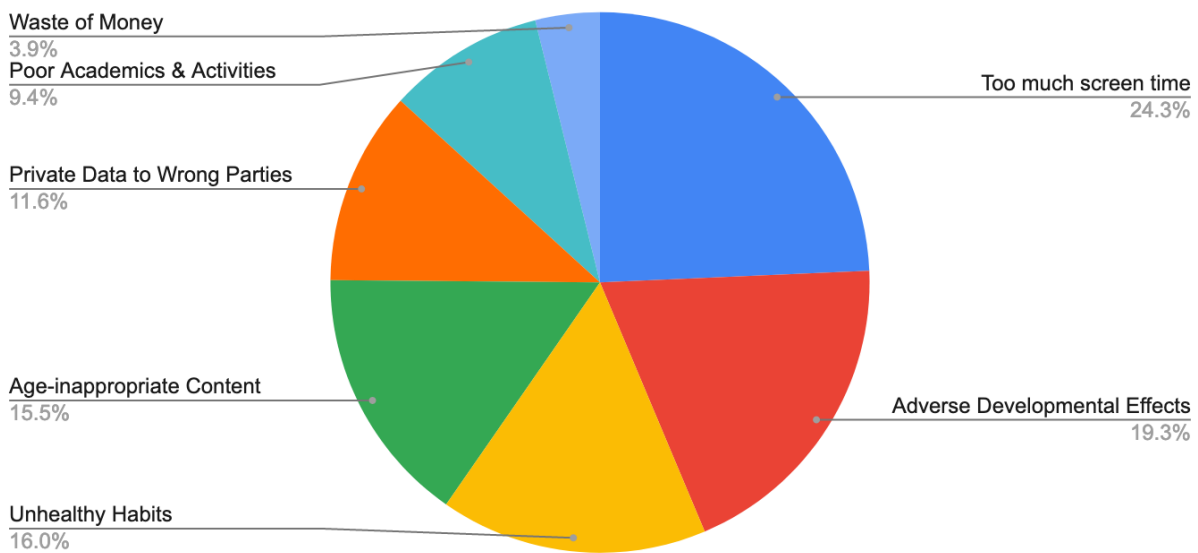
As per [internetmatters.org](#) survey, the majority of teens are in favor of parental controls. The findings released in 2018 by Safer Internet Day, reveal 65% of young people aged 11-16 are in favor of the controls.

Teachers are also concerned about their students' digital health and safety, cyberbullying is their top safety concern as per [internetsafety101.org survey](#). About 54% of teens surveyed have witnessed online bullying with 39% on Facebook, 29% on YouTube, 22% on Twitter, 22% on Instagram. According to a [UNICEF poll](#) one third of young people in

30 countries are among the victims of online bullying with one fifth end up skipping school.

The GrowSmart team circulated a survey among their social networks. Based on seventy responses received, most of the parents are concerned about their kids' screen time, unhealthy habits, and inappropriate content. Close to three quarters of surveyed parents are willing to share the curated policies with the GrowSmart community. 86% of parents agree to receive AI generated recommendations for how best to set their family policies.

### Top Parental Concerns



Based on the survey and considering potential Android users in the United States, the serviceable available market (SAM) for GrowSmart is estimated to be between \$300M and \$432M. Addressing the top ten Designated Market Areas (DMA) in the US at launch the serviceable obtainable market (SOM) is estimated at \$104M.

TAM (Total addressable market) in US = \$24 yearly subscription per kid per device \* 55M accounts (one for each kid in the target demographic)

SAM (Service Addressable Market) = \$24 yearly subscription per kid per device \* 55 million kids in 5-16 age group in US \* 0.78 parents currently monitoring the kids' device usage \* 0.42 android market share in smartphones and tablets in US

SOM (Service Obtainable Market) at the time of public release on Android = SAM \* 0.3 (fraction of US population in top 10 DMAs) \* 0.80 (fraction of parents watching their kids usage but not using any other mobile app)



# Competitive Landscape

Several competitor products are available on the market. A feature comparison among the competition and GrowSmart is presented below based on reviews, customer feedback and product analysis.

GrowSmart has advantages in cost, customization of parental controls, ease of initial setup and the unique Social Parenting Community. By enabling interaction between parents and children as well as introducing flexibility including bonus screen or game time (based on kids' recent good behavior), GrowSmart can win the battle to gain big attraction to the kids.

**Table: Comparison of Competing Solutions**

Product	Downloads <sup>2</sup>	Funding <sup>3</sup>	Cost per month	Parental Controls	Location Tracking	Search Engine integration & monitoring	Initial set-up	Social Parenting	Attraction to kids
<b>OutPact (app)</b>	>500K	-	\$7	Intermediate No on SMS/calls	Yes	Default	Default	No	Privacy
<b>Qustodio (app)</b>	>10K	\$2.5M	>\$4.5	Intermediate No on Calling	Yes	Default	None	No	None
<b>Bark.us (app)</b>	>100K	-	>\$14	Comprehensive	Yes	Default	Default	No	None
<b>Pinwheel (phone + OS + app store + carrier)</b>	-	\$7M	>\$25	Basic No on calls	Yes	No internet browser	Default	No	Special phone with no social media
<b>Gabb (phone + OS + app store + carrier)</b>	-	\$7M	>\$19	Basic No on calls	Yes	No internet browser	Default	No	Special phone with no social media

<sup>2</sup> Download numbers from Google (Android) Play Store as of Apr 1 2021

<sup>3</sup> Funding information from <https://www.crunchbase.com/organization/> as of Apr 1 2021

<b>Family Link (app)</b>	>10M	-	Free	Basic No on Calls	Yes	Default	Default	No	Privacy
<b>GrowSmart (ecosystem)</b>	-	-	\$2	Comprehensive	Yes	AI-powered for Guardian, transparent on Prisma	Age-specific expert recommendation	Yes	Use any device to access any app; Parents access to aggregate data. Bonus screen/Game Time

Legend	BEST	AVERAGE	POOR
--------	------	---------	------

## Rollout Plan

---

GrowSmart will go to market with a phased roll-out approach.

### I) Development

*Approximately 6 to 12 months from starting.*

A minimal viable product will be built with expert crafted policies. Seed policies are required since the community is not yet functional. User testing in the field will begin using this MVP within the first 6 months with invite-only trials starting shortly after.

### II) Limited Trials

*Approximately 12 to 18 months from starting.*

A public Beta is introduced. Simultaneously, the team will build partnerships with educational institutions and start building the GrowSmart community.

### III) Release

*Approximately 18 to 36 months from starting.*

Beta issues will be resolved making the product available for the general public. As the community grows, we can initiate AI based policy recommendations and plan to enrich

the community experience. Partnerships with OEMs and Telcos to bake our solution into their devices. Start development of an iOS version..

#### **IV) Market Capture and Profitability**

*36 months onward.*

Nourishment, upkeep and continuous building of our unique and vibrant community will drive market share increase and turn to profitability.

### **How to seed and grow the community?**

We believe that purpose-built communities such as LinkedIn (Professional) and Nextdoor (Neighborhood) are valuable to its members and are very sticky. Generic social networks such as Facebook and Twitter have large following and allow for the creation of special purpose communities. However, they don't have the right tools available to achieve all goals of a specific community. GrowSmart will add the focus and the tools to a special community of parents, teachers, educational institutes, and experts focused on children's digital health.

The community will work only with real validated identities of the members. For parents this validation would be based on their driving license details. While the accounts for schools, institutes and influencers will be created by the staff and then handed over to the corresponding parties. GrowSmart will have experts on staff who will collaborate and solicit academic and industry experts to contribute to the growth of the community knowledge base.

The community will foster subgroups that correspond to PTAs, neighborhoods, schools, grades etc. while maintaining the ability to make connections with anyone and benefit from all interactions.

At inception the community would mostly be initiated with tester accounts and team member's friends and family accounts. As the basic software implementation delivers the MVP, the team will onboard the more invite-only participants and influencers. Fast iteration will be required to achieve critical mass in the DMAs we are trying to widen our reach in.

At the time of public beta, we would open up this community to anyone who wants to sign in, regardless of whether they have subscribed to the product.

# Marketing Plan

---

We need marketing to reach as many parents and teachers as possible and differentiate ourselves from the competition. GrowSmart will take a four pronged approach to a marketing strategy in accordance with the phased rollout. The target is to gain mindshare within the first couple of years of our venture. Maintaining the customer acquisition as low as possible will enable early success.

**Schools** are the top choice - it's easy to reach parents, teachers and students in bulk. They also provide the right setting to discuss what's good for kids and have parents and teachers act on it. Further some schools provide digital devices to the kids and / or have online instruction. Some examples of low cost marketing centered around schools include: sponsoring Parent Teacher Association (PTA) events, adding adverts to photo-day pamphlets, and providing free accounts. Sponsoring digital devices is a high cost option that may be considered depending on how much leverage we have to minimize costs. We are going to target schools selectively to cover the DMA. Within the top 10 DMAs and select a good combination of (elementary, middle, and high) x (private, public, and charter) schools. We will focus on school-related outreach from Phase 1-3 with a phase-out in Phase 4.

Putting adverts with kids **device protectors** is low cost but highly on target. After all, parents are buying the protectors to safeguard the new devices from your kids. It is the right moment to prompt them about safeguarding the kids from the unintended effects of the devices. GrowSmart will work with top manufacturers to package adverts with a QR code at some fixed price or revenue share agreement. This level of marketing requires a robust product and would be targeted for Phase 2 and onwards.

We can't escape advertising on **app stores and social media** these days but it is costly. Optimizing such campaigns may take some iterations. We will use it sparingly in later stages and compliment it with **endorsements** from experts and institutes like the American Academy of Pediatrics and Common Sense Media. We will also try to get endorsement from celebrity parents with large social media followings. We will put efforts in to get distinguished on various app store platforms by having the editorial choice mark.

The team is in the process of ideating guerrilla **marketing** at select events and DMAs to pique interests.

Lastly, we believe positive word-of-mouth is the most effective form of marketing. So we will build in a referral program into the product from the very beginning.

## Appealing to Kids

GrowSmart must find a way to appeal to kids in order to drive greater adoption. The attractive points to highlight in a made-for-kids commercial on TV are (1) Their privacy is protected to a great degree from their parents - their activities are reported only in the aggregate - no screenshots, no communication capture, etc. (2) The Prisma layer is transparent to their usage and doesn't distract or impede normal usage. (3) The ecosystem is flexible and they would get all age appropriate apps and content allowed as per the policy. (4) GrowSmart allows for the use of any device available for adults - no "kid-specific" or de-featured devices.

## Mission and Vision

---

Our mission is to empower parents through the GrowSmart Community to shape their children's digital habits. However, GrowSmart's vision goes beyond this building and shipping this initial offering. We want to ensure healthy digital lives for our kids. And we believe it's not only a great business opportunity but also the right thing to do for our future generation!

## GrowSmart Team

---

### Matvey Farber

*Manager, Mechanical Engineering, Applied Materials*

[LinkedIn](#) | [Email](#)

Matvey Farber, Manager of the Vacuum Robotics team in the Robotics Center of Excellence at Applied Materials. Started a career working on telescopes, but moved on to design mechanical components for the Semi, Rail and Utilities industries. Manages a team of robotics engineers responsible for the design, integration and validation of automated wafer handling systems in Applied Materials' equipment intended for use in semiconductor fabs. Received a Bachelors in Physics from Northwestern University and a Masters in Mechanical Engineering from the University of Michigan in Ann Arbor.

## Trupti Dave

*Lead Developer/Architect, California State University*

Trupti Dave is the lead developer/architect of data integration, data services projects at the California State University in Monterey, California. She co-chairs a group of data integration technical leads, developers of California State University twenty three campuses who focus on designing, developing internal and external data integrations. Trupti previously worked for Oracle America for nine years in product development group, Clinical Research Organizations - Keck School of Medicine, IQVIA. Trupti received her MS degree from Illinois Institute of Technology (IIT). Her BS degree (with honors) is from the L. D. College of Engineering, India.

## Rajan Verma

*Principal Engineer, Ericsson Inc.*

[LinkedIn](#) | [Email](#)

Rajan Verma, Principal System Engineer at Ericsson Inc, Santa Clara, CA. Currently in the 14th Year within Ericsson. Lived in 4 countries, Started with Ericsson in 2007 at Ericsson India and worked for around 5 years, primarily in a customer facing solution architect role for Telecom Network deployment. Moved to Germany in 2012 and was a cross-functional team leader and part of a newly formed Product development unit for Cloud. In 2016 moved to the USA and since then primarily leading strategic and innovation projects within the silicon valley ecosystem. My current responsibility includes interfacing with Partner/Customer companies like ATT, Verizon, Apple, FB, Netflix, Hyper scale cloud providers etc. and driving technical engagements on 5G and Cloud related solutions from Ericsson's behalf. I am leading a small team of Senior and principal engineers and acting as a Solution responsible for multiple projects in parallel. Received a Bachelor's in Engineering with a major in Electronics.

## Rain Lei

*Director of Process Engg. & Distinguished MTS, Applied Materials* [LinkedIn](#) | [Email](#)

Joined AMAT in 2008 and started working on numerous conductive films by ALD and CVD, which have been implemented into several generations of iPhones. Currently trying to lead a few teams to put a few new metal films into next generation iPhones. Had a bachelor degree in Chemistry and a couple of master degrees in Physical Chemistry and Electrical Engineering. Spent 6 years in TAMU in a PhD program of solid state electronics but haven't finished yet.

# Sudarshan Lamkhede

*Lead Research Engineer, Netflix*

[LinkedIn](#) | [Email](#)

Sudarshan Lamkhede, is the lead research engineer for Netflix's Search where he leads the cross functional team to apply innovative Machine Learning techniques to improve the Search and Recommendation user experience for the ever expanding global Netflix member base. Prior to joining Netflix he was a Principal Research Engineer and a tech lead for Yahoo!'s Web Search where he led several business critical projects that had significant upside to relevance and revenue of Yahoo! Search. His passion is to delight end-users by solving their real-world problems using Machine Learning in an industrial setting and thereby help businesses successfully achieve their goals. He loves building cross-functional teams as well as hiring and mentoring top talent. He received Master of Science (Computer Science) from SUNY at Buffalo and Bachelor of Engineering (Computer Engineering) from University of Pune (India).